NOKUKHANYA ENERGY

Proposed Construction of a 75 MW Solar Photovoltaic (PV) Power Plant near Dennilton, Limpopo Province

Draft Scoping Report

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Revision Number:	1
Checked by:	Rebecca Thomas
Approved:	Rebecca Thomas
Signature:	
For:	SiVEST Environmental Division

KEY PROJECT INFORMATION

FARM DESCRIPTION	21 DIGIT SURVEYOR GENERAL CODE
Portion 182 of the farm Kikvorschfontein 57	T0JS00000000000000182
Remainder 183 of farm Kikvorschfontein 57	T0JS00000000000000183
Portion 191 of the farm Kikvorschfontein 57	T0JS00000000000000191

SITE CO-ORDINATES:				
NORTH-WEST CORNER	**NORTH-EAST CORNER**	**CENTRE POINT**	**SOUTH-WEST CORNER**	**SOUTH-EAST CORNER**
S25° 17' 17.020"	S25° 17' 43.325"	S25° 18' 1.767"	S25° 18' 35.341"	S25° 18' 27.929"
E29° 7' 29.931"	E29° 8' 11.240"	E29° 8' 2.768"	E29° 8' 0.704"	E29° 8' 37.388"

TITLE DEEDS: These will be included within the EIR.

PHOTOGRAPHS OF SITE:

General Characteristics of the study area

TYPE OF TECHNOLOGY: Photovoltaic (PV) panels

STRUCTURE HEIGHT: Estimated to be approximately 3m although the final design details are yet to be confirmed. These details will become available during the EIA phase of the project.

SURFACE AREA TO BE COVERED: The total area of the site is 175 hectares, however the power plant will only require a portion of the site. The final design details are yet to be confirmed. These details will become available during the EIA phase of the project.

STRUCTURE ORIENTATION: Structure will be orientated in a north / north –east / north- west direction.

PV DESIGN: The final design is not available. The final design details are yet to be confirmed. These details will become available during the EIA phase of the project.

FOUNDATION DIMENSIONS: To be confirmed.

TEMPORARY LAYDOWN AREA DIMENSIONS: Approximately 10 000m² is typical. The final design details are yet to be confirmed. These details will become available during the EIA phase of the project.

GENERATION CAPACITY: 75MW

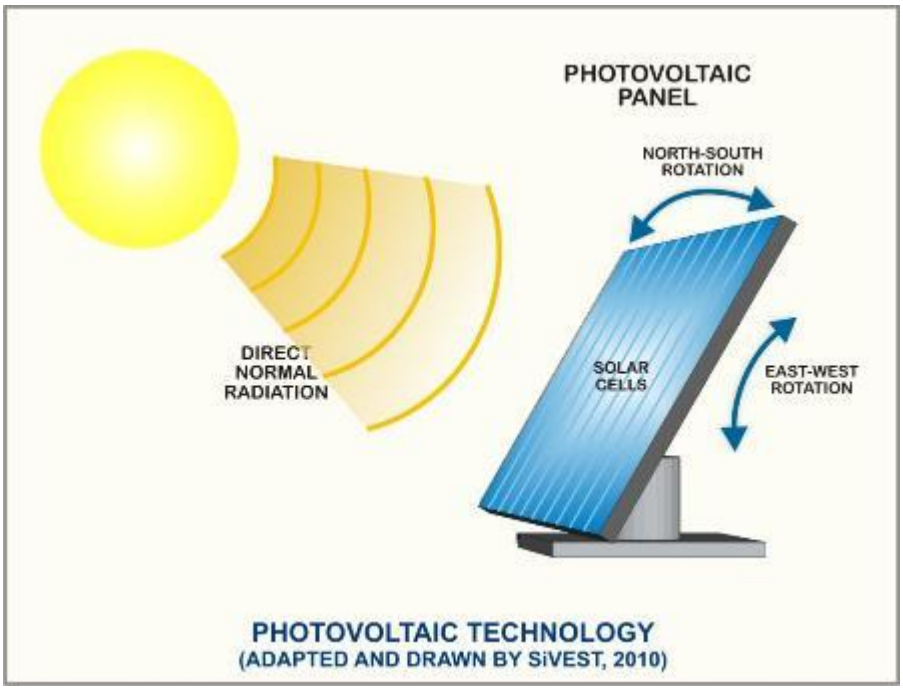

Figure i. Example of a Photovoltaic Panel

A3 Maps of all smaller maps included in the report are included in Appendix 5.

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Executive Summary

Nokukhanya Energy (Pty) Ltd (hereafter referred to as Nokukhanya) intends to develop a solar photovoltaic (PV) power plant and associated infrastructure near Dennilton, Limpopo Province of South Africa (Figure i). SiVEST Environmental Division has been appointed as independent consultants to undertake the Environmental Impact Assessment (EIA) for the proposed solar photovoltaic (PV) power plant and associated infrastructure near Dennilton. The overall objective of the project is to generate electricity to feed into the National Grid by constructing a solar PV power plant (and associated infrastructure).

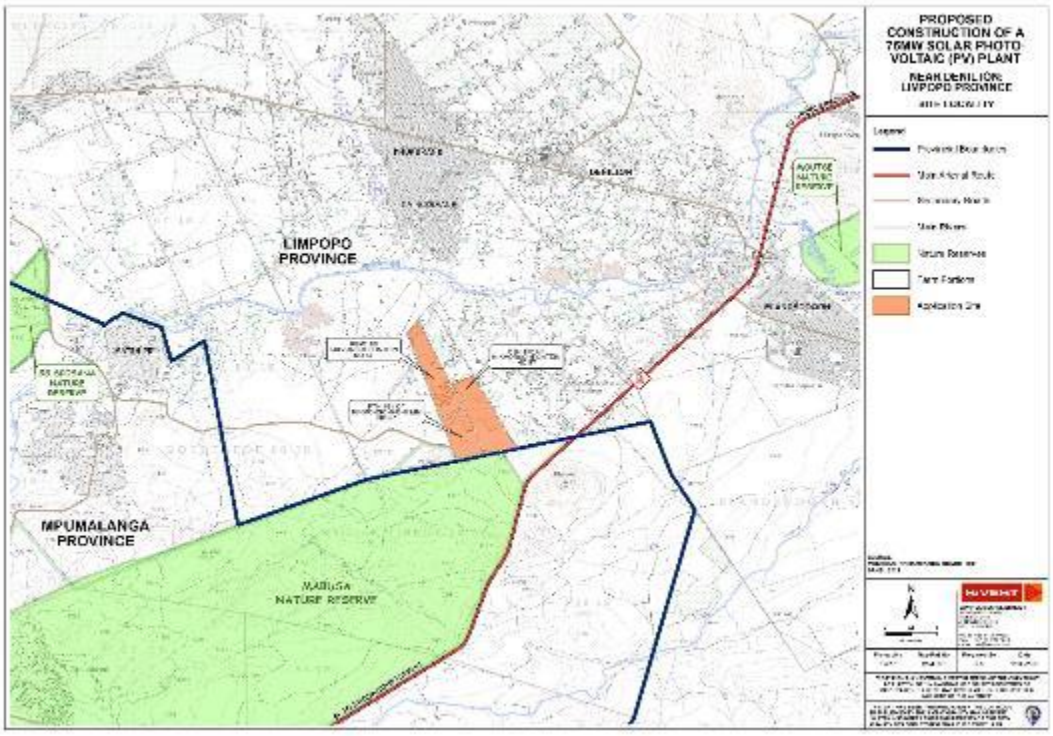

Figure i: PV power plant application site.

SITE CO-ORDINATES:				
NORTH-WEST CORNER	**NORTH-EAST CORNER**	**CENTRE POINT**	**SOUTH-WEST CORNER**	**SOUTH-EAST CORNER**
S25° 17' 17.020"	S25° 17' 43.325"	S25° 18' 1.767"	S25° 18' 35.341"	S25° 18' 27.929"
E29° 7' 29.931"	E29° 8' 11.240"	E29° 8' 2.768"	E29° 8' 0.704"	E29° 8' 37.388"

The proposed development requires Environmental Authorisation from the Department of Environmental Affairs (DEA). However, the provincial authority will also be consulted (i.e. the Limpopo Department of Economic Development, Environment and Tourism - LEDET). The EIA for the proposed development will be conducted in terms of the newly released EIA Regulations promulgated in terms of Chapter 5 NEMA (National Environmental Management Act), which came into effect on the 2nd of August 2010. In terms of these regulations, a full EIA is required for the proposed project. All relevant legislations and guidelines (including Equator Principles) will be consulted during the EIA process and will be complied with at all times.

The following assessments were conducted during the Scoping phase to identify the issues associated with the proposed development. These assessments will also inform the impact assessment to take place in the Impact phase of the project:

- Biodiversity (including fauna, avi-fauna and flora) Assessment
- Surface Water Impact Assessment
- Soils and Agricultural Potential Assessment
- Visual Impact Assessment
- Heritage Assessment
- Socio-economic Impact Assessment
- Geotechnical Assessment

Based on the scoping studies which were conducted, a few potentially sensitive aspects have been identified within the study area. These will be assessed in more detail during the Environmental Impact Assessment (EIA) phase so as to choose the best possible location for the proposed development within the project site. The table below summarises the specialist findings of the Scoping Report.

Biodiversity (Flora, Avi-Fauna and Fauna)	▪ Remaining areas of natural vegetation appear from aerial imagery to have been impacted upon to varying degrees and are not in good condition. ▪ There are two regional vegetation types occurring in the study area, neither vegetation type is listed in the National List of Ecosystems that are threatened and in need of protection

	▪ There is one Near Threatened, one Declining and one Rare plant species that could occur in habitats that are available in the study area. Eight species of protected trees could potentially occur on site, but no protected plants are likely to occur there. ▪ There are no threatened amphibian or reptile species of conservation concern that have a geographical distribution that includes the study area and habitat requirements which are met by those found on site. ▪ There are eleven mammal species and ten bird species of conservation concern that could potentially use the site, mostly for foraging. The protected species, the Black-footed Cat, Brown Hyaena, Serval, Honey Badger, Leopard, Cape Fox, Southern African Hedgehog, Southern African Python and some of the birds (Blue Crane, Grey-crowned Crane, Martial Eagle, Cape Vulture and Lappet-faced Vulture) have a likelihood of occurring on site, but are all, except the Southern African Hedgehog, considered to be mobile animals that are unlikely to be significantly affected by the proposed development of the solar power facility and associated infrastructure
Surface Water	▪ Database findings revealed that two (2) natural channelled valley-bottom wetlands are located within the study area, with several surface water resources located within close proximity to the study area; ▪ The study area spans across a CBA 2, an ESA 1 and ESA 2, as identified by the Limpopo C-Plan V2. ▪ The desktop findings supported the presence of a channelled valley-bottom wetland observed in the database findings. However, this surface water system was observed to be larger in size, and incorporated a larger portion of the study area. Furthermore, the desktop findings revealed an additional surface water resource, in the form of a depression wetland, located within the study area.
Soils and Agricultural Potential	▪ Soils are generally shallow, yellow-brown, structureless, sandy loam to sandy clay loams with low to moderate agricultural potential. ▪ The construction of the photovoltaic plant at the chosen site will have minimal impact on the loss of agricultural land, due to the small percentage (1.6%) of high potential agricultural land indicated by the Land Type survey information. These somewhat deeper soils could occur anywhere within the area of land type Ba4.
Visual	▪ A major portion of the study area has a pastoral visual character and is not valued for its scenic significance. ▪ Overall it can be concluded that the visual impact of the PV plant would be reduced due to the number and nature of visual receptors present and the degree of transformation of the natural environment.

	▪ The facility does not however correspond with the typical land use and would visually contrast with the existing character of the landscape. ▪ Despite the low density of sensitive visual receptors, the nature of visual impacts associated with a PV plant of this size entail that the visual impact exerted on a receptor in the study area could still be significant
Heritage	▪ Archival research and evaluation of aerial photography suggests that the sites may have heritage resources present on the property. ▪ The historical significance of the region with regards to the Ndebele and the proclamation of the KwaNdebele homeland have been described in the background research. The presence of Late Iron Age (LIA) stone walling, on the south western boundary the study area, as well as the numerous historical ruins of African homesteads necessitate extensive fieldwork to evaluate and recommend the necessary mitigation measures, where required. ▪ Due to the age and igneous nature of the Nebo Granite, no fossils will be present and a Low Palaeontological Sensitivity is allocated. No further Palaeontological mitigation is recommended.
Socio-economic	▪ After reviewing all relevant policies on national, provincial and local level, no socio-economic fatal flaws or divergence away from legislation and plans was found, indicating the compliance of the proposed project to national and lower administrative levels objectives. ▪ Tourism is considered as a key sector of the economy of both LMs, which means that any development pursued in the area should be sensitive to the impact on this industry. ▪ The economy and communities of Elias Motsoaledi and Thembisile Hani are in need for investment injection, particularly considering the limited economic base of these municipalities, the stagnation of their economies since the recession in 2009, above average unemployment rates, and high levels of poverty. Both economies need to be diversified and the development of a solar PV plant in the area will offer such an opportunity. ▪ The project will have the potential to contribute to the improvement of the standards of living of the communities living close to the project and increase the employment rate in the area.
Geotechnical	▪ Soils have low bearing capacity at founding level, and therefore collapsible soil fabric; ▪ Inundation could occur as a result of shallow ground water conditions; ▪ Hard excavation conditions are present.

Based on the above mentioned studies, the Scoping Report has identified several aspects that warrant further investigation in the EIR Phase. These are as follows:

- Biodiversity (including fauna, avi-fauna and flora) Assessment
- Surface Water Impact Assessment
- Soils and Agricultural Potential Assessment
- Visual Impact Assessment
- Heritage Assessment
- Socio-economic Impact Assessment
- Geotechnical Assessment

A full comparative assessment of layout alternatives will be undertaken during the EIA phase.

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Glossary of Terms

Alluvial: Resulting from the action of rivers, whereby sedimentary deposits are laid down in river channels, floodplains, lakes, depressions etc.

Biodiversity: The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.

Cultural Significance: This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

Cumulative Impact: In relation to an activity, cumulative impact means 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.

"Equator Principles": A financial industry benchmark for determining, assessing and managing social & environmental risk in project financing.

Environmental Impact Assessment: In relation to an application, to which Scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of the application.

Environmental Impact Report: In-depth assessment of impacts associated with a proposed development. This forms the second phase of an Environmental Impact Assessment and follows on from the Scoping Report.

Environmental Management Programme: A legally binding working document, which stipulates environmental and socio-economic mitigation measures which must be implemented by several responsible parties throughout the duration of the proposed project.

Heritage Significance Grades:
a) Grade I: Heritage resources with qualities so exceptional that they are of special national significance;
(b) Grade II: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
(c) Grade III: Other heritage resources worthy of conservation.

Heritage Resources: This means any place or object of cultural significance. See also archaeological resources above.

Historical Period: Since the arrival of the white settlers - c. AD 1840 - in this part of the country

Hyrdomorphic / Hydric Soil: Soil that in its undrained condition is saturated or flooded long enough during the growing season to develop anaerobic conditions favouring growth and regeneration of hydrophytic vegetation. These soils are found in and associated with wetlands.

Iron Age: Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. These people, according to archaeological evidence, spoke early variations of the Bantu Language. Because they produced their own iron tools, archaeologists call this the Iron Age.
Early Iron Age AD 200 - AD 900
Middle Iron Age AD 900 - AD 1300
Late Iron Age AD 1300 - AD 1830

Kilovolt (kV): a unit of electric potential equal to a thousand volts (a volt being the standard unit of electric potential. It is defined as the amount of electrical potential between two points on a conductor carrying a current of one ampere while one watt of power is dissipated between the two points).

Macro-Geomorphological: Related to / on the scale of geomorphic provinces. A geomorphic province is a spatial entity with common geomorphic attributes.

Precipitation: Any form of water, such as rain, snow, sleet, or hail that falls to the earth's surface.

Red Data Species: All those species included in the categories of endangered, vulnerable or rare, as defined by the International Union for the Conservation of Nature and Natural Resources.

Riparian: The area of land adjacent to a stream or river that is influenced by stream induced or related processes.

Scoping Report: An “issues-based” report which forms the first phase of an Environmental Impact Assessment process.

Stone Age: The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.
Early Stone Age 2 000 000 - 150 000 Before Present
Middle Stone Age 150 000 - 30 000 BP
Late Stone Age 30 000 - until c. AD 200

List of Abbreviations

AP - Action Plan
BID - Background Information Document
CRM - Cost Recovery Mechanism
DEA - Department of Environmental Affairs
DSR -Draft Scoping Report
DoE - Department of Energy
FSR - Final Scoping Report
DWA - Department of Water Affairs
EAPs - Environmental Assessment Practitioner
EHS - Environmental, Health, and Safety
EIA - Environmental Impact Assessment
EIR - Environmental Impact Report
EMPr - Environmental Management Programme
ENPAT - Environmental Potential Atlas
ECA - Environmental Conservation Act No 73 of 1989
EP - Equator Principles
EPFI - Equator Principles Financial Institutions
ERA - The Electricity Regulation Act No. 4 of 2006
FGM - Focus Group Meeting
FSR - Final Scoping Report
GDP - Gross Domestic Product
GIIP - Good International Industry Practice
GIS - Geographic Information System
GPS - Global Positioning System
GW - Gigawatts
HIA - Heritage Impact Assessment
I&AP(s) - Interested and Affected Parties
IBA(s) - Important Bird Area(s)
IDP - Integrated Development Plan
IEP - Integrated Energy Plan
IFC - International Finance Corporation
IPP(s) - Independent Power Producers
IRP - Integrated Resource Plan
ISMO - Independent System and Market Operator
IUCN - International Union for the Conservation of Nature and Natural Resources
KSW - Key Stakeholder Workshop
kV - Kilo Volt
LGMSA - Local Government: Municipal Systems Act No. 32 of 2000
MSA - Middle Stone Age
MYPD2 - Multi Year Price Determination 2
MW - Megawatt

MSBL - Multi-Site base load (MSBL)
NEA - The National Energy Act No. 34 of 2008
NERSA - National Energy Regulator of South Africa
NEMA - National Environmental Management Act No. 107 of 1998
NEMBA - National Environmental Management: Biodiversity Act No. 10 of 2004
NFEPA - National Freshwater Ecological Priority Areas
NHRA - National Heritage Resources Act No. 25 of 1999
NSBA - National Spatial Biodiversity Assessment
NWA - National Water Act No. 36 of 1998
NEMAA - National Environmental Management: Air Quality Act of 2004
OHSA - Occupational Health and Safety Act No. 85 of 1993
PFA - Project Facilitation Act No. 67 of 1995
PoS - Plan of Study
PM - Public Meeting
PPA - Power Purchase Agreement
PPP - Public Participation Process
REFIT - Renewable Feed-In Tariff Programme
RFP - Request for Proposals
RFQ - Request for Qualifications
SA - South Africa
SABAP 2 - Southern African Bird Atlas Project 2
SAHRA - South African Heritage Resources Agency
SANBI - South African National Biodiversity Institute
SAWS - South African Weather Service
SBO - Single Buyer Office
SDF - Spatial Development Framework
VAC - Visual Absorption Capacity

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DRAFT SCOPING REPORT

1 INTRODUCTION

Nokukhanya intends to develop a solar photovoltaic (PV) power plant (hereafter referred to as the "proposed development") near Dennilton in the Limpopo Province of South Africa. SiVEST Environmental Division has been appointed as independent consultants to undertake the Environmental Impact Assessment (EIA) for the proposed development. The overall objective of the project is to generate electricity to feed into the National Grid by constructing a solar PV power plant (and associated infrastructure).

The proposed development requires Environmental Authorisation from the Department of Environmental Affairs (DEA). However, the provincial authority will also be consulted (i.e. the Limpopo Department of Economic Development, Environment and Tourism - LEDET). The EIA for the proposed development will be conducted in terms of the newly released EIA Regulations promulgated in terms of Chapter 5 NEMA (National Environmental Management Act), which came into effect on the 2nd of August 2010. In terms of these regulations, a full EIA is required for the proposed project. All relevant legislations and guidelines (including Equator Principles) will be consulted during the EIA process and will be complied with at all times.

As previously mentioned, this Scoping Report is compiled in accordance with the Equator Principles (EP), which is a financial industry benchmark for determining, assessing and managing social and environmental risk in project financing (Equator Principles, 2006). This proposed development is considered a Category B project, which are those with potential limited adverse social or environmental impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures (Equator Principles, 2006). The project will also comply with the International Finance Corporation's Social and Environmental Performance Standards (2006).

1.1 Applicable Documentation

The following documentation should be read in conjunction with this Scoping Report:

- "Equator Principles" 2006
- International Finance Corporation's (IFC) Performance Standards on Social and Environment, April 2006, namely:
    - Performance Standard 1: Social and Environmental Assessment and Management Systems
    - Performance Standard 2: Labour and Working Conditions
    - Performance Standard 3: Pollution Prevention and Abatement
    - Performance Standard 4: Community Health, Safety and Security
    - Performance Standard 5: Land Acquisition and Involuntary Resettlement
    - Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management
    - Performance Standard 7: Indigenous Peoples
    - Performance Standard 8: Cultural Heritage
- International Finance Corporation – World Bank Guidelines, General Environmental Health and Safety (EHS) Guidelines 2007.

The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP). These EHS Guidelines are applied as required by the World Bank's respective policies and standards. These General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines which provide guidance to users on EHS issues in specific industry sectors. The IFC handbook is contained in Appendix 1.

1.2 Technical Description

At this scoping stage of the EIA process, it is anticipated that the proposed project will encompass the installation of a solar PV field and associated components, in order to generate electricity that is to be fed into the existing Eskom grid. The total solar PV power plant area is yet to be determined, and will be determined during the EIA phase. The project will be situated on three farm portions with a total area of 175ha. During the scoping phase the entire 175ha will be assessed in order to finalise location alternatives for the solar PV power plant. It is currently envisaged that the total generation capacity will be no more than 75 Megawatts (MW). The voltage of the connection lines from the solar PV power plant substation to the grid is dependent on the total generation capacity and the actual available connection as determined by Eskom after the subsequent EIA approvals have been granted. The key components of the project follow in the sub-sections below.

1.2.1 PV Project Components

Nokukhanya is proposing the establishment of a solar PV power plant on the development site near Dennilton (Figure 1). The objective of the solar project is to generate electricity to feed into the national grid. The solar PV power plant will have a maximum capacity of 75 MW.

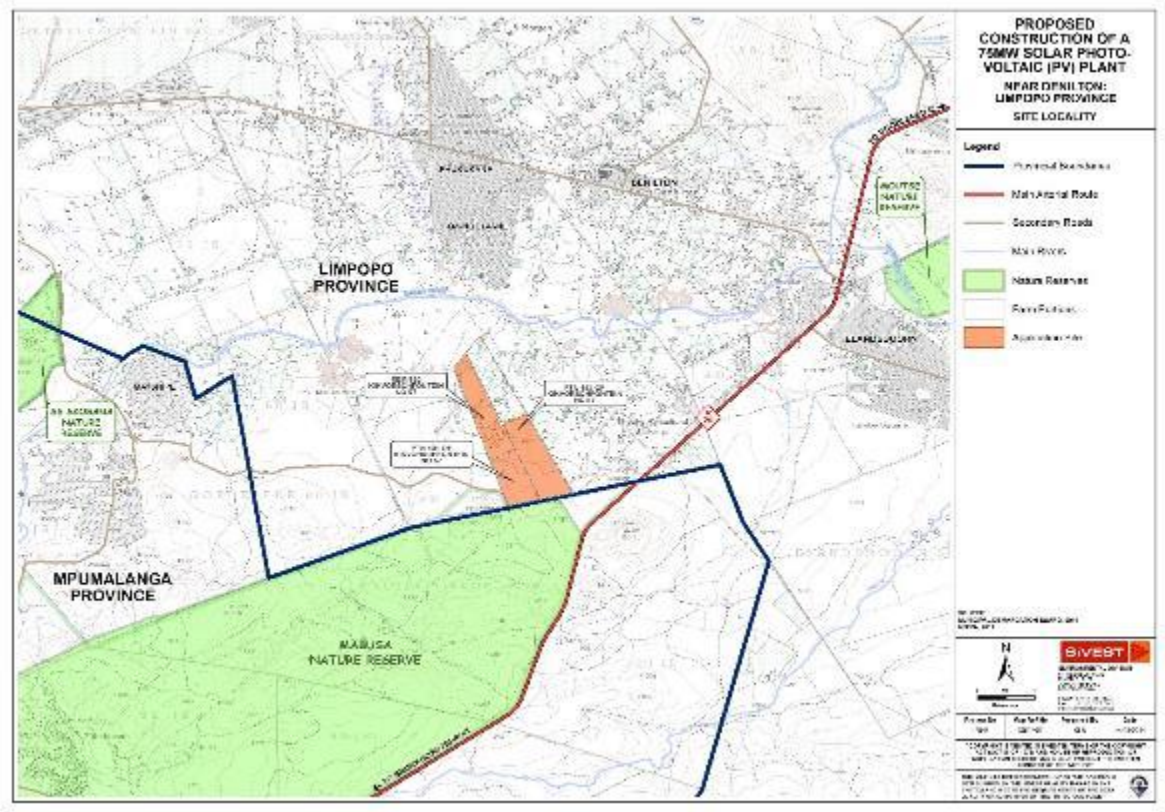

Figure 1: Proposed solar PV power plant study area

The project will consist of two components:

- Solar PV Power Plant
- Associated infrastructure

The solar PV power plant will consist of the following infrastructure

- Solar field
- Buildings

The section below describes the typical technical components that would be involved in the construction of the proposed infrastructure.

1.2.2 Solar Field

Solar PV panels are usually arranged in rows or 'arrays' consisting of a number of PV panels. The area required for the PV panel arrays would not need to be entirely cleared or graded. However, where tall vegetation is present, this vegetation may need to be removed from the PV array area.

The solar PV panels are variable in size. The actual size will be determined in the final design stages of the project however a PV height of 3m has been estimated. The PV panels are mounted into metal frames which are usually aluminium. Concrete or screw pile foundations are commonly used to support the panel arrays (Figure 2).

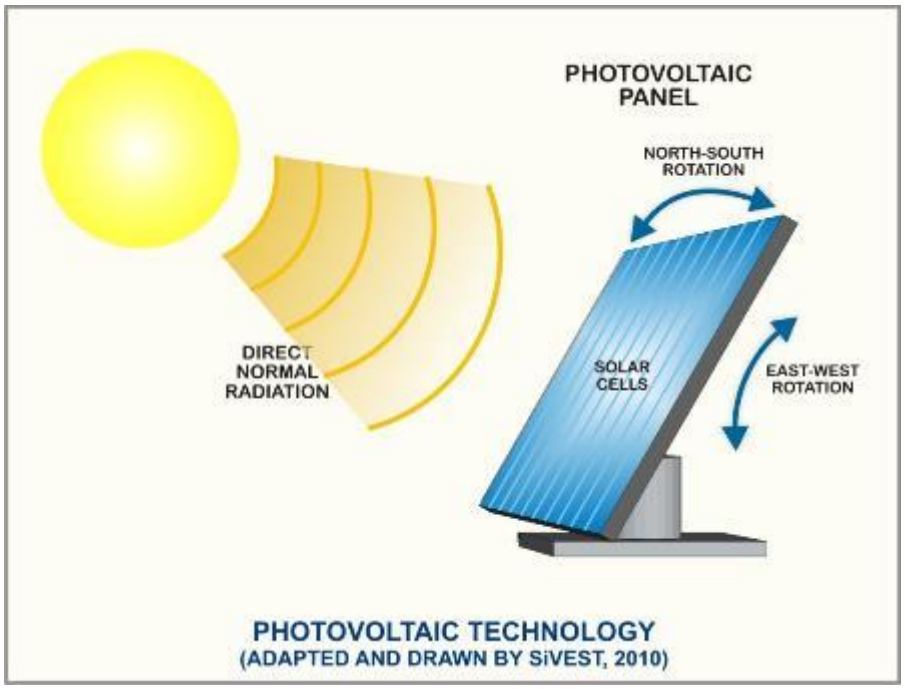

Figure 2: Illustration of how a PV panel operates

1.2.3 Buildings

The solar field will require an onsite building which will be used in the daily operation of the plant and includes an administration building (office). Potential locations for the administration building will be determined at a later stage during the EIA process based on any environmental constraints identified and design factors that need to be considered. The buildings will likely be single storey buildings which will be required to accommodate the following:

- Control room
- Workshop

- High Voltage (HV) switchgear
- Mess Room
- Toilets
- Warehouse for storage

1.2.4 Associated Infrastructure

- Electrical Infrastructure

The solar PV panel arrays are connected to each other in strings. In turn, the strings are connected to DC to the AC inverters (Figure 3). The strings are connected to the inverters by low voltage DC cables. Power from the inverters is collected in medium voltage transformers through AC cables. Cables may be buried or pole mounted depending on the voltage level and site conditions.

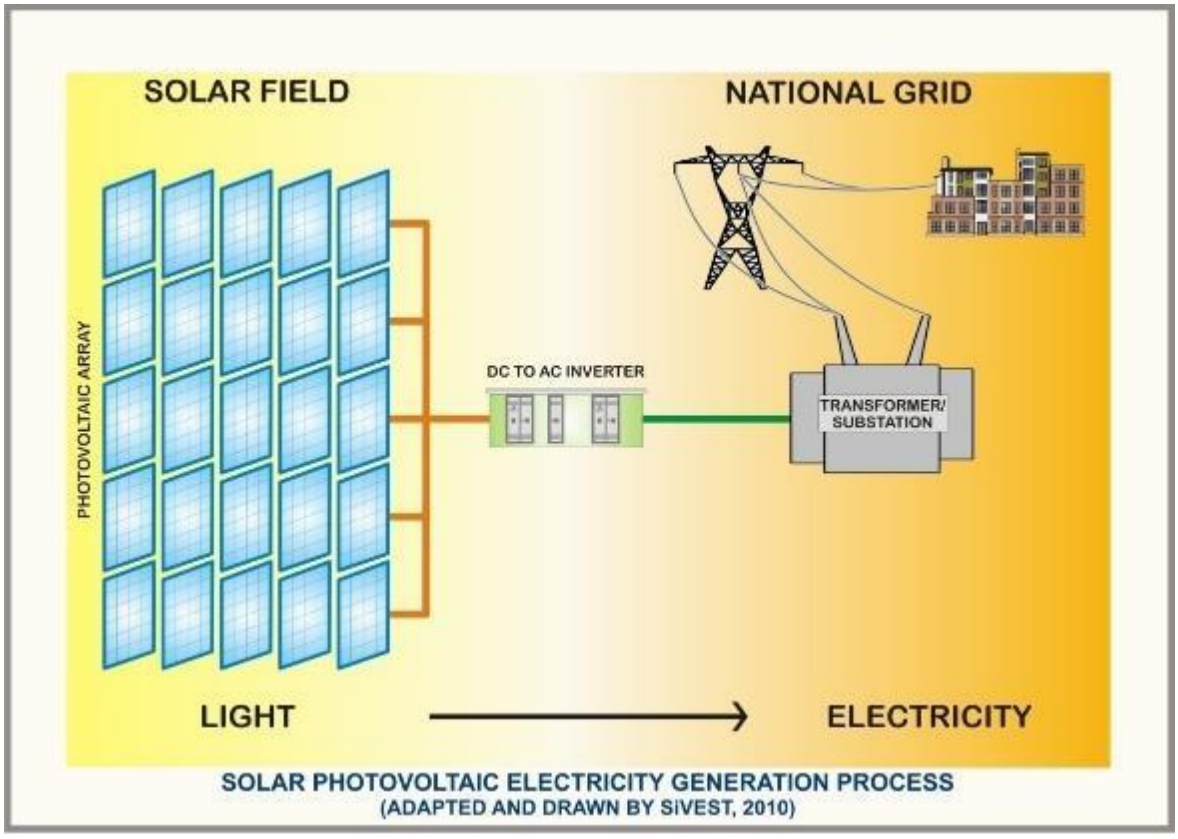

Figure 3: PV process

The medium voltage transformers will be at a central substation. The location of the construction substation will be determined at a later stage in the EIA process based on environmental constraints and design factors.

Where possible the distribution substation will ideally be located in close proximity to the existing power lines in order to limit the environmental impact. This substation will be a transmission substation and will include transformer bays which will contain transformer oils. Bunds will be constructed to ensure that any oil spills are suitable attenuated and not released into the environment. The substation will be securely fenced.

As previously mentioned, the electricity generated by the proposed PV plant is to be fed into the existing Eskom grid. During the EIA phase a number of power line route alternatives will be proposed and investigated further. The proposed alternatives will include completely new lines that will link into an existing Eskom substation. A preliminary identification of potential Eskom substations includes the 132kV Amandla substation, the 132kV Kwaggafontein substation and the 88kV Groblersdal substation.

- Construction Lay-down Area

A general construction lay-down area will be required for the construction phase of the proposed solar PV power plant. The size of this area is yet to be determined, but 10 000 m² is typical. The location of the construction lay-down area will be determined at a later stage in the EIA process based on environmental constraints and design factors.

1.3 Alternatives

In terms of the EIA regulations, feasible and reasonable alternatives are required to be considered during the EIA process. The no-go alternative will thus be considered in this draft Scoping Report. During the EIA phase of the project layout alternatives will be extensively investigated. Additionally, grid connection alternatives, and alternative locations for the administration building, central substation and construction lay-down area will be investigated at a later stage in the EIA process based on environmental constraints and design factors.

- No-go Alternative

The 'no-go' alternative is the option of not establishing the proposed solar PV power plant. South Africa is under immense pressure to provide electricity generating capacity in order to reduce the current electricity demand in the country. With the global focus on climate change, the government is under severe pressure to explore alternative energy sources in addition to coal-fired power stations. Although solar power is not the only solution to solving the energy crisis in South Africa, not establishing the proposed solar PV power plant would be detrimental to the mandate that the government has set to promote the implementation of renewable energy. It is a suitable sustainable solution to the energy crisis and this project could contribute to addressing the problem. This project will aid in achieving South Africa's goals in terms of sustainability, energy security, mitigating energy cost risks, local economic development and national job creation.

1.4 Specialist studies

Specialist studies have been conducted in terms of the stipulations contained within Section 28 (1) of the 2010 NEMA EIA regulations.

The following specialist studies have been conducted for the area:

- Biodiversity (flora, avi-fauna and fauna) Assessment
- Surface Water Impact Assessment
- Soils and Agricultural Potential Assessment
- Visual Impact Assessment
- Heritage Assessment
- Socio-economic Assessment
- Geotechnical Assessment

These studies have been used to identify issues at a scoping level and will be supplemented with more site specific studies during the EIA phase of the project. Key issues relating to the proposed site are discussed below.

1.5 Draft Scoping Report Structure

This Draft Scoping Report (DSR) is structured as follows:

- Chapter 1 introduces the project and the relevance of the Equator Principles as well as the IFC Performance Standards for this project. It describes the project background, describing the project technical components. It also discusses the experience of the Environmental Assessment Practitioners (EAPs), including specialists, who have contributed to the report. Chapter 1 further expands on the relevant legal ramifications applicable to the project and describes relevant development strategies and guidelines. Finally, the chapter provides explanation to the need and desirability of the proposed project, as well as an explanation of the objectives of the scoping phase.
- Chapter 2 provides a description of the region in which the proposed development is intended to be located. Although the chapter provides a broad overview of the region, it is also specific to the application. It contains descriptions of the site and the specialist studies are also summarised.
- Chapter 3 identifies potential impacts associated with the proposed development. The chapter further identifies these impacts per specialist study and discusses potential cumulative impacts.
- Chapter 4 describes the Public Participation Process (PPP) undertaken during the Scoping Phase and tables issues and concerns raised by Interested and Affected Parties (I&APs).
- Chapter 5 assesses the project in relation to the Equator Principles to ensure it complies with international funding requirements, if required.

- Chapter 6 provides a conclusion to the DSR and recommendations to be addressed in further assessment.
- Chapter 7 describes the environmental impact reporting phase of the EIA (i.e. the way forward for this study and includes the Plan of Study (PoS for EIA).
- Chapter 8 lists references indicated in the DSR.

1.6 Expertise of Environmental Assessment Practitioner

SiVEST has considerable experience in the undertaking of EIAs. Staff and specialists who have worked on this project and contributed to the compilation of this Scoping Report are detailed in Table 1 below.

Table 1: Project Team

Name and Organisation	Role
Rebecca Thomas – SiVEST	Project Leader
Andrea Gibb – SiVEST	Environmental Practitioner and Visual Specialist
Lynsey Rimbault - SiVEST	Environmental Consultant
David Hoare – David Hoare Consulting	Biodiversity (Flora and Fauna, Avi-fauna)
Shaun Taylor and Alistair Fyfe – SiVEST	Surface Water
D.G. Paterson – ARC Institute for Soil, Climate and Water	Agricultural Potential
Kerry Schwartz – SiVEST	GIS and Mapping
Andrea Gibb – SiVEST	Visual
Wouter Fourie - PGS	Heritage
Elena Broughton – Urban-Econ Development Economists	Socio-economic
Cecilia Canahai – Jeffares and Green	Geotechnical
Nicolene Venter – Imaginative Africa	Public Participation
Veronique Evans – SiVEST	

Please refer to attached CV's for more information in Appendix 2. Declarations of independence of each specialist are contained in Appendix 3.

1.7 Key Legal and Administrative Requirements Relating to the Proposed Development

1.7.1 National Environmental Management Act No. 107 of 1998 – NEMA EIA Requirements

The National Environmental Management Act (NEMA) No. 107 of 1998 has since been amended on several occasions from the date of its inception. This Act replaces parts of the Environment Conservation Act (ECA) No. 73 of 1989 with exception to certain parts pertaining to Integrated Environmental Management. The act intends to provide for:

- co-operative environmental governance by establishing principles for decision-making on matters affecting the environment;
- institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state;
- to provide for the prohibition, restriction or control of activities which are likely to have a detrimental effect on the environment;
- and to provide for matters connected therewith.

NEMA now governs the EIA process with the recent promulgation of the new EIA regulations in June 2010 (Government Gazette No. 33306 of 18th June 2010).

Activities that may significantly affect the environment must be considered, investigated and assessed prior to implementation.

In terms of the EIA Regulations promulgated in terms of Chapter 5 NEMA (National Environmental Management Act), which came into effect on 2nd August 2010, a full EIA is required for the proposed project

1.7.2 NEMA EIA Requirements

In terms of the Regulations, which were released on the 18th of June 2010 and placed into full effect on the 2nd of August 2010, a full Environmental Impact Assessment is required for the proposed development based on triggered activities. However, several activities which trigger a basic assessment were also identified and need also to be specified. Ultimately, these activities will not form a separate assessment, but will fall into the greater EIA.

The following Schedules of the Government Notice No. R. 544 - 545 of the 18th June 2010 are of relevance to the project in question (Table 2). All of the Listed Activities identified in terms of Sections 24(2) and 24D include:

Table 2: Listed activities in terms of the NEMA Regulations

Number and date of the relevant notice:	**Activity No (s)**	**Description of listed activity**

Government Notice R544 (18 June 2010)	Activity 10	The construction 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 275 kilovolts.* Power lines are proposed to connect the Photovoltaic Plant to the Eskom Grid.
	Activity 11	The construction of (iii) bridges…(xi) infrastructure or structures covering 50 square metres or more, where such infrastructure occurs within a water course or within 32 metres of a watercourse, measured from the edge of the water course…. Proximity of the development to watercourses will be determined during the EIA, depending on final layouts selected, but there are water courses within the vicinity of the proposed development site.
	Activity 18	The infilling or deposition of any material of more than 5 cubic metres into, or the dredging. Excavation, removal of moving of soil, sand, sand….pebbles or rock from a watercourse may occur during the construction of the access road or any other infrastructure associate with the proposed solar energy plant. Proximity of the development to watercourses will be determined during the EIA, depending on final layouts selected. Should construction activities take place within a watercourse soil is likely to be removed.
	Activity 26	Any process or activity identified in terms of section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004). Should Red Data species be affected by the proposed development during construction or operation a permit in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) would be required. A Biodiversity specialist will be commissioned to determine the presence of Red Data species during the EIA.
Government Notice R545 (18 June 2010)	Activity 1	The construction of facilities or infrastructure, including associated structures or infrastructure, for the generation of electricity where the electricity output is 20 megawatts or more.

		It is proposed that a solar PV plant with a generation capacity of approximately 75MW will be constructed.
	Activity 15	Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational , industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for *i) Linear development activities; or* *ii) Agriculture or afforestation where the activity 16 in this schedule will apply* The proposed development will transform undeveloped, vacant or derelict land to industrial use (solar PV plant). The size of the area to be transformed will be determined during the EIA phase, but the total area being assessed during the scoping phase is 175ha.
Government Notice R546 (18 June 2010)	Activity 4:	The construction of a road wider than 4 metres with a reserve less than 13,5 metres - (a) In Limpopo province: *ii) Outside urban areas, in:* *c) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority* Internal access roads will require a width of typically at least 5m. The proximity of the development in relation to sensitive areas will be determined during the EIA, depending on final layouts selected.
	Activity 12:	The clearance of an area of 300 square metres or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation *a) within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *b) Within critical biodiversity areas identified in bioregional plans;* Vegetation would need to be cleared for the proposed solar PV plant and associated infrastructure. The proximity of the proposed development in relation to endangered ecosystems and critical biodiversity areas will be determined during the EIA, depending on final layouts selected.

	Activity 13	The clearance of an area of 1 hectare or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for: **c) In Limpopo:** iii) *Outside urban areas, the following*: (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority Vegetation would need to be cleared for the proposed solar PV plant and associated infrastructure. The proximity of the proposed development in relation to sensitive areas will be determined during the EIA, depending on final layouts selected.
	Activity 14	The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation **(a) In Limpopo** *i) All areas outside of urban areas* Vegetation would need to be cleared for the proposed solar PV plant and associated infrastructure. The size of the area to be cleared and the composition of the vegetation cover in terms of indigenous species will be determined during the EIA, depending on final layouts selected.
	Activity 16	The construction of: iv) infrastructure covering 10 square metres or more where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line. **a) In Limpopo:** ii) Outside urban areas, in: (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans

		Proximity of the development to watercourses and sensitive areas will be determined during the EIA, depending on final layouts selected.
	Activity 19	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. **a) In Limpopo provinces:** iii) Outside urban areas, in: (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined. Existing access roads will need to be upgraded in order to access to the site. Upgrading the existing roads could involve widening and lengthening of the road. Proximity of the development to watercourses and sensitive areas will be determined during the EIA.

1.7.3 National Heritage Resources Act No. 25 of 1999

This Act requires all developers to undertake archaeological impact studies whenever any type of development activity is undertaken. Preliminary archaeological impact studies will consequently become a common procedure for all development activities, even if such development may be exempted in terms of the NEMA.

The law ensures community participation in the protection of national heritage resources and will involve all three levels of government in the management of the country's national heritage. The South African Heritage Resources Agency (SAHRA) will establish and maintain a national policy, strategy plans and standards for heritage resources management and will monitor the system as a whole.

Heritage authorities will assist and co-operate with individuals and organisations concerned with the study, the conservation, promotion and utilisation of national heritage resources. A newly established National Heritage Resources Fund will provide financial assistance for heritage projects.

A heritage assessment has been conducted to explore how the proposed development may impact on heritage resources as protected by the Act.

1.7.4 National Water Act No. 36 of 1998

The National Water Act (NWA) No 36 of 1998 was promulgated on the 20th August 1998. This Act is important in that it provides a framework to protect water resources against over exploitation and to ensure that there is water for socio-economic and economic development, human needs and to meet the needs of the aquatic environment. The Act also recognises that water belongs to the whole nation for the benefit of all people.

It is important to note that water resources are protected under the Act. Under the act, water resources as defined include a watercourse, surface water, estuary or aquifer. A watercourse is defined as a river or spring, a natural channel in which water flows regularly or intermittently, or a wetland, lake or dam into which, or from which water flows.

One of the main aims of the Act is the protection of water resources. 'Protection' in relation to a water resource entails:

- Maintenance of the quality of the water resource to the extent that the water use may be used in a sustainable way;
- Prevention of degradation of the water resource
- The rehabilitation of the water resource

In the context of the proposed development and any potential impact on water resources, the definition of pollution and pollution prevention contained within the Act is relevant. 'Pollution', as described by the Act is the direct or indirect alteration of the physical, chemical or biological properties of a water resource, so as to make it (*inter alia*):

- less fit for any beneficial purpose for which it may reasonably be expected to be used; or
- harmful or potentially harmful to the welfare or human beings, to any aquatic or non-aquatic organisms, or to the resource quality.

This definition of pollution is quite wide ranging, and it applies to all types of water resource. Activities which cause alteration of the biological properties of a watercourse (i.e. the fauna and flora contained within that watercourse are also considered pollution).

In terms of section 19 of the Act owners / managers / people occupying land on which any activity or process undertaken which causes, or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring. These measures may include (inter alia):

- measures to cease, modify, or control any act or process causing the pollution;
- comply with any prescribed waste standard or management practice;

- contain or prevent the movement of pollutants;
- remedy the effects of the pollution; and
- remedy the effects of any disturbance to the bed and banks of a watercourse.

A surface water assessment has been conducted to explore how the proposed development may impact on water resources as protected by the Act.

1.7.5 National Environmental Management: Biodiversity Act No. 10 of 2004

The overarching aim of the National Environmental Management: Biodiversity Act (NEMBA) No. 10 of 2004, within the framework of NEMA, is to provide for:

- The management and conservation of biological diversity within South Africa, and of the components of such biological diversity;
- The use of indigenous biological resources in a sustainable manner; and
- The fair and equitable sharing among stakeholders of benefits arising from bio-prospecting involving indigenous biological resources.

The South African National Biodiversity Institute (SANBI) was established by the NEMBA, its purpose being (*inter alia*) to report on the status of the country's biodiversity and the conservation status of all listed threatened or protected species and ecosystems.

NEMBA provides for a range of measures to protect ecosystems and for the protection of species that are threatened or in need of protection to ensure their survival in the wild, including a prohibition on carrying out a "restricted activity" involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7. Lists of critically endangered, endangered, vulnerable and protected species have been published and a permit system for listed species has been established.

It is also appropriate to undertake a Faunal and Botanical Impact Assessment where proposed developments, in an area that is considered ecologically sensitive, require an environmental authorisation in terms of NEMA, with such Assessment taking place during the basic assessment or EIA. These two studies will be undertaken during the project.

The NEMBA is relevant to the proposed project as the construction of the solar PV power plant and other components (such as power lines and the substations) may impact negatively on biodiversity. The project proponent is therefore required to take appropriate reasonable measures to limit the impacts on biodiversity, to obtain permits if required and to also invite SANBI to provide commentary on any documentation resulting from the proposed development.

1.7.6 National Forests Act, 1998 (Act No. 84 of 1998)

The National Forest Act (NFA), 1998 (No. 84 of 1998) was enacted to:

- Promote the sustainable management and development of forests for the benefit of all;
- Provide special measures for the protection of certain forests and trees;
- Promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes;
- Promote greater participation in all aspects of forestry and forest products industry by persons disadvantaged by unfair discrimination.

The NFA enforces the necessity for a license to be obtained prior to destroying any indigenous tree in a natural forest and, subject to certain exemptions, cutting, disturbing, damaging, destroying or removing any protected tree. The list of protected trees is currently contained in Government Gazette 34595, Notice Number 734 of 16 September 2011. Licenses are issued by the Minister and are subject to periods and conditions as may be stipulated.

The NFA is relevant to the proposed project as the removal and/or disturbance and/or clearance of protected vegetation may be required and a license in terms of the NFA may be required for this to be done.

1.7.7 Conservation of Agricultural Resources Act No. 43 of 1983

The Conservation of Agricultural Resources Act (CARA) No. 43 of 1983 controls the utilization of natural agricultural resources in South Africa. The Act promotes the conservation of soil, water sources and vegetation as well as the combating weeds and invader plants. The Act has been amended in part by the Abolition of Racially Based Land Measures Act, No. 108 of 1991.

The primary objective of the Act is to conserve natural agricultural resources by:

- maintaining the production potential of land;
- combating and preventing erosion and weakening or destruction of the water resources;
- protecting vegetation; and
- combating weeds and invaders plants.

The CARA is relevant to the proposed project as the construction of solar energy facilities as well as other components (such as power lines and the substations) may impact on agricultural resources and vegetation on the site. The Act prohibits the spreading of weeds and prescribes control measures that need to be complied with in order to achieve this. As such, measures will need to be taken to protect agricultural resources and prevent weeds and exotic plants from invading the site as a result of the proposed development.

An agricultural potential assessment has been conducted to explore how the proposed development may impact on the agricultural production potential of the proposed site.

1.7.8 Subdivision of Agricultural Land Act No. 70 of 1970, as amended

The Subdivision of Agricultural Land Act No. 70 of 1970 controls the subdivision of all agricultural land in South Africa; prohibiting certain actions pertaining to agricultural land. Under the Act the owner of agricultural land is required to obtain consent from the Minister of Agriculture in order to subdivide agricultural land.

The purpose of the Act is to prevent uneconomic farming units from being created and degradation of prime agricultural land. To achieve this purpose the act also regulates leasing and selling of agricultural land as well as registration of servitudes.

The Act is of relevance to the proposed development as any land within the study area that is zoned for agricultural purposes will be regulated by this Act.

Although the whole of this Act has been repealed by section 1 of the Subdivision of Agricultural Land Act Repeal Act 64 of 1998, this Repeal Act has not been implemented and no date of coming into operation has been proclaimed.

It is important to note that the implementation of this act is problematic as the Act defines 'Agricultural Land' as being any land, except land situated in the area of jurisdiction of a municipality or town council, and subsequent to the promulgation of this Act uninterrupted Municipalities have been established throughout South Africa.

1.7.9 National Road Traffic Act No. 93 of 1996, as amended

The National Road Traffic Act (NRTA) No. 93 of 1996 provides for all road traffic matters and is applied uniformly throughout South Africa. The Act enforces the necessity of registering and licensing motor vehicles. It also stipulates requirements regarding fitness of drivers and vehicles as well as making provision for the transportation of dangerous goods.

All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed solar PV power plant.

1.7.10 Additional Relevant Legislation

- Occupational Health and Safety Act No. 85 of 1993

- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)
- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
- Development Facilitation Act No. 67 of 1995

1.8 Key Development Strategies and Guidelines

1.8.1 Integrated Development Plans

An Integrated Development Plan (IDP) is defined in the Local Government: Municipal Systems Act No. 32 of 2000), as an inclusive and strategic plan that:

- Links, integrates and co-ordinates plans and takes into account proposals for the development of the municipality;
- Aligns the resources and capacity of the municipality with the implementation of the plan
- Forms the policy framework on which annual budgets must be based; and
- Is compatible with national and provincial development plans and planning requirements binding on the municipality in terms of legislation.

The main purpose of the IDP is considered the enhancement of service delivery and fighting poverty through an integrated and aligned approach between different role-players and stakeholders.

Each municipality is required to produce an IDP which would address pertinent issues relevant to their municipality. However, common concerns include municipal transformation and development, and service delivery and infrastructural development.

The Nokukhanya project site falls within the Elias Motsoaledi Local Municipality (EMLM) which is located within the greater Sekhukhune District Municipality. The EMLM IDP for 2013-2014 estimates that 4.6% of the towns and villages in the local municipality do not have access to electricity supply, and that there is insufficient bulk capacity to extend connections to additional households. This is undermining the economic and housing developments in the Groblersdal and Roossenekal areas.

1.8.2 Integrated Energy Plan for the Republic of South Africa, 2003

The Integrated Energy Plan (IEP), developed by the former DME (now DMR), was formulated to address the energy demand of the country balanced with energy supply, transformation, economics and environmental considerations in concourse with available resources. One of the main objectives of the plan is to promote universal access to clean and affordable energy, with emphasis on household energy supply being co-ordinated with provincial and local integrated development programmes. Another objective is to ensure that environmental considerations in energy supply, transformation and end use are made. This project is thus a goal in order to implement this plan.

1.9 Authority Consultation

The National Department of Environmental Affairs (DEA) is the competent authority on this project. As such an application was submitted to DEA on the 28th of August 2014. The project application was acknowledged on the 16th of September 2014. A reference number was allocated to the proposed development; DEA Ref. No.: 14/12/16/3/3/2/737 (Appendix 4). Authorisation was thus granted to undertake a Scoping study and submit a Scoping Report for the project. A proof of payment, details of the Environmental Assessment Practitioner (EAP) and declaration of interest, a project schedule, details of landowners, and locality map formed part of the application form and were submitted accordingly on the same date.

1.10 Project Need and Desirability

South Africa is the largest emitter of greenhouse gases (GHG) in Africa and the one of the most carbon emission-intensive countries in the world. Despite the worldwide concern regarding GHG emissions and climate change, South Africa continues to rely heavily on coal as its primary source of energy, while most of the countries renewable energy resources remain largely untapped (DME, 2003).

Coupled with this, is the growing demand for electricity in South Africa. According to Eskom, the demand for electricity in South Africa has been growing at approximately 3% per annum. This factor fueled by increasing economic growth and social development within Southern Africa, is placing increasing pressure on South Africa's existing power generation capacity.

As the demand for electricity grows, so too the awareness of environmental impacts, climate change and the need for sustainable development. There is therefore an increasing need to establish a new generation capacity in South Africa within the next several years. The technologies may differ in their generation costs, state of commercial development and most importantly, suitability to the South African Environment.

As one of its strategies to meet future energy consumption requirements, the country is opting for the use of renewable energy technologies, which is fast becoming an important energy option for South Africa. The use of renewable energy technologies is also being investigated as part of Eskom's long-term strategic planning and research process as one of a mix of technologies needed to meet future energy consumption requirements. It is within this context that Nokukhanya plans to establish a solar PV power plant near Dennilton, Limpopo Province.

The Government of South African is also committed to growing the renewable energy industry in South Africa. This is supported by the *White Paper on Renewable Energy* (2003) which sets out the Government's principals, goals and objectives for promoting and implementing renewable energy in South Africa, and by the updated *Integrated Resource Plan* (2010). In order to achieve the long term goal of achieving a sustainable renewable energy industry, the Department of Energy has set a target of contributing 17,8*GW*

of renewable energy to the final energy consumption by 2030. This target is to be produced mainly through, wind and solar; but also through biomass and small scale hydro (DME, 2003; IRP, 2010).

In addition the *White Paper on Energy Policy of the Republic of South Africa*, which sets out the Governments policy regarding the supply and consumption of energy, prioritizes the need to stimulate the development of renewable energy sources. It is also concerned with meeting the challenge of ensuring that; economically feasible technologies and applications are implemented, national resources are equitably invested in renewable technologies and constraints on the development of renewable industry are addressed (DME, 1998).

According to the solar map (Figure 4) the Limpopo Province of South Africa has a solar energy concentration of between 6501 and 8500 MJ/m^2. The project site falls within the range of 8001 – 8500 MJ/m^2 and is thus suitable for the establishment of solar PV power plants. Solar energy is an abundant renewable energy resource which cannot be depleted. Furthermore it has been identified as predictable, clean and cost free fuel.

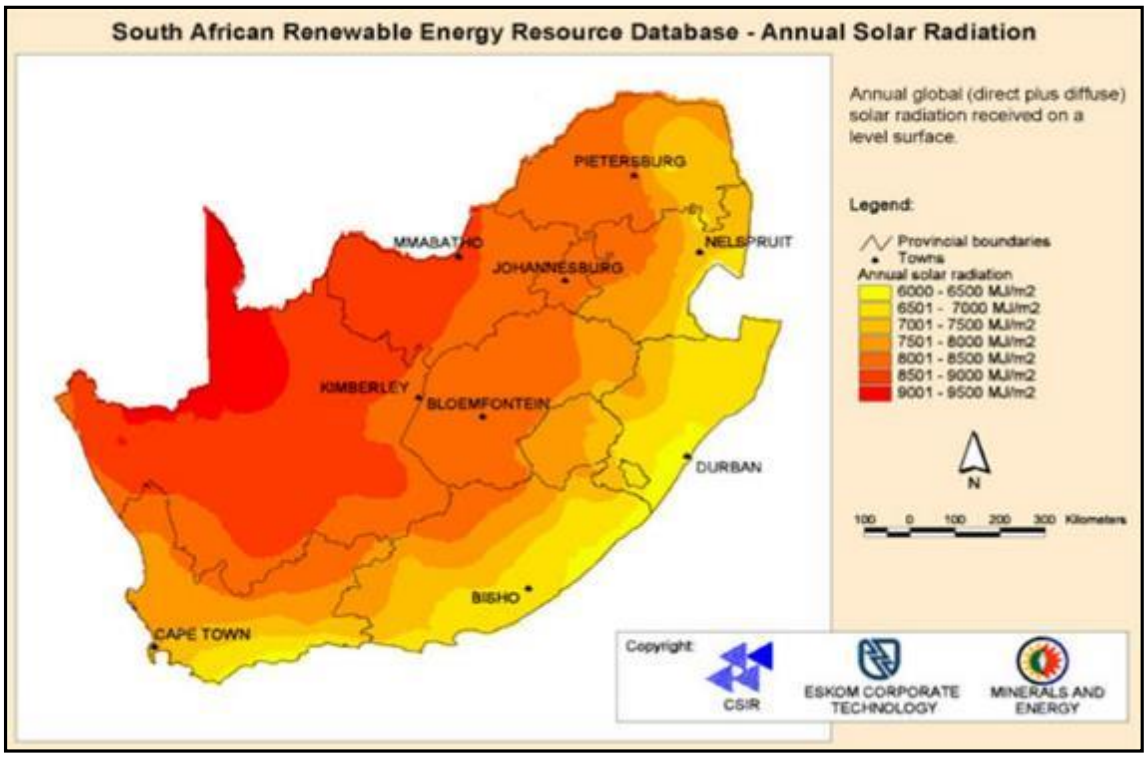

Figure 4: National Solar Resource Map (Source: Solar Vision, 2010)

In addition, CPV/PV plants have been identified as potentially being viable and capable of being employed on a large scale. This project will therefore have the potential to make significant contribution to the electricity stabilization and reduce load shedding.

It is important to note that the current CPV/ PV market in South Africa is relatively small. In 2002, the overall sales volume (including exports) was estimated at 3 to 3.5 MW, with a market turnover of approximately R200 million to R225 million (Cawood & Morris, 2002). At that time, a manufacturer indicated expected production of 8 MWp for 2003. Therefore the opportunity for investment into these facilities, given the overall increasing demand both locally and internationally, needs to be further stimulated.

1.10.1 Security of Power Supply

In the period immediately after the supply shortage and 2007 / 2008 power blackouts, Eskom announced a number of new power generation facilities including new coal-fired power stations, refurbishment of mothballed stations and oil, diesel or gas powered turbines in order to ensure appropriate supply and the needed reserve margin. In the intervening period several of these projects have experienced delays as the economic recession has led to reductions in demand pressure. However, with possible recovery looming, the situation may change and demand growth may resume. Short to medium term electricity supply security is instrumental in securing economic growth and investor confidence (HIS Global Insight, 2009).

The project has the potential of "securing" economic activity by assisting in removing supply constraints if Eskom generation activities result in a supply shortfall. When supply is constrained it represents a limitation to economic growth. When a supply reserve is available, it represents an opportunity for economic growth.

The project will contribute to local economic progress by supporting industry development in line with provincial and regional goals and ensuring advanced skills are drawn to the Limpopo Province. The project will likely encounter widespread support from government, civil society and businesses, all of whom see potential opportunities for revenues, employment and business opportunities locally.

1.10.2 Local Employment

The Elias Motsoaledi LM encompasses 249 363 people comprising of 60 249 households that accounts for approximately 22.8% of the total households of the Sekhukhune District. The majority (86.6%) of the population in the LM resides in tribal areas, with only 6.1% of the people living in urban areas and 7.3% living on farms. The female population (53.6%) in the municipality exceeds that of male (46.4 %). Practically all people are Black African (97.9%), followed by White (1.6%), Indian Asian (0.2%), other (0.17%) and Coloured (0.15%). Sepedi is the mother tongue of the majority of people residing in this area is 87.8% (Stats SA, 2014). On average, households in the Elias Motsoaledi LM earn R4 109 per month in 2014 prices, which is significantly lower than the national average of R9 235 and the district level (R 4 229). The lower than national average income levels in the municipality is an indicator of the limited number of employment opportunities available, which in turn is associated with a small economic base. More than half of the households (56.1%) earn an income of less than R1 600 per month, including 13.5% who have no income at all. This means that the majority of households are unable to pay for services and afford an

adequate standard of living, which in turn impacts negatively on the ability of the municipality to deliver these services.

In 2011, the Elias Motsoaledi LM had 141 951 people within the working age population (i.e. between 15 and 64 years of age), of who 56 803 comprised the labour force (Stats SA, 2014). About 7.9% of the working age population was discouraged job seekers, who are capable of working but who are no longer looking for employment (Stats SA, 2014). The labour force comprised of 32 883 employed and 23 920 unemployed, reflecting a 42.1% unemployment rate, which is significantly higher than that of the country (29.7%) recorded by Stats SA through Census 2011 (Stats SA, 2014). Regarding **Dennilton** and the small towns and settlements/villages surrounding it, their unemployment rate was slightly better (36.6%) than that of the average for the municipality but still worse than that for the country.

The Nokukhanya project site borders the Thembisile Local Municipality. Thembisile Hani LM encompasses 310 455 people comprising of 75 635 households, which accounts for approximately 21.2% of the total households of the Nkangala District. The bulk of the population lives in the tribal areas (69.9%) and 28.5% of people live in urban areas. The female population (52.5%) in the municipality exceeds that of male (47.5 %). The main language spoken is IsiNdebele (58.4%), followed by Sepede and IsiZulu (i.e. respectively 12.6% and 12.5%). On average, households in the Thembisile Hani LM earn R4 254 per month in 2014 prices, which is significantly lower than the district and national averages of R8 106 and R9 235 per month. Half of households (49.8%) earn an income lower than R1600 per month, including 14.2% who do not earn any income.

In 2011, the unemployment rate in Thembisile Hani LM was also high (36.4%) and 6.8% of the working age population (i.e. 195 495 people) was discouraged job seekers (Stats SA, 2014). More than half of the employed population (54.5%) worked in the formal sector, while 22.5% people worked in the informal sector. Private households provided about 20.4% of employment opportunities in the municipality.

Given the information above, local development in Dennilton may help to raise employment rates in the construction sector by providing income to the unemployed local community. It is within this context that the proposed solar PV power plant can aid unemployment in the local area.

1.11 Objectives of the Scoping Phase

The NEMA EIA Regulations (Government Notice. R. 543) states that the objectives of a Scoping study are to identify:

- 27 (e) (i): issues that will be relevant for consideration of the application;
- 27 (e) (ii): the potential environmental impact of the proposed activity; and
- 27 (e) (iii): alternatives to the proposed activity that are feasible and reasonable.

The primary purpose of the Scoping phase is to establish baseline information with regards to the environment within which the project is proposed to take place and to determine feasible and reasonable alternatives associated with the activities. In this context the environment is taken to include the natural, cultural, social and economic environments, with baseline information being the current conditions of the various environments. Various specialists have undertaken studies to ascertain the current conditions in the study area in their specific field, all of which is done within the framework of the project description.

Having established the baseline information, specialists are then required to identify possible impacts of the proposed development on the specific environment that their field encompasses. These potential impacts are set out in several tables below. Note that the impacts detailed in the tables are provisional and additional impacts may be identified during the Environmental Assessment phase, while other identified impacts may fall away.

An additional objective of the scoping phase is to provide Interested and Affected Parties (I&APs) with information regarding the project and also the opportunity to raise issues regarding the project, submit comments and ask questions. The Public Participation Process (PPP) undertaken during the Scoping phase is also reported on below. The PPP section provides details on the greater process as well as lists comments and concerns raised by I&APs.

2 DESCRIPTION OF THE RECEIVING ENVIRONMENT

The Limpopo Province is considered to be a suitable region for the establishment of solar PV power plants. Accordingly, land portions located near Dennilton have been identified as a potential site. A general description of the study area is outlined in the section below. The receiving environment in relation to each specialists study is also provided.

2.1 Regional Locality

The proposed development site is situated within the Elias Motsoaledi Local Municipality in the greater Sekhukhune District Municipality, Limpopo Province. (Figure 5). The Nokukhanya solar PV power plant site is located approximately 6km south-west of the town of Dennilton. Dennilton can be found approximately 30 km to the west-south-west of Groblersdal, approximately 110km north-east of Pretoria and approximately 70km north of Emalahleni. The Nokukhanya solar PV power plant site is situated to the north of the R25. The project site co-ordinates are included in Table 3.

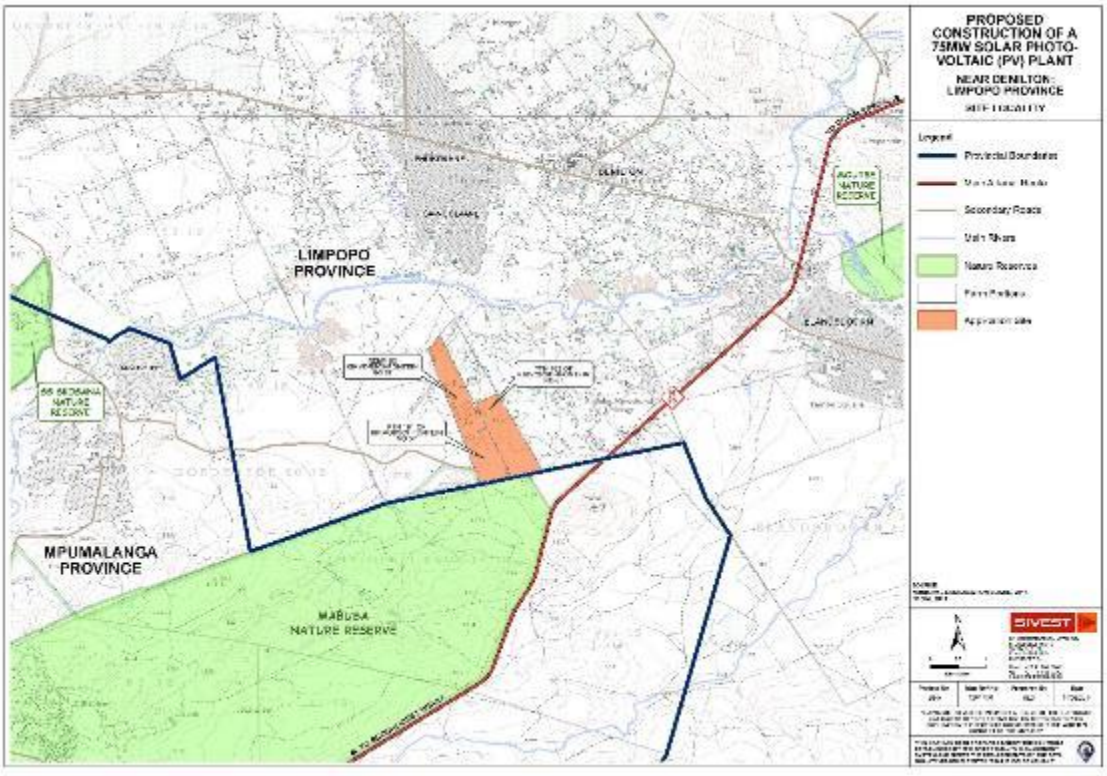

Figure 5: Dennilton Regional Study Area.

Table 3: Proposed Site Location

SITE CO-ORDINATES:				
NORTH-WEST CORNER	**NORTH-EAST CORNER**	**CENTRE POINT**	**SOUTH-WEST CORNER**	**SOUTH-EAST CORNER**
S25° 17' 17.020"	S25° 17' 43.325"	S25° 18' 1.767"	S25° 18' 35.341"	S25° 18' 27.929"
E29° 7' 29.931"	E29° 8' 11.240"	E29° 8' 2.768"	E29° 8' 0.704"	E29° 8' 37.388"

Please note that all maps within the report are included in Appendix 5 and are in A3 format.

2.2 Study Site Description

The sites that are proposed for the solar PV power plant near Dennilton are located on the following farms:

- Portion 182 of the farm Kikvorschfontein 57;
- Remainder 183 of the farm Kikvorschfontein 57;
- Portion 191 of the farm Kikvorschfontein 57;

The total area of the Nokukhanya project site is 175.147ha in size, however the total area and site of the actual solar PV power plant is yet to be determined.

2.3 Topography

The topography of the broader landscape around the project site is shown below (Figure 6). Much of the broader study area lies in the Moses River valley and is characterised by relatively flat to gently undulating terrain. The south-western portion of the study area however incorporates part of the Mabusa Nature Reserve which is characterised by hilly terrain with steep slopes. Overall, the gradient of the study area rises in a north-east to south-west direction, while the application site itself slopes gently from an elevation of 1020m in the north to 1055m in the south. Furthermore, the study site displays areas of gentle gradient ranging from 0-8% (Figure 7).

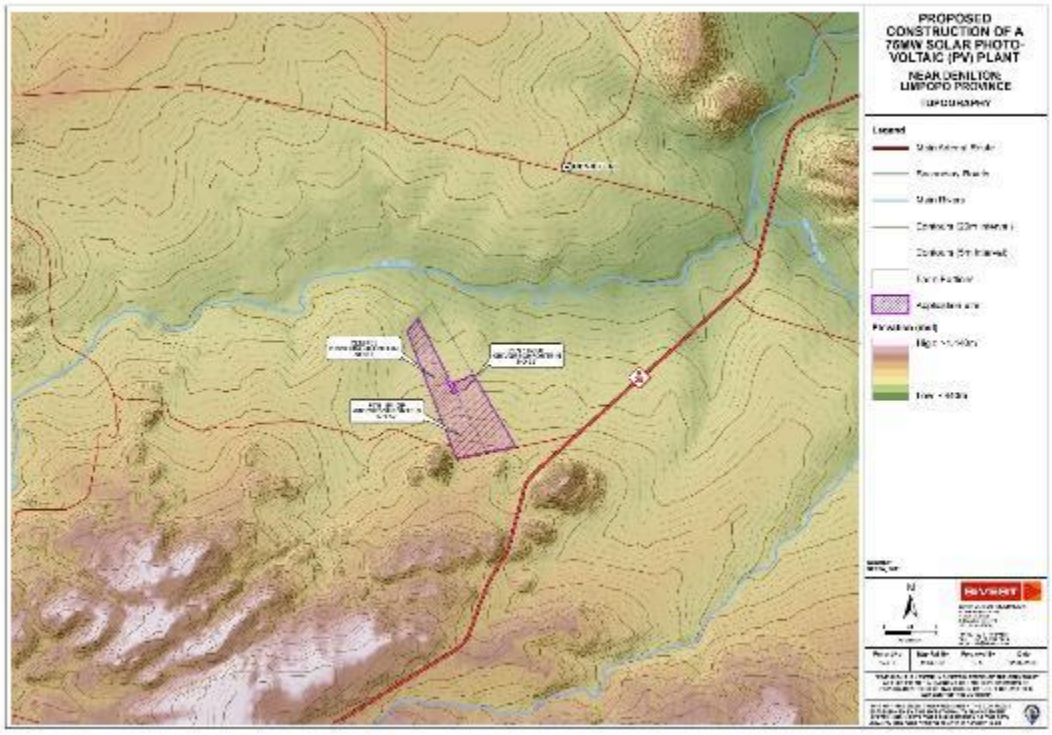

Figure 6: Topography of the study area.

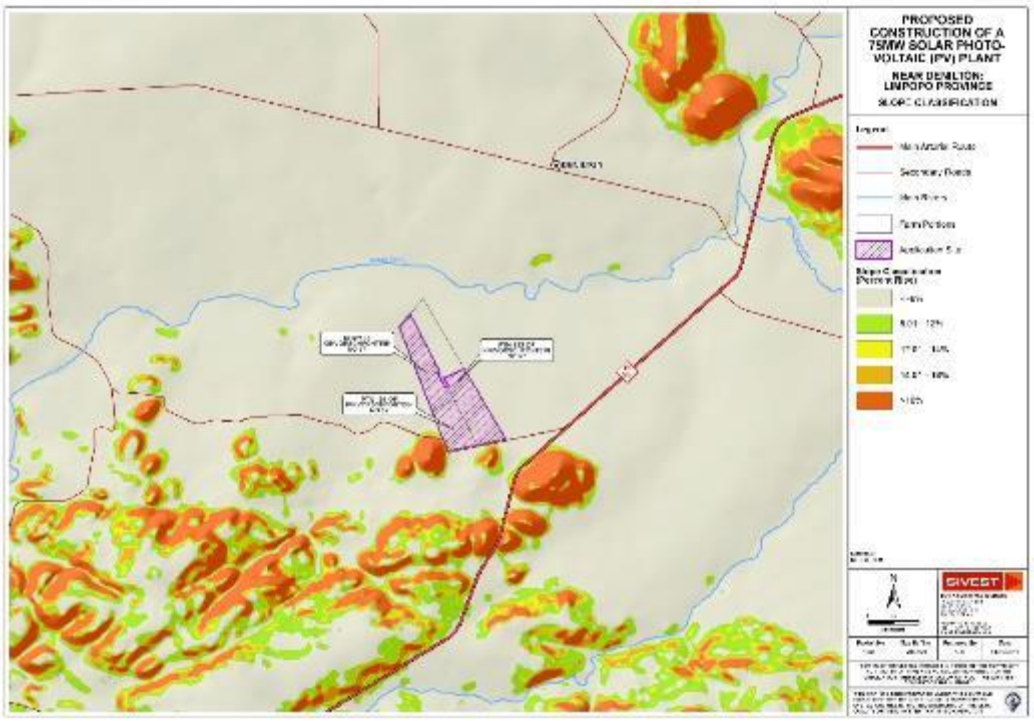

Figure 7: Degree of slope in region of the study area.

2.4 Geotechnical

According to the 1:250 000 geological map 2528 Pretoria, the study area is underlain entirely by grey to pink, coarse grained granite and red, medium grained near top granite known as Nebo Granite, of the Lebowa Suite, of the Bushveld Complex. Based on the geological maps, the following near-surface materials may be encountered at the site. Nebo granites will occur over the entire site and will comprise the parent bedrock. The site is expected to be overlain by a mantle of alluvial, colluvial and residual soils. Very shallow or surface rock outcrop may be expected in certain areas such as riverbeds.

2.5 Land Use

The entire study area falls within the Savanna biome with the two dominant vegetation units being Central Sandy Bushveld and Loskop Mountain Bushveld. Central Sandy Bushveld is generally associated with low undulating terrain and is characterized by tall, deciduous woodland or low broadleaf woodland on shallow rocky or gravelly soils. This vegetation unit occurs across much of the study area where undulating terrain occurs. Loskop Mountain Bushveld is generally associated with low mountains and ridges and is characterized by open tree and broad-leaved savanna. (Mucina and Rutherford, 2006). This vegetation is prevalent on the hilly terrain in the south west sector of the study area. The natural vegetation cover across much of the study area has undergone significant transformation to accommodate human settlement and agricultural activity. Much of the natural woodland has been cleared from the flatter areas leaving grassy plains with scattered trees and some isolated small patches of dense woodland.

Land use in Sekhukhune is dominated by commercial and subsistence farming (Sekhukhune District Municipality, 2014). Importantly, about a third of the land area in Elias Motsoaledi is recognised to be potential conservation areas, which may eventually encompass a third of the total land cover of this LM (Sekhukhune District Municipality, 2014).

Much of the study area appears to be vacant, undeveloped land although the presence of a few cattle would suggest some low intensity grazing activity (Figure 8). In addition, there are some patches of small-scale cultivation, typical of that found on peri-urban smallholdings. There few farmsteads in evidence but there are clusters of small dwellings and structures near the development site, many of which are derelict or abandoned. Additional anthropogenic elements include gravel access roads, wire fences and electrical and Telkom infrastructure. Patches of severe erosion are evident in the landscape. The south western sector of the study area falls inside the boundary of the Mabusa Nature Reserve and forms a scenic, natural landscape on the hilly terrain. The closest built up area lies to the north and north-east of the application site and includes the residential townships of Ga-Ngolvane and Phukukane and the town of Dennilton

Some commercial agricultural activities could be found on the site where the proposed project is to be located. This information though dates back to 2009, and will need to be confirmed during the site visit in the EIA phase. Both formal and informal build-up areas are found to the east and north of the site although

none of them are adjacent to the site itself. Nature reserves, i.e. Diana Ranch Private Nature Reserve and Mabusa Nature Reserve are found to the west and south of the site, respectively; however, the project boundaries are expected to share the border only with the Mabusa Nature Reserve in its north-western corner.

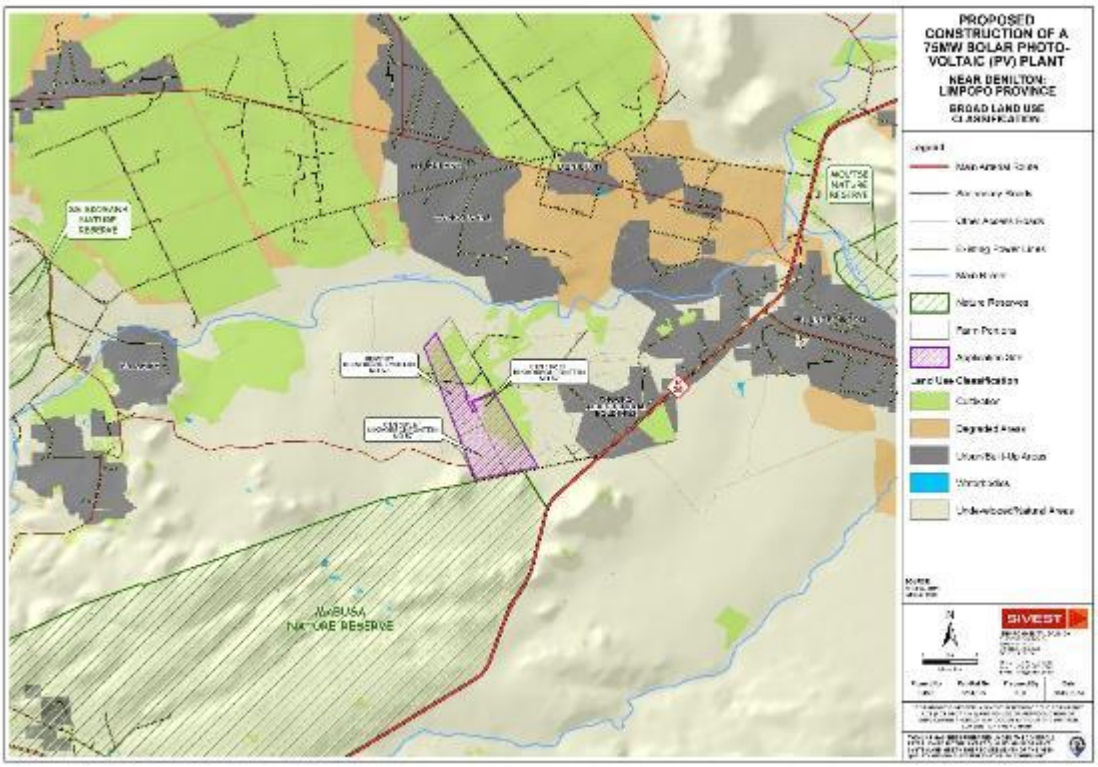

Figure 8: Land use in the region of the study area.

2.6 Climate

Climate data was obtained from the Agroclimatology database at ARC-ISCW (ARC-ISCW, 2011). The area has warm to hot, moist summers with cool to cold, dry winters. The climatic data is given in Table **4** below.

Table 4: Monthly temperature table

Month	Average Rainfall (mm)	Average Min. Temp (°C)	Average Max. Temp (°C)	Average frost dates
Jan	97.9	18.0	31.3	Start date: 28/06
Feb	88.1	17.9	30.7	End date: 04/07
Mar	68.8	16.2	29.6	Days with frost: ±7
Apr	45.2	12.7	27.5	
May	14.4	8.1	24.4	

Jun	4.9	4.6	22.0	
Jul	5.0	3.7	29.5	**Heat units (hrs > 10ºC)**
Aug	3.9	6.8	24.8	Summer
Sep	18.4	11.0	28.3	(Oct-Mar): 2554
Oct	51.5	15.0	30.3	
Nov	99.7	16.4	31.2	Winter
Dec	99.6	17.6	31.5	(Apr-Sept): 1396
Year	**597.3 mm**	**20.4 ºC (Average)**		

The long-term average annual rainfall is 597.3 mm, of which 505.6 mm, or 85%, falls from October to March. Temperatures vary from an average monthly maximum and minimum of 31.3ºC and 18.0ºC for January to 29.5ºC and 3.7ºC for July respectively.

2.7 **Biodiversity**

The Biodiversity Assessment was conducted by David Hoare and is included as Appendix 6A. The environmental baseline from a biodiversity perspective is presented below. The ultimate aim of the study was to determine potential impacts of the proposed project on fauna and flora, with special attention given to Red Data species. The findings of this report are based on desk top assessments rather than field verification which will commence in the next phase of the environmental application process.

2.7.1 Vegetation

The vegetation of the study area indicates that there are two regional vegetation types occurring in the study area, one of which only just enters the site in the southern parts. These are Central Sandy Bushveld across most of the site and Loskop Mountain Bushveld at the southern tip associated with the low hills.

Central Sandy Bushveld is found in Limpopo, Mpumalanga, Gauteng and North-West Provinces and occurs mainly in a broad arc south of the Springbokvlakte from the Pilanesberg in the west through Hammanskraal and Groblersdal to GaMasemola in the east. It is found in low undulating areas and sandy plains (Mucina et al. 2006). The vegetation is a tall, deciduous *Terminalia sericea* and *Burkea africana* woodland on deep sandy soils and low, broad-leaved *Combretum* woodland on shallow rocky or gravelly soils (Mucina et al. 2006). Species of *Acacia, Ziziphus* and *Euclea* are found on flats and lower slopes on eutrophic sands and some less sandy soils. *Acacia tortilis* may dominate some areas long valleys.

Loskop Mountain Bushveld is found in Limpopo, Mpumalanga and Gauteng Provinces and occurs on mountains in the vicinity of Loskop Dam extending south-westwards towards Bronkhorstspruit on mountains including the Gouwsberge and westwards to Rust de Winter. It is found on low mountains and ridges (Mucina et al. 2006). The vegetation is open tree savanna on lower-lying areas dominated by *Burkea*

africana and denser broad-leaved tree savanna on lower slopes and midslopes characterized by the prominent occurrence of *Diplorhynchus condylocarpon*, *Combretum apiculatum* and *Acacia caffra* (Mucina et al. 2006).

2.7.2 Conservation Status of Broad Vegetation Types

On the basis of a scientific approach used at national level by SANBI (Driver et al. 2005), vegetation types can be categorised according to their conservation status which is, in turn, assessed according to the degree of transformation relative to the expected extent of each vegetation type. The status of a habitat or vegetation type is based on how much of its original area still remains intact relative to various thresholds. The original extent of a vegetation type is as presented in the most recent national vegetation map (Mucina, Rutherford & Powrie 2005) and is the extent of the vegetation type in the absence of any historical human impact. On a national scale the thresholds are determined by best available scientific approaches (Driver et al. 2005). The level at which an ecosystem becomes Critically Endangered differs from one ecosystem to another and varies from 16% to 36% (Driver et al. 2005). According to scientific literature (Driver et al. 2005; Mucina et al., 2006) Central Sandy Bushveld is listed as Vulnerable and Loskop Mountain Bushveld as Least threatened.

The National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011), published under the National Environmental Management: Biodiversity Act (Act No. 10, 2004), lists national vegetation types that are afforded protection on the basis of rates of transformation. The thresholds for listing in this legislation are higher than in the scientific literature, which means there are fewer ecosystems listed in the National Ecosystem List versus in the scientific literature. Neither vegetation type is listed in the National List of Ecosystems that are Threatened and need of protection (GN1002 of 2011).

There is a fine-scale Biodiversity Conservation Plan for Limpopo Province, called the Limpopo Conservation Plan version 2 (http://bgis.sanbi.org). This divides the Province CBAs into various conservation levels, as follows (in decreasing conservation importance):

- Protected Area;
- Critical Biodiversity Area 1;
- Critical Biodiversity Area 2;
- Ecological Support Area 1;
- Ecological Support Area 2;
- Other Natural;
- No natural remaining.

Based on the Limpopo Conservation Plan, 40% of the province is designated as CBAs. These CBAs have been split into CBA 1 and CBA 2 on the basis of selection frequency and the underlying characteristics of the biodiversity features which are being protected (i.e. location fixed features such as sites for Critically

Endangered (CR) species and flexible ones such as Least Cost Corridors). The majority of the CBAs in the province are CBA 1 (22 %), which can be considered "irreplaceable" in that there is little choice in terms of areas available to meet targets. If CBA 1 areas are not maintained in a natural state then targets cannot be achieved. CBA 2's are considered "optimal" as there is significant design involved in their identification, make up 18 % of the province.

An additional 23% of the province is designated as Ecological Support Area (ESA). This category has also been split on the basis of land-cover into ESA 1 (16%) and ESA 2 (7%), with ESA 1 being in a largely natural state while ESA 2 areas are no longer intact but potentially retain significant importance from a process perspective (e.g. maintaining landscape connectivity). Other Natural Areas make up 20% of the province and just over 11% is designated as formal Protected Area.

Most of the study area falls within either Critical Biodiversity Area 2 (CBA2) or Ecological Support Area 1 (ESA1) (see Figure 9). The remainder is mapped as "No Natural Remaining".

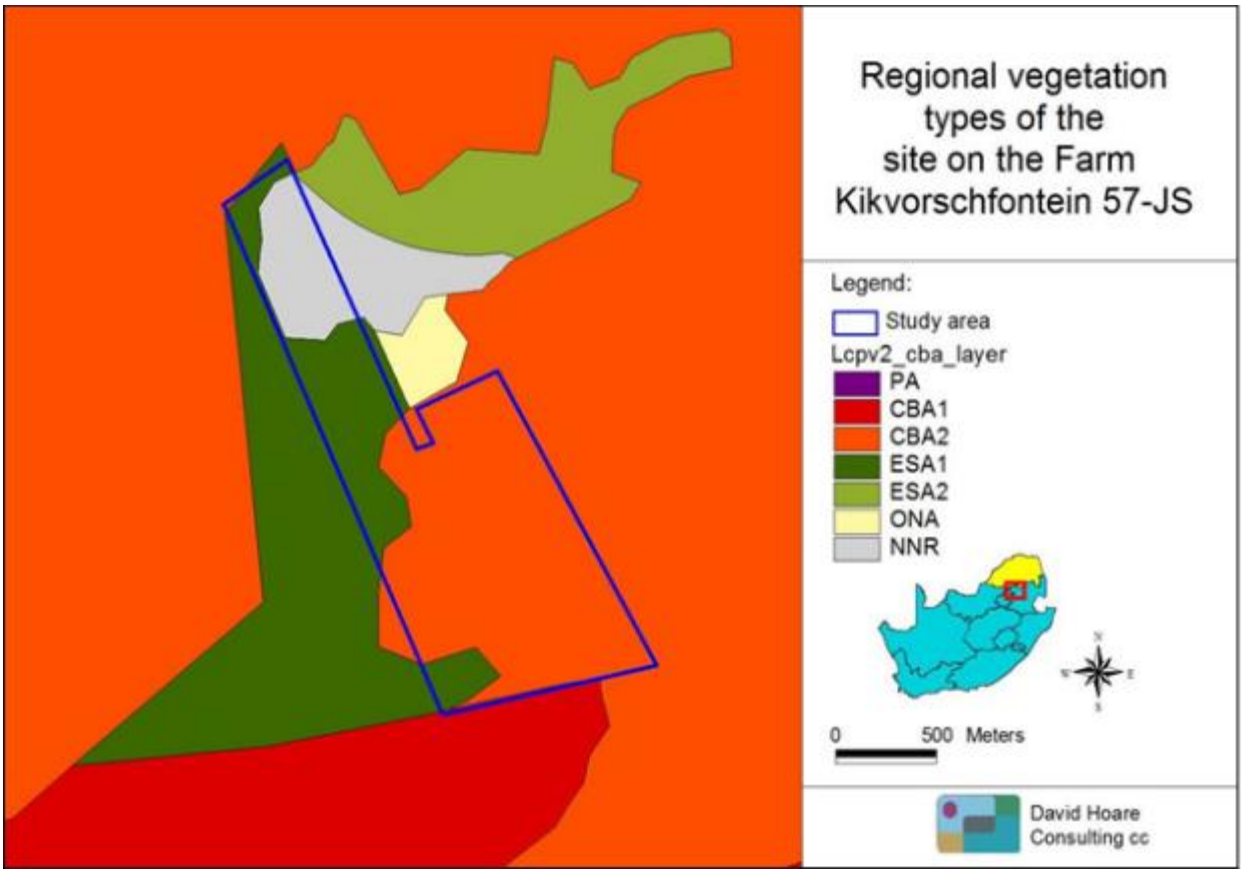

Figure 9: Critical Biodiversity Areas of the study area

2.7.3 Red List floral species of the study area

Lists of plant species previously recorded in the quarter degree grids in which the study area is situated were obtained from the South African National Biodiversity Institute. Additional species that could occur in similar habitats, as determined from database searches and literature sources, but have not been recorded in these grids are also listed.

The species on this list were evaluated to determine the likelihood of any of them occurring on site on the basis of habitat suitability. Of the five species that are considered to occur within the geographical area under consideration, there is one Declining plant species that has a high probability of occurring in habitats that are available in the study area. This species is *Ilex mitis* var. *mitis*. This is a tree that is found along rivers and streams in forest and thickets, sometimes in the open. There are also two species that have a moderate probability of occurring on site, namely *Argyrolobium megarrhizum* (listed as Near threatened) and *Gladiolus pole-evansii* (listed as Rare).

2.7.4 Protected Flora

Two plant species that are protected under the National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) could potentially occur in the general region, although they have not previously been recorded in the grids of the study area, are *Encephalartus middelbergensis* and *Encephalartus lanatus*.

Encephalartus middelbergensis is confined to the Witbank and Middelburg districts in the upper catchment areas of the Olifants River, which include the Wilge and Klein Olifants Rivers. It occurs in open grassland and sheltered valleys. It has not been previously recorded in this grid, but has been recorded in the grid to the south-east and east. It is considered unlikely that this species could occur on site due to habitat conditions found there relative to the species requirements.

Encephalartus lanatus occurs in the upper catchment area of the Olifants River in the Middelburg, Witbank and Bronkhorstspruit areas. It also occurs along the Little Olifants and Wilge rivers in this area, from 1,200 to 1,500 m. It is found on the slopes of sheltered wooded kloofs and sandstone ridges where it occurs as an element of open to sometimes rather closed woodland communities. Sites are usually gentle to steep sloping, associated with scattered sandstone boulders and well drained soils. The species shows a definite preference for semi-exposed, steep sloping sites with a southern aspect. It has not been previously recorded in this grid, but has been recorded in the grid to the south, south-east and east. It is considered unlikely that this species could occur on site due to habitat conditions found there relative to the species requirements.

There are a number of species protected under the National Forest Act that are known to have a geographical distribution that includes the grids in which the proposed infrastructure is to be located, namely

Boscia albitrunca, Combretum imberbe, Curtisia dentata, Elaedendron transvaalensis, Pittosporum viridiflorum, Prunus africana and *Sclerocarya birrea* subsp. *caffra.*

- *Boscia albitrunca* occurs in semi-desert areas and bushveld, often on termitaria, but is common on sandy to loamy soils and calcrete soils.
- *Combretum imberbe* occurs in bushveld, often on alluvial soils along rivers or dry watercourses.
- *Curtisia dentata* occurs in coastal and montane forest.
- *Elaedendron transvaalensis* occurs in bushveld, occasionally on termitaria.
- *Pittosporum viridiflorum* occurs along forest margins, in bush-clumps and in bushveld, often in rocky outcrops.
- *Pittosporum viridiflorum* occurs along forest margins, in bush clumps and in bushveld, often on rocky outcrops.
- *Prunus africana* occurs in montane forest, usually in mistbelt areas. It is unlikely to occur on site and has not previously been recorded there.
- *Sclerocarya birrea* subsp. *caffra* occurs in bushveld and woodland. A number of individuals of this species were recorded on site and in surrounding areas.

In summary, a number of protected trees could occur in the geographical area that includes the site or in habitats that may be found on site. A site evaluation will need to be undertaken in order to properly assess the probability of any of these species occurring there and/or to determine whether any occur on site or not.

2.7.5 Red List faunal species of the study area

All threatened (Critically Endangered, Endangered or Vulnerable) or near threatened vertebrate animals (mammals, reptiles, amphibians) that could occur in the study area are listed in the biodiversity specialist report. Those vertebrate species with a geographical distribution that includes the study area, and habitat preference that includes habitats available in the study area are discussed further.

There is a high diversity of mammal species that have a geographical distribution that includes the study area. This includes various species that are listed in a threat category, including the following that are considered to have a probability of potentially occurring on site:

1. Brown Hyaena (NT)
2. Serval (NT)
3. Honey Badger (NT)
4. Percival's Short-eared Trident Bat (NT)
5. Natal Long-fingered Bat (NT)
6. Temminck's Hairy Bat (NT)
7. Welwitsch's Hairy Bat (NT)
8. Rusty Bat (NT)
9. Geoffroy's Horseshoe Bat (NT)

10. Darling's Horseshoe Bat (NT)
11. South African Hedgehog (NT)

This list includes a high number of bat species that are likely to only traverse the site during feeding or travelling and will not use the site for roosting. Of the remaining species, all, except the South African Hedgehog, are highly mobile species and are unlikely to be resident on site.

There are no threatened reptile species that have a geographical distribution that includes the study area.

There is one listed amphibian species that has a geographical distribution that includes the study area. This is the Giant Bullfrog, listed as Near Threatened. Based on habitat requirements, this species is not considered likely to occur on site.

There are ten bird species of conservation concern that could potentially use the site, mostly for foraging, but in one case, possibly also for breeding. The Red-billed Oxpecker is the only bird species that may possibly breed on site. The remainder of the species, if they occurred there, would only use the site for occasional foraging. These are the following species:

1. Blue Crane
2. Grey-crowned crane
3. Martial Eagle
4. Lanner Falcon
5. Lesser Kestrel
6. Melodious Lark
7. Red-billed Oxpecker
8. Secretarybird
9. Cape vulture
10. Lappet-faced Vulture

In all cases, the site does not constitute important habitat for any of these species, but there is still a possibility that they may occur there. Development of the site is unlikely to cause a significant loss of habitat for any of these species.

2.7.6 Protected Fauna

There are a number of animal species protected according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004). According to this Act, "*a person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7". Such activities include any that are "of a nature that may negatively impact on the survival of a listed*

threatened or protected species". This implies that any negative impacts on habitats in which populations of protected species occur or are dependent upon would be restricted according to this Act.

Those species protected according to the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) that have a geographical distribution that includes the site include: White Rhinoceros, Black Wildebeest, Oribi, Cheetah, Cape Clawless Otter, Black-footed Cat, Brown Hyaena, Serval, Spotted-necked Otter, Honey Badger, Leopard, Cape Fox, Southern African Hedgehog, Southern African Python, Giant Bullfrog, Blue Crane, Grey-crowned Crane, Martial Eagle, Cape Vulture, Lappet-faced Vulture.

Due to habitat and forage requirements and the fact that some species are restricted to game farms and/or conservation areas, only the Black-footed Cat, Brown Hyaena, Serval, Honey Badger, Leopard, Cape Fox, Southern African Hedgehog, Southern African Python and some of the birds (Blue Crane, Grey-crowned Crane, Martial Eagle, Cape Vulture and Lappet-faced Vulture) have a likelihood of occurring on site. All of these species are mobile animals that are likely to move away in the event of any activities on site disturbing them. They are therefore unlikely to be affected by the proposed development of the solar power facility and associated infrastructure.

In summary, the following animal species protected by National legislation (National Environmental Management: Biodiversity Act) could potentially occur on site and may be negatively affected by development of the study area:

1. Southern African Hedgehog,
2. Southern African Python,
3. Blue Crane,
4. Grey-crowned Crane,
5. Martial Eagle,
6. Cape Vulture,
7. Lappet-faced Vulture.

- Important Bird Areas
  The study area is not within an Important Bird Area, but is near to the Loskop Dam Nature Reserve IBA (approximately 14 km from the site to the south-east).

2.7.7 Habitat Sensitivity on Site

A preliminary map of habitats on site is provided in Figure 10. This shows three main habitat units on site, namely riparian habitats, previously cultivated areas and other natural areas. The other natural areas include various densities of woodland, but these areas are also degraded to varying degrees and do not appear from aerial imagery to be in a pristine state. This information, in combination with the map of Critical Biodiversity Areas (Figure 9), was used to produce a preliminary sensitivity map of the study area (Figure 11). This shows the river area and the natural area in the southern part of the site to have HIGH sensitivity, other natural areas to have MEDIUM-HIGH sensitivity and all remaining areas to have LOW sensitivity.

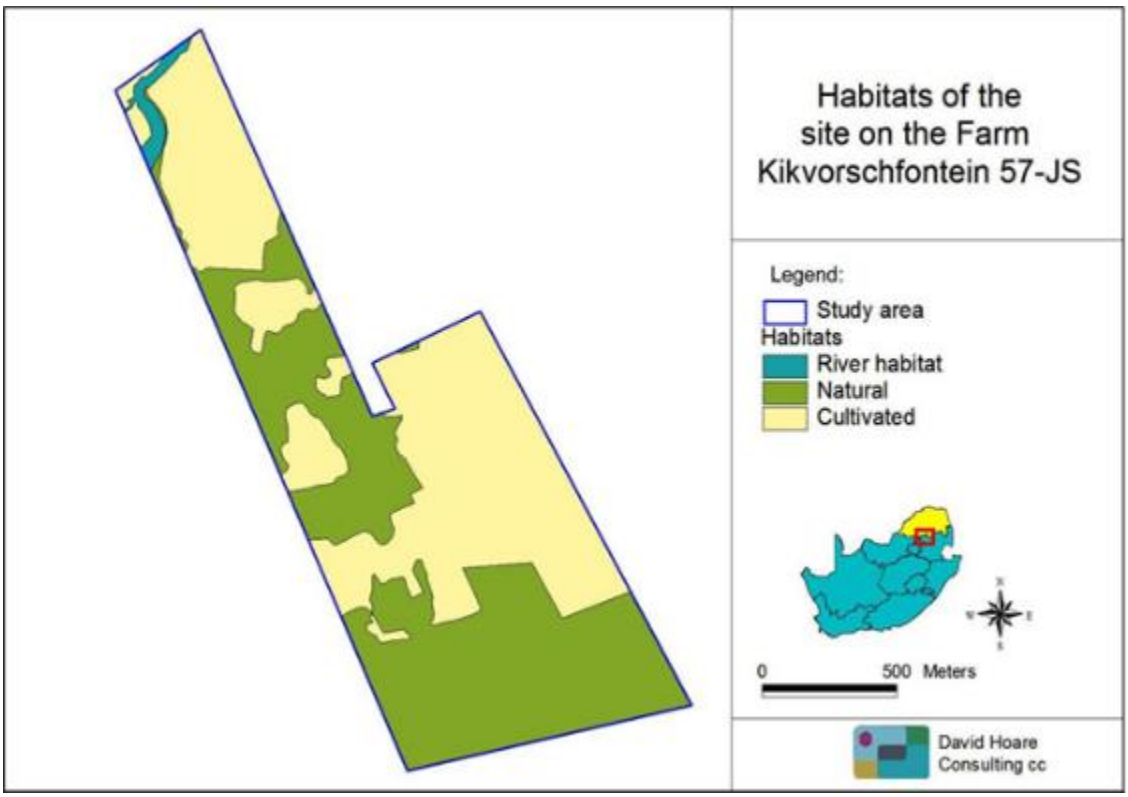

Figure 10: Main habitats of the study area

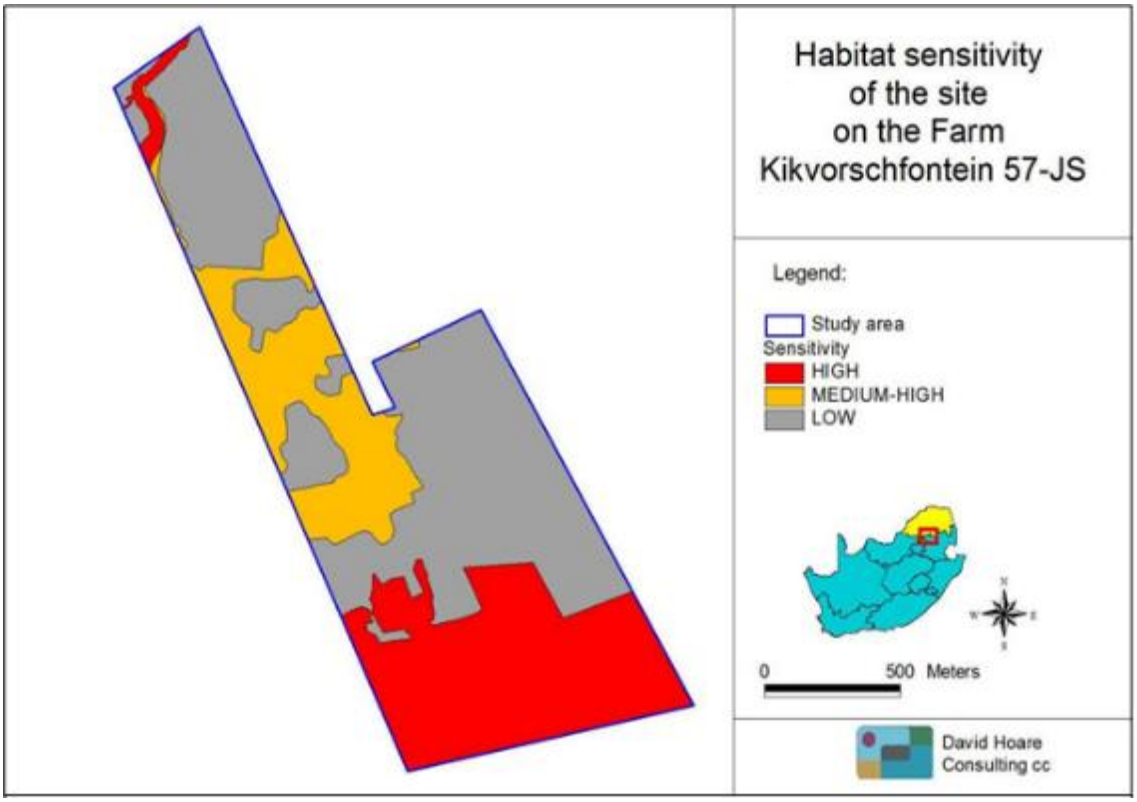

Figure 11: Preliminary habitat sensitivity of the study area

2.8 Surface Water

The Surface Water Assessment was conducted by SiVEST. The full report is included in Appendix 6B. The environmental baseline from a surface water perspective is presented below.

The study area falls within the Savanna Biome (Mucina and Rutherford, 2006). Within a biome, smaller groupings referred to as bioregions can be found which provide more specific but general details as to the biophysical characteristics of smaller areas. The study sites can be found within the Central Bushveld bioregion. Going into even finer detail, vegetation units are classified which contain a set of general but more local biophysical characteristics as opposed to the entire bioregion. The proposed development is found within the Central Sandy Bushveld and the Loskop Mountain Bushveld vegetation units.

2.8.1 Drainage Context

According to Dollar *et al*. (2007), regions can be grouped that have similar land areas containing a limited range of recurring landforms that reflect comparable erosion, climatic and tectonic influences, and impose broad constraints on lower levels of organisation, e.g., drainage basins, macro-reaches and channel types.

Hence, on this basis, geomorphic provinces (Partridge *et al*. 2010) have been delineated that reflect a relatively common set of climatic, vegetation, geological and topographical characteristics that are akin to one another. Utilising this information, the regional drainage characteristics of the broader study area can be elucidated. Under this context, the study site is located within the Western Transvaal Basin geomorphic province of South Africa.

- Western Transvaal Basin geomorphic province

According to Partridge *et al.* (2010), this province represents that western part of the Transvaal Basin which has been intruded by the rocks of the Bushveld Complex (mainly norite, granite and felsite) and as a consequence, the province is characterised by considerable topographical diversity. The centripetal dip of these rocks was imparted by the emplacement of the igneous rocks that occupy much of the province's floor. Along parts of the rim, recent faults (Partridge, 1998), some still active today and many associated with thermal springs, show that the basin floor has subsided by as much as 400 m in places (particularly in the northeast) (McCarthy & Rubidge, 2005). Much of the floor has limited relief, the landscape being dominated by a sprinkling of steep hills separated by wide, gentle pediments. The relief is particularly subdued on the Springbok Flats, where the Bushveld rocks are overlain by Karoo basalt. This low-relief area coincides with the Post-African I erosion surface (Partridge & Maud, 1987). Here, both the valley cross-sectional and longitudinal profiles of rivers are very gentle. The flat, marshy valley of the Nyl River, with its underfit character, is partly the result of channel disruption through ongoing subsidence and partly the product of capture by the Mokgalakwena River (Partridge & Maud, 1987). During the Cretaceous, the Mokgalakwena River drained the north-eastern escarpment zone to the west of the then Great Escarpment (around Tzaneen and Phalaborwa). It flowed west approximately along the present-day course of the Olifants River before veering north at the point where the present-day Nyl River flows into the valley of the Mokgalakwena River (Partridge & Maud, 1987). The westward recession of the Great Escarpment in the warm and wet Cretaceous and the Tertiary subsidence of the Western Transvaal Basin disrupted the early drainage pattern, leading to the present day hydrography.

These events also constrained the hydrography of the Olifants River. The concave longitudinal profiles of the five main river systems (Marico, Crocodile, Elands, Mokgalakwena and Olifants) that drain the Western Transvaal Basin reflect the imprint of lithology, structure and neotectonics. There is no clear trend from west to east or north to south, although in the extreme west of the basin, flatter slopes and broader valley cross sectional profiles are evident. However, the rivers are uniform in their longitudinal profile, with flat or medium slopes and wide or broad valley cross-sectional profiles, so that the sediment storage surrogate descriptors are predominantly Wide and Flat (WF) and, Broad and Medium (BM). However, there is significant heterogeneity, with river longitudinal profiles.

2.8.2 Surface Water Resource Occurrence in the Study Area

As identified at a desktop level using available resources, Figure 12 and Figure 13 (below) represent an illustration of the surface water resources mapped from the various consulted databases and those

delineated via remote sensing utilising Google™ satellite imagery for the solar PV power plant Nokukhanya application site.

- Database Identified Surface Water Resource Occurrence in the Study Area

The following findings from the study are limited to the databases that were directly relevant and where information was available. Not all databases and corresponding information were relevant for this study. In terms of the Limpopo ENPAT database, the study area is found within the Olifants Primary Catchment. More specifically, the study area is found within the B32G quaternary catchment. Of the surface water resources identifiable in the databases (Limpopo ENPAT and NFEPA), the study area contains two (2) non-WETFEPA identified natural channelled valley-bottom wetlands.

Within close proximity to the study area, the following surface water resources identifiable in the databases (Limpopo ENPAT and NFEPA) were noted:

- One (1) non-WETFEPA natural channelled valley-bottom wetland roughly 130m north of the study area,
- The perennial Moses River Buffer Zone approximately 450m north of the study area, and
- One (1) non-WETFEPA artificial channelled valley-bottom wetland roughly 650m to the west of the study area.

Over and above the already mentioned, no other wetlands or surface water features were identifiable from other remaining databases consulted that are in close proximity to the proposed development, and are expected to be affected by the proposed development.

In terms of the Limpopo C-Plan V2 database, the study area spans across:

- A Critical Biodiversity Area (CBA) 2, which are areas selected to meet biodiversity pattern and/or ecological process targets;
- An Ecological Support Area (ESA) 1, which are natural/ or near natural, near natural and degraded areas supporting CBSs by maintaining ecological processes; and
- An ESA 2, which are areas with no natural habitat, that are important for supporting ecological processes.

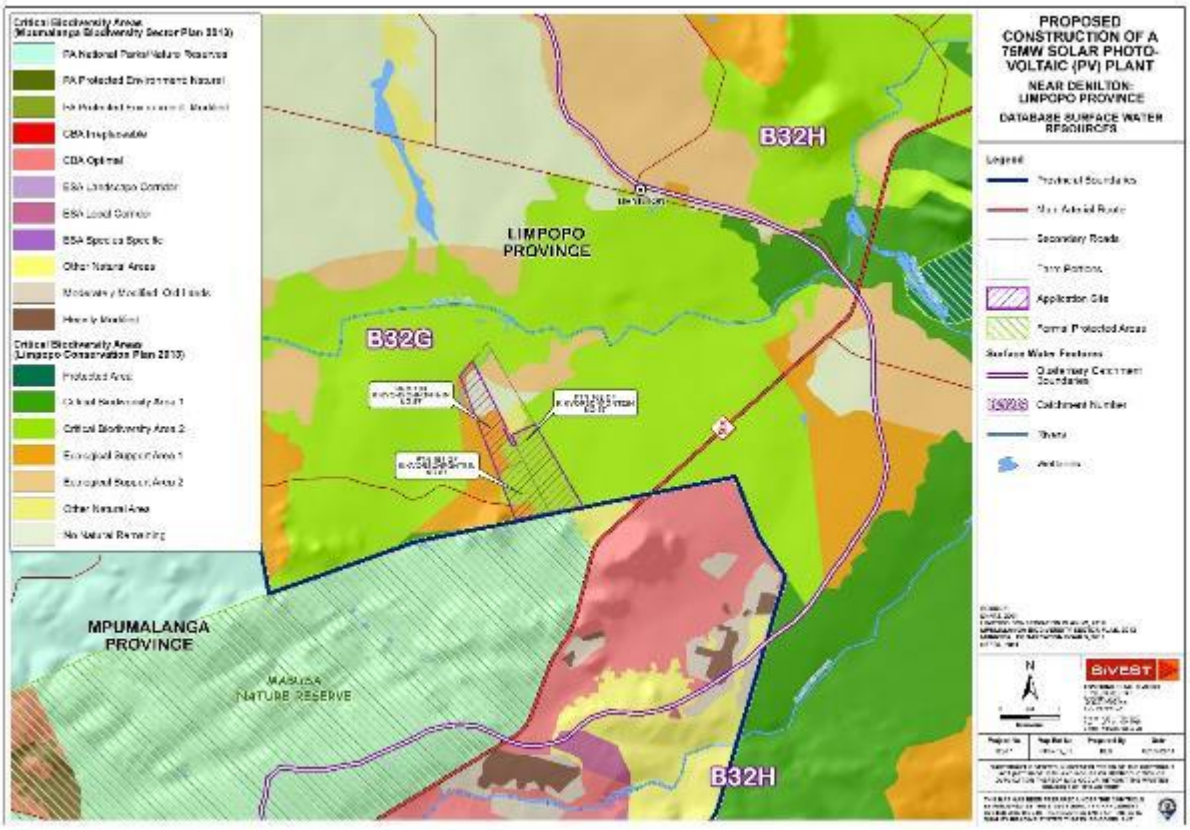

Figure 12: Database surface water resources for the Nokukhanya solar PV power plant application site.

- Desktop Surface Water Resource Occurrence in the Study Area

Utilising the database findings above, Google™ satellite imagery overlaid with 1:50 000 topographical images were consulted to refine/confirm surface water resources that were identified. A number of drainage lines and potential surface water resources were apparent and could be delineated for the all-inclusive study area. In summary, it was found that there were a total of:

- One (1) channelled valley-bottom wetland with a northerly direction of flow, and;
- One (1) depression wetland.

The one (1) channelled valley-bottom wetland located directly southeast of the study site was found to be characterised by a northerly direction of flow.

The desktop findings verify the presence of the channelled valley-bottom wetland located within the study area. However, from what had been observed in the desktop findings, the channelled valley-bottom wetland system seemed to be somewhat larger in size and incorporate a larger portion of the study area than that shown in the database findings. Additionally, the database findings identified that the channelled (natural

and artificial) valley-bottom wetlands were separate systems. However, from a desktop findings perspective, it was apparent that these two wetland systems may be connected as one greater system. An in-field site visit involving a ground-truthing exercise will need to be undertaken to verify database and desktop findings.

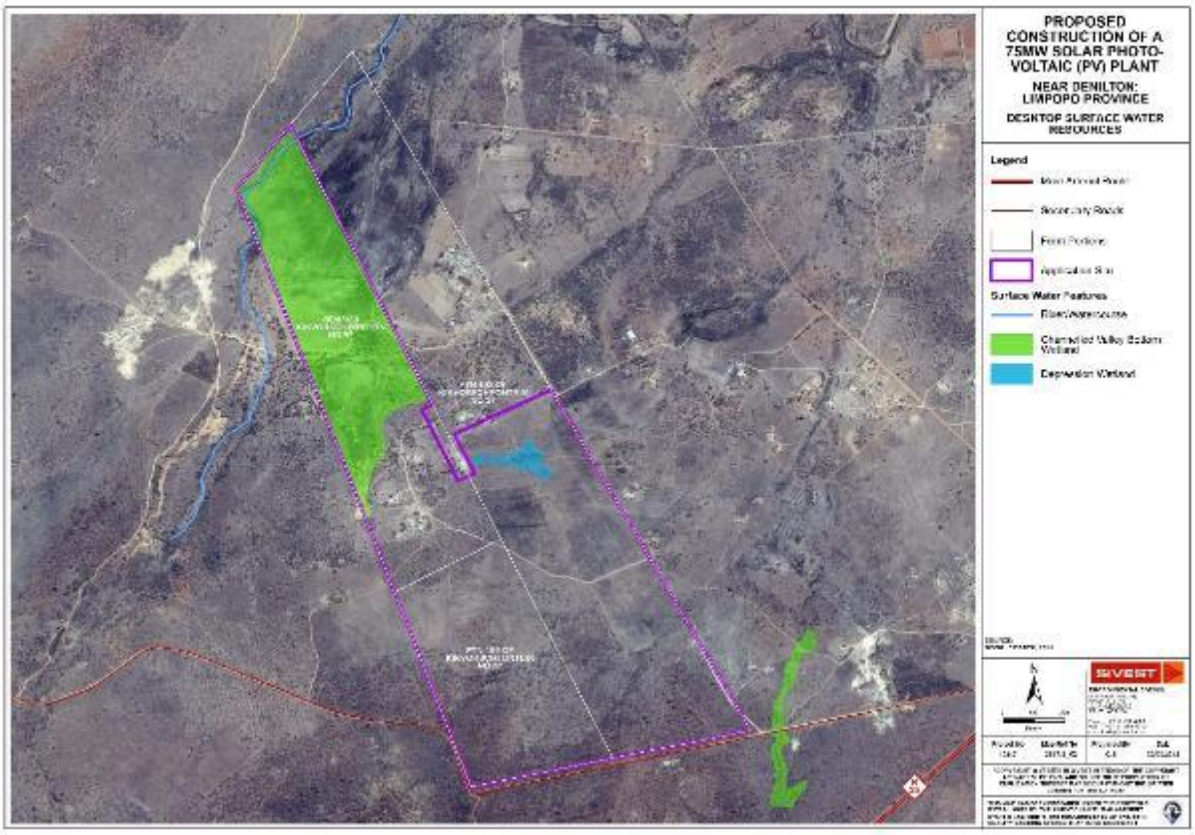

Figure 13: Desktop surface water resources for the Nokukhanya all inclusive scoping area.

2.9 **Soils and Agricultural Potential**

The Soils and Agricultural Potential Assessment was conducted by D.G. Paterson. The full report is included in Appendix 6C. The environmental baseline from a soils and agricultural perspective is presented below.

2.9.1 Soils

Existing soil information was obtained from the map sheet 2528 Pretoria (Fitzpatrick *et. al*., 1986) from the national Land Type Survey, published at a 1:250 000 scale. A land type is defined as an area with a uniform

terrain type, macroclimate and broad soil pattern. The soils are classified according to MacVicar *et al.* (1977).

The area under investigation and based on a desktop survey is covered by one land type, namely:

- **Bd4** (Yellow-brown, structureless, highly weathered soils within a plinthic catena)

A summary of the dominant soil characteristics of the land types occurring is given in Table 2 below. The distribution of soils with high, medium and low agricultural potential within the land types is also given, with the dominant class shown in bold type.

Table 5: Land types occurring (with soils in order of dominance)

Land Type	Dominant soils	Depth (mm)	Percent of land type	Characteristics	Agric. Potential (%)
Bd4	Cartref 30/31, Wasbank 30/31	200-450	29.4%	Yellowish-brown, apedal, sandy loam topsoil on a grey structureless horizon and grading into weathering rock and ultimately bedrock.	High: 1.6 Mod: 24.8 Low: 73.6
	Glenrosa 15, Mispah 10/11	200-450	33.7%	Yellowish-brown, apedal, sandy loam topsoil grading into weathering rock and ultimately bedrock.	
	Glencoe 25, Clovelly 35/36, Avalon 25/35/36, Hutton 25/35/36	450-750	24.8%	Yellow-brown, structureless, sandy clay loam soils on cemented ferricrete (Glencoe), rock (Clovelly) or mottled, soft plinthite (Avalon). Red-brown to yellow-brown, structureless, sandy clay loam soils, on weathering rock (Hutton).	

It should be noted that the Agricultural Potential referred to in column 6 refers to *soil potential only* and does not take prevailing climatic conditions into account.

The Land Type Survey information (Fitzpatrick, et. al. 1986) shows that the study area is dominated by relatively shallow yellow-brown, structureless soils (land type Bd4). The texture generally varies slightly from coarse sand to sandy loam and the effective depth also varies somewhat, generally between 200 and 750 mm.

The prevailing agricultural potential of the area is low to moderate, defined mainly by the restricted rooting depth. The majority of the soils in the area have an average effective soil depth of 300-400 mm (Table 2), which is very low for most crops. Where subsurface restrictions, such as rock or hard plinthite, are present at shallow depth (generally less than 450 mm from the surface), then the arable agricultural potential will be significantly restricted. Almost 74% of the area has low potential arable soils (Table 2).

It should be clearly noted that, since the 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 the land type survey may also occur.

2.10 **Visual**

The Visual Assessment was conducted by SiVEST. The full report is included in Appendix 6D. The environmental baseline from a soils and agricultural perspective is presented below.

2.10.1 Visual Character and Sensitivity of the study area

The physical and land use related characteristics are outlined below as they are important factors contributing to the visibility of a development and visual character of the study area. Defining the visual character is an important part of assessing visual impacts as it establishes the visual baseline or existing visual environment in which the development would be constructed. The visual impact of a development is measured according to this visual baseline by establishing the degree to which the development would contrast or conform with the visual character of the surrounding area. The inherent sensitivity of the area to visual impacts or visual sensitivity is thereafter determined, based on the visual character, economic importance of the scenic quality of the area, inherent cultural value of the area and presence of visual receptors.

2.10.2 Physical and Land Use Characteristics

- Topography

Much of the broader study area lies in the Moses River valley and is characterised by relatively flat to gently undulating terrain (Figure 15). The south-western portion of the study area however incorporates part of the Mabusa Nature Reserve which is characterised by hilly terrain with steep slopes (Figure 14). The nature of the terrain would suggest that that PV panels with a height of 3m could be visible from many surrounding areas as well as from higher ground.

Figure 14: View of Hilly Terrain in the South-Western Sector of the Study Area.

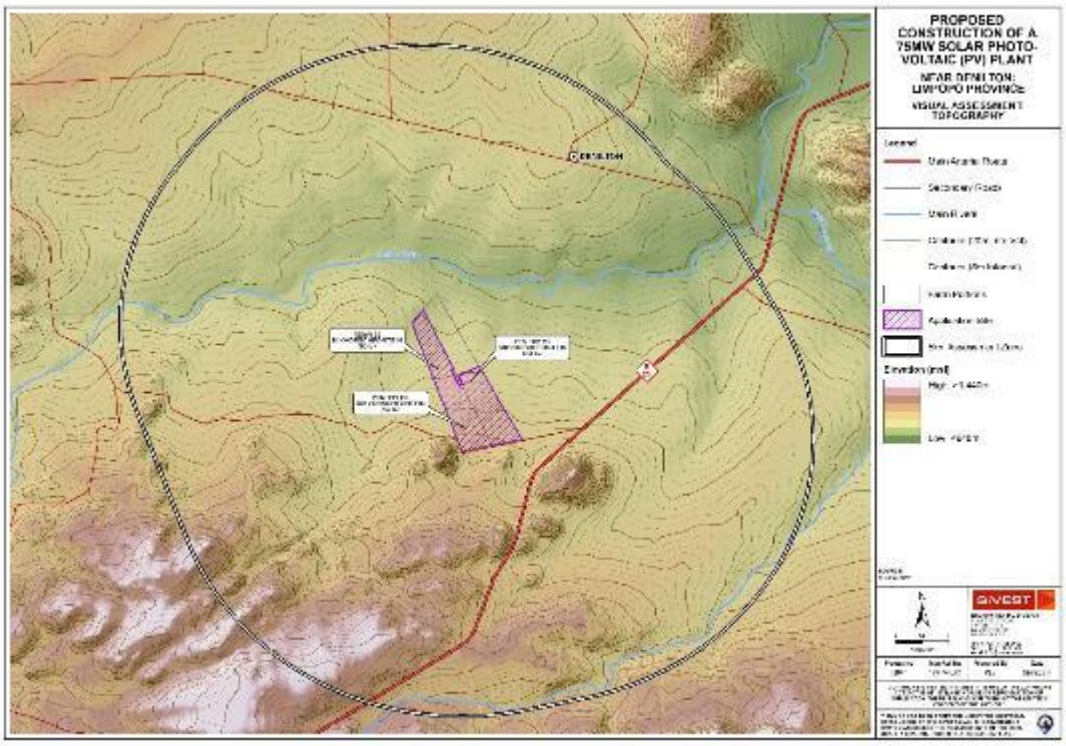

Figure 15: Topography within the application site.

- Land cover

The natural vegetation cover across much of the study area has undergone significant transformation to accommodate human settlement and agricultural activity. Much of the natural woodland has been cleared from the flatter areas leaving grassy plains with scattered trees and some isolated small patches of dense woodland. At the time of the site visit, vegetation cover near the development site was fairly sparse as a result of bush fires. In contrast, the natural vegetation cover has been largely preserved in the hilly areas located within the Mabusa Nature Reserve.

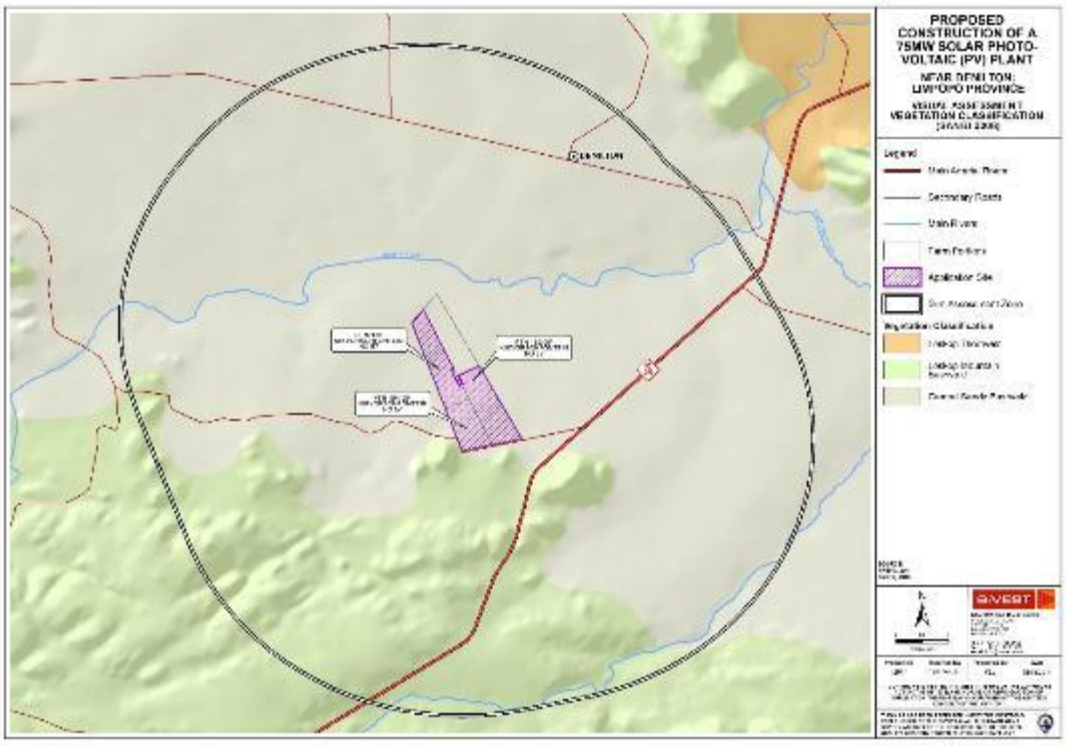

Figure 16: Map showing the vegetation within the study area.

Much of the study area appears to be vacant, undeveloped land although the presence of a few cattle would suggest some low intensity grazing activity. In addition, there are some patches of small-scale cultivation, typical of that found on peri-urban smallholdings. There few farmsteads in evidence but there are clusters of small dwellings and structures near the development site, many of which are derelict or abandoned. Additional anthropogenic elements include gravel access roads, wire fences and electrical and Telkom infrastructure. Patches of severe erosion are evident in the landscape.

The closest built up area lies to the north and north-east of the application site and includes the residential townships of Ga-Ngolvane and Phukukane and the town of Dennilton (Figure 17).

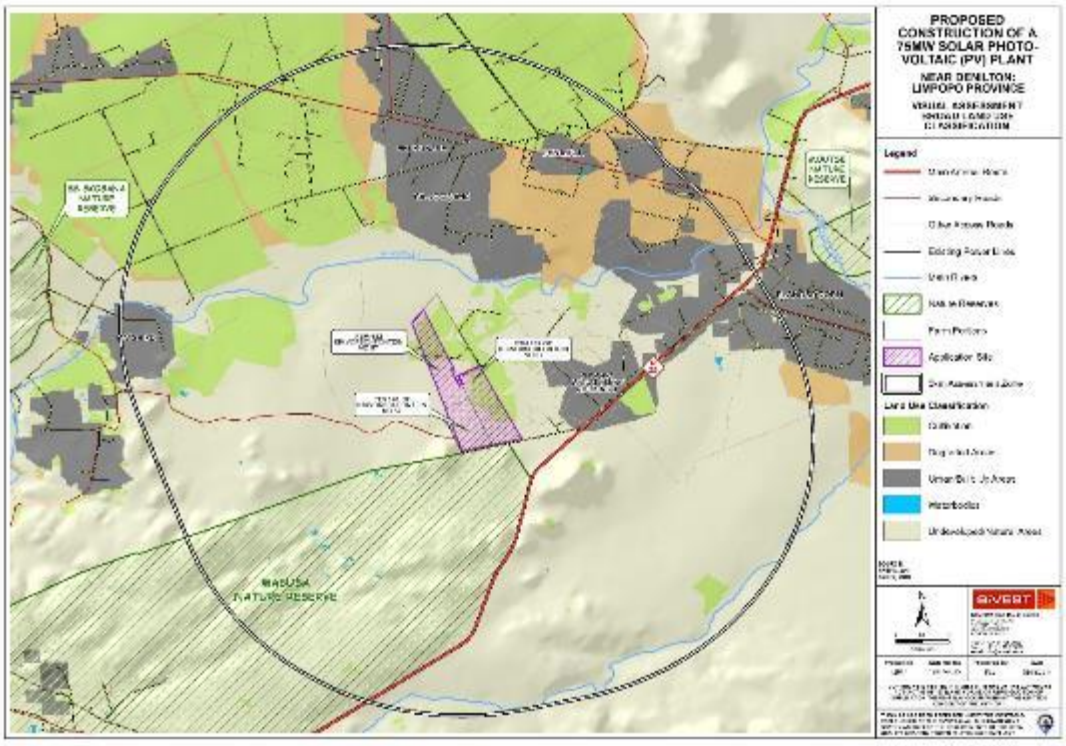

Figure 17: Map showing the land use within the study area

Despite the degree of transformation of the natural vegetation in the study area, remaining vegetation cover could provide sufficient visual screening of the proposed development, although the effectiveness of this screening would depend on the location of the receptor. Land use and associated infrastructure has significantly transformed the surrounding environment and has resulted in a somewhat degraded peri-urban landscape.

2.10.3 Visual Character

The above physical and land use-related characteristics of the study area contribute to its visual character. Visual character is determined by the level of change or transformation from a completely natural setting, which would represent a natural baseline in which there is little evidence of human transformation of the landscape. Varying degrees of human transformation of a landscape would engender differing visual characteristics to that landscape, with a highly modified urban or industrial landscape being at the opposite end of the scale to a largely natural undisturbed landscape. Visual character is also influenced by the presence of built infrastructure such as buildings, roads and other objects such as electrical infrastructure.

The only remaining natural landscape is found in the Mabusa Nature reserve in the south-western sector of the study area but this only forms a small portion of the study area and has little influence on the overall visual character of the study area (Figure 18 and Figure 19). The primary built infrastructure within the study area includes built-up areas to the north-east and the west, the R25 tar road, a network of gravel access roads, several boundary fences, power

lines, telephone lines and a few farm buildings. These localised anthropogenic features are typical of a pastoral environment. As such, the overall study area is considered to have a rural visual character, which appears to display a peri-urban environment in close proximity to the built-up areas. Although the PV plant would not conform to the typical character of the area, the visual contrast would be less significant in an already degraded landscape and this would reduce the likely visual impacts.

Figure 18: Typical landscape of the project site

Figure 19: Natural vegetation in Mabusa Nature Reserve

2.10.4 Visual Sensitivity

Visual Sensitivity can be defined as the inherent sensitivity of an area to potential visual impacts associated with a proposed development. It is based on the physical characteristics of the area (visual character), spatial distribution of potential receptors, and the likely value judgements of these receptors towards a new development. A viewer's perception is usually based on the perceived aesthetic appeal of an area and on the presence of economic activities (such as recreational tourism) which may be based on this aesthetic appeal. The visual sensitivity of an area is broken up into a number of categories, as described below:

- **High** - The introduction of a new development such as a solar power plant would be likely to be perceived negatively by receptors in this area; it would be considered to be a visual intrusion and may elicit opposition from these receptors
- **Moderate** – Receptors are present, but due to the nature of the existing visual character of the area and likely value judgements of receptors, there would be limited negative perception towards the new development as a source of visual impact.
- **Low** - The introduction of a new development would not be perceived to be negative, there would be little opposition or negative perception towards it.

The study area is rated as having a low visual sensitivity. This is mainly due to the transformation and degradation of the landscape as a result of human activity in conjunction with a low density of sensitive receptor locations and the absence of tourism facilities or other sites of cultural significance. The relatively low degree of visual sensitivity of the area under the current baseline is an important factor that has a bearing on the likely visual impacts that would be associated with the proposed PV Plant.

A sensitive receptor is defined as a receptor, which would potentially be adversely impacted by a proposed development. This takes into account a subjective factor on behalf of the viewer – i.e. whether the viewer would consider the impact as a negative impact. As described above, the adverse impact is often associated with the alteration of the visual character of the area in terms of the intrusion of a development into a 'view', which may affect the 'sense of place'. The identification of sensitive receptors is based on a number of factors which include:

- the visual character of the area, especially taking into account visually scenic areas and areas of visual sensitivity
- the presence of leisure-based (esp. nature-based) tourism in an area
- the presence of sites / routes that are valued for their scenic quality and sense of place.
- feedback from interested and affected parties, as raised during the public participation process conducted as part of the wider EIA study

The table below provides details of the visually sensitive receptors that were identified during the field investigation. It must be noted that most of these receptors encompass areas or clusters of land usage rather than individual points.

Table 6: Visual receptors in the study area

Name	Receptor Type
Dennilton Residential Suburb	Low density residential area
Ga-Ngolvane/Phukukane Residential Community	Dense settlement
Metshipe Residential Community	Dense Settlement
Farm Dwelling (West)	Dwelling
Farm Dwellings (East)	Cluster of dwellings
Phooko Agricultural Holdings	Dwellings
Mabusa Nature Reserve	Nature Reserve
R25	Road

The existing dwellings on the development site have been excluded from this assessment as it has been assumed that the occupants would have a vested interest in the development and would therefore not perceive the proposed development in a negative light.

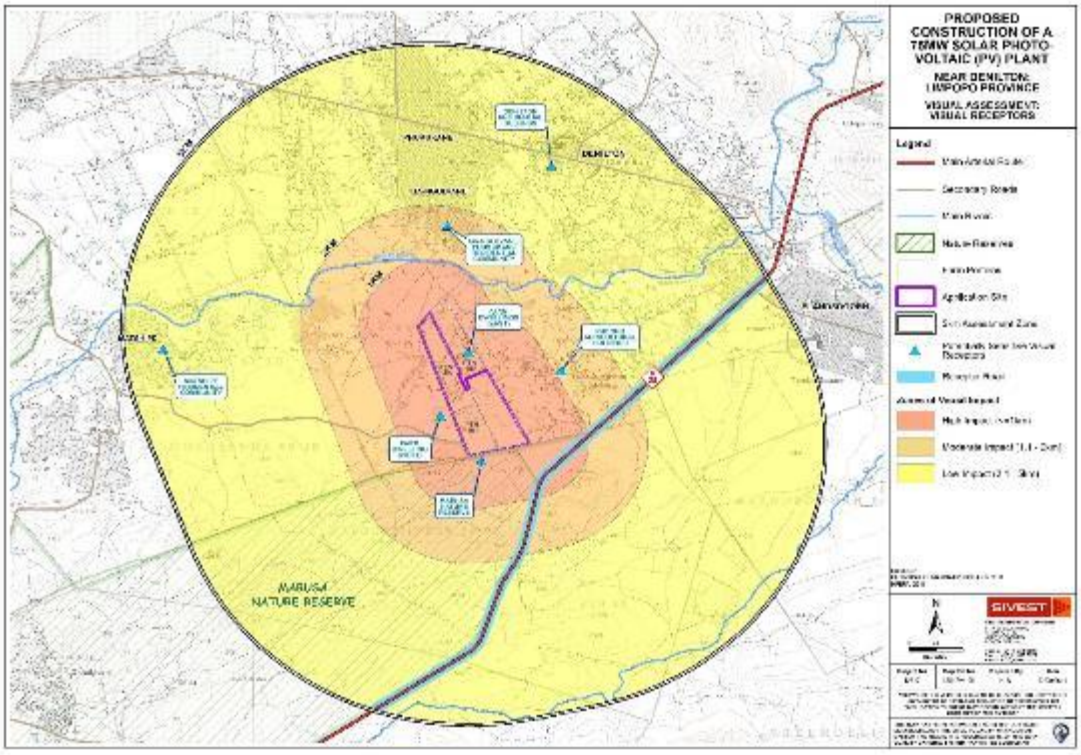

Figure 20: Map showing potential visual receptors within the study area

2.10.1 Typical Visual Impact Associated with PV Plants

In a solar PV power plant the PV panels are grouped together to form a 'solar field'. Each PV panel is a large structure, being between 3m and 10m in height (equivalent in height to a building between one and three storeys). The height of these objects will make them visible,

especially in the context of a relatively flat landscape. More importantly, the concentration of these panels will make them highly visible, which will depend on the number of panels in each solar field, known as its spatial extent or footprint. Solar fields with a large spatial extent will become an important focal point in a landscape, especially if the landscape is natural in character or undeveloped. As most solar power plants tend to be located in vacant or uninhabited areas due to space availability, the landscape context is often natural or undeveloped and in this context the solar field could be considered to be a visual intrusion that possibly acts to alter the visual environment.

In the case of PV plants, taller vegetation such as trees and shrubs will need to be cleared. This practice of clearing vegetation will intensify the visual prominence of the solar energy facility, particularly in natural locations where woody vegetation still exists, but to a lesser degree if the proposed facility is located on land that has already been cleared or where the natural vegetation cover is short.

It should also be noted, that the perception of the viewer/receptor toward an impact is highly subjective and involves 'value judgements' on behalf of the receptor. If a development is associated with employment creation, social upliftment and the general growth and progression of an area, it may not be associated with any negative visual impacts and may even have positive connotations. It should be noted that the proposed solar facility may be considered to be an environmentally sustainable option of generating electricity, and this may positively alter the viewer's perceived experience of the visual impact, as the facility may be viewed as a symbol of progress toward a 'greener' future.

Solar plants are not features of the natural environment, but are a representation of human (anthropogenic) alteration; however, the presence / existence of other anthropogenic objects associated with the built environment may not only obstruct views but also influence the perception of whether a development is a visual impact. In industrial areas where structures, buildings and other infrastructure exist, the visual environment could be considered to be 'degraded' and thus the introduction of a PV plant into this setting may be considered to be less of a visual impact than if there was no existing built infrastructure visible. In this case value may not be placed in the aesthetic quality of the landscape, and the renewable energy facility may not necessarily be considered to be visually intrusive.

The solar development is likely to be perceived as a visual impact in areas that have a natural scenic quality and where tourism activities based upon the enjoyment of, or exposure to, the scenic or aesthetic character of the area are practiced. Residents and visitors to these areas may regard the solar panels as unwelcome intrusions, which degrade the natural character and scenic beauty of the area, and which would potentially even compromise the practising of tourism activities in the area.

2.11 **Heritage**

The Heritage Assessment was conducted by Wouter Fourie of Professional Grave Solutions. The full report is included in Appendix 6E. The environmental baseline from a heritage perspective is presented below.

2.11.1 Archival findings

The examination of heritage databases, historical data and cartographic resources represents a critical additional tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Therefore an internet literature search was conducted and relevant archaeological and historical texts were also consulted. Relevant topographic maps and satellite imagery were studied.

Researching the SAHRA APM Report Mapping Project records and the SAHRIS online database (http://www.sahra.org.za/sahris), it was determined that a number of other archaeological or historical studies have been performed within the wider vicinity of the study area. A single exemption application done by Roodt in 2006 was identified close to the study area. The study did not include any background research and no heritage resources were identified during the field work.

2.11.2 General Background to the Study Area

- Stone Age

The Stone Age can be roughly divided into three

Earlier Stone Age (400 000 – 2 million Before Present/BP)
Middle Stone Age (30 000 – 300 000 BP)
Later Stone Age (30 000 BP – recent times)

- Iron Age

The Iron Age as a whole represents the spread of Bantu speaking people and includes both the Pre-Historic and Historic periods. It can be divided into three distinct periods:

The Early Iron Age: Most of the first millennium AD.
The Middle Iron Age: 10th to 13th centuries AD
The Late Iron Age: 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. Iron is a very hard metal to work with compared to gold and copper that have lower

melting temperatures and therefore are easier to forge. A drawback of gold and copper are the occurrence of ore, which is relatively limited compared to iron.

In Africa, we proceeded technologically directly from the Stone Age in to the Iron Age whereas in Eurasia there was a prolonged Copper and Bronze Age preceding the Iron Age. In southern Africa, metallurgical techniques made their first appearance in a rather advanced state that permitted the smelting of Copper and Iron directly after a Stone Age economic way of live.

This scenario provides a strong argument that metallurgical technology was introduced from elsewhere and did not develop locally. To effectively smelt iron oxide, ore by reduction requires a temperature of at least 1100°C that is 400°C below the metals melting point. To obtain a temperature this high was probably unattainable in ancient furnaces. But the prolonged heating of ore in contact with abundant charcoal, needed to obtain a sufficiently high temperature for the reduction of the oxide ores, enable the iron to obtain enough carbon to make it mild steel. If this mild steel was repeatedly heated and hammered during the forge process, it will harden.

- Early Iron Age

Early in the first millennium AD, there seem to be a significant change in the archaeological record of the greater part of eastern and southern Africa lying between the equator and Natal. This change is marked by the appearance of a characteristic ceramic style that belongs to a single stylistic tradition. These Early Iron Age people practised a mixed farming economy and had the technology to work metals like iron and copper.

A meaningful interpretation of the Early Iron Age has been hampered by the uneven distribution of research conducted so far; this can be partly attributed to the poor preservation of these early sites.

Linguistic and archaeological research has developed a model of Bantu distribution from Central Africa down towards Southern Africa from around 1000 BC to 500 AD. This movement has resulted in the current tribal distribution as known today

- Later Iron Age – early farming communities

Later Iron Age (LIA), also referred to as early farming communities, starts around 1500 AD and continues up to 1840 with the start of colonialisation of the South African interior. One of the main features of the LIA is the remnants of stone walled settlements scattered over large area of southern Africa. These stone walled settlements and characterised by a specific type of layout referred to as the Central Cattle Pattern (CCP). The CCP refer to a settlement pattern where animal enclosures forma circle around a central open space or cattle are kept in a central kraal around which the development of settlements are done (Huffman, 2007).

There are numerous differences in layout of these stone walled settlements which researchers use to assign cultural affinities and/ or associated temporal scales. The main types are Moorpark Cluster (Moore park/Melora/KwaMaza walling; Nguni, 1500-1600AD), Ntsuanatsatsi

Cluster (Types N/V/ Klipriviersberg/Molokwane/Badfontein/Type Z/B/ Thukela and Doornspruit type walling), and Zimbabwe Patterns (Khami and great Zimbabwe) (Huffman, 2007).

- Anthropology of the area

The study area falls within an area proclaimed as a homeland to the Ndebele, by the pre-1994 government as KwaNdebele. The inhabitants of this area are predominantly associated with the Southern Ndebele.

Three main groups of Ndebele people are recognised in southern Africa:

- The Southern Transvaal Ndebele (now Gauteng and Mpumalanga)
- The Northern Transvaal Ndebele (now Limpopo Province) around the towns of Mokopane (Potgietersrus) and Polokwane (Pietersburg).
- The Ndebele people of Zimbabwe, who were called the Matabele by the British (Coetzee, 1980; De Beer, 1986; Fourie, 1921)

The Southern Transvaal Ndebele (Southern Ndebele) is divided into three kin groups, namely the Ndzundza, the Manala and the Hwaduba (Jonas, 1989). The origins of the southern Ndebele starts with Mafana and Mhlanga (1557 AD-1587 AD) ruling at a place called Emhlangeni (close to Randfontein) after which they moved under Mhlanga to KwaMnyamana, near Bon Accord. Mhlanga was then succeeded by Musi (1666 AD). Musi had five or six sons: Manala, Masombuka, Ndzundza, Mathombeni and Dhlomu (Nelson, 2008; Jonas, 1989). Jonas (1989) indicates that a war of succession broke out between Manala and Ndundza and Ndzundza and his followers fled east wards through the Bronkhorstspruit, Witbank and Middelburg areas before settling in the Stoffberg area. Massie (1905) however maintains that the tribe divided in to four groups; Manala (settling in the Pretoria area), Kekaan (settling in the Soutpansberg, Waterberg and Pretoria area), M'Hwaduba (settling the Pretoria area) and Ndzundza (also known as the Mapoch tribe, settling in the eastern Transvaal (Mpumalanga) and Pretoria area).

The dispersal of the Ndzundza Ndebele to the Steelpoort and KwaNdebele in 1883, was preceded by numerous movements and resettlements due to political and socio-economic circumstances during the preceding 150 years (Nelson, 2008). The most significant of these sites, also having the final part in the scattering of the Ndebele, is KoNomtjarhelo. KoNomtjarhelo was the royal kraal of Mabogho of the Ndzundza clan and was laid out as settlement and military fortress around 1830. The Ndzundza maintained a fragile peace with the colonial forces of the ZAR up until 1882, when Nyabela, the successor of Mabhogo, provided shelter for the Pedi chief, Mampuru and his men. Mampuru murdered his half-brother Sekhukhune in 1882, resulting in the then ZAR sending gen. Piet Joubert and a commando to arrest Mampuru and end the uprising that ensued the murder of Sekhukhune (Saks, 2008)

The ZAR forces laid siege to KoNomtjarhelo for 8 months after which Nyabela and 8000 of his subject surrendered. Mampuru was sentenced to death and hanged on 22 November 1883 in Pretoria.

The Ndzundza was dispersed to Boer farms in different districts of the ZAR to work for 5 years as indentured labour. KoNomtjarhelo and surrounds were subdivided and given as reward to Boer commando members that participated in the siege. After the release of Nyabela in 1898 he settled with some of his subjects at KwaMkhina (close to Derdepoort in Pretoria) (Van Jaarsveld, 1986)

- Recent History

Since the scattering of the Ndzundza, the Ndebele people work towards the establishment of a self-governing area (Phatlane, 1998). This former Bantustan was given self-governing status on 1 April 1981 by the pre-1994 government under the name KwaNdebele. This former homeland was re-integrated in to South Africa on 27 April 1994.

2.11.3 General Background to the Study Area

Historical maps of the study area consulted were the First edition 1:50 000 topo cadastral map – 2529AC dated 1966 and surveyed in 1965. The map provides interesting information on the historic layout of the farm and corroboration of the data on farms sales in the area. Evaluation of the map indicates the presence of on cluster of structures in the central part of the study area and two separate settlement units in the southern sections of the study area (all circled in red).

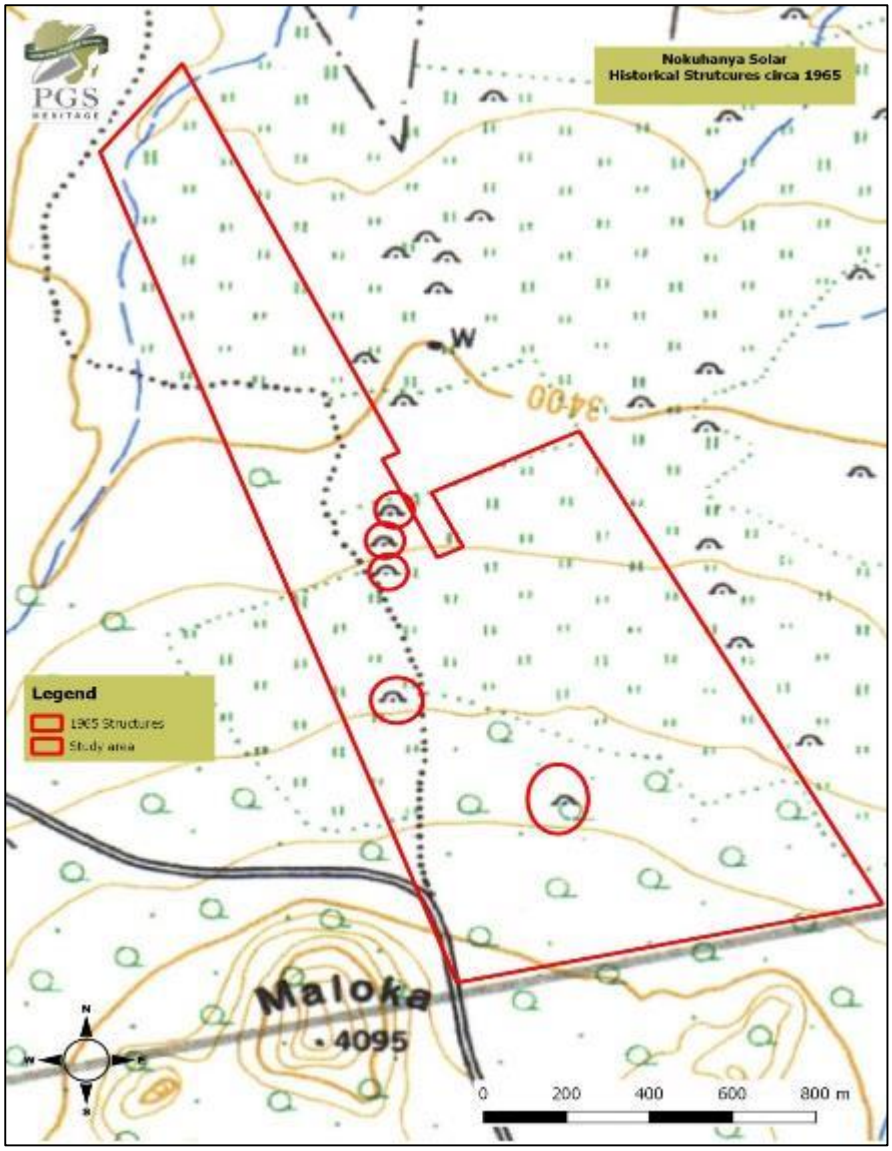

Figure 21: Structures dating to 1965 as demarcated on the 1966 topographical map

2.11.4 Palaeontology

The Study area is underlain by Mogolian aged Nebo Granite of the Lebowa Granite Suite, Bushveld Complex. This unit consists of grey to pink coarse grained granite becoming red, medium grained near the top (Geological Survey 1978). Due to the age and igneous nature of the Nebo Granite, no fossils will occur and there is a Low Palaeontological sensitivity

2.11.5 Possible Finds

Evaluation of aerial photography has indicated the following area that may be sensitive from an archaeological perspective (Figure 23). The analysis of the studies conducted in the area assisted in the development of the following landform type to heritage find matrix in Table 7.

Table 7: Landform to heritage matrix

LAND FROM TYPE	**HERITAGE TYPE**
River drainages	LSA and MSA scatters
Ridges	Iron Age stone walling
Farmsteads	Historical material/cemeteries
Labourer housing	Historical material/cemeteries/still born burials (Cocks, et al, 2006)

Analysis of the area around the study area has shown a large late iron age stone walled site situated on the hill (Phookwane Hill) just southwest of the study area (Figure 22), at this stage no reference to any archaeological sites could be found in literature and will be followed up with further research during the EIA phase. The layout of the stone walling shows resemblance to stone walled layout of other Ndebele sites such as KwMaza.

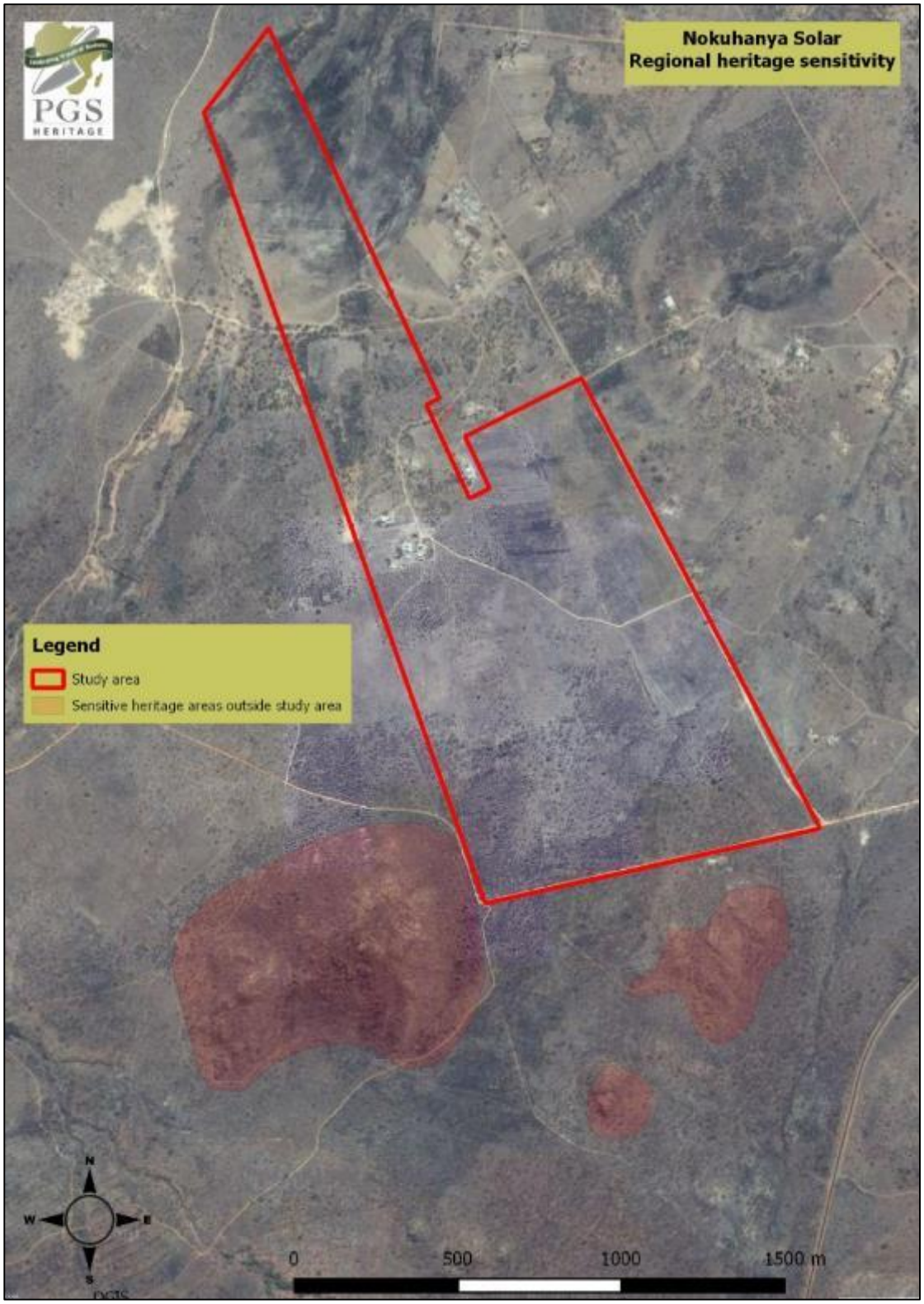

Figure 22: Heritage sensitivities outside study area

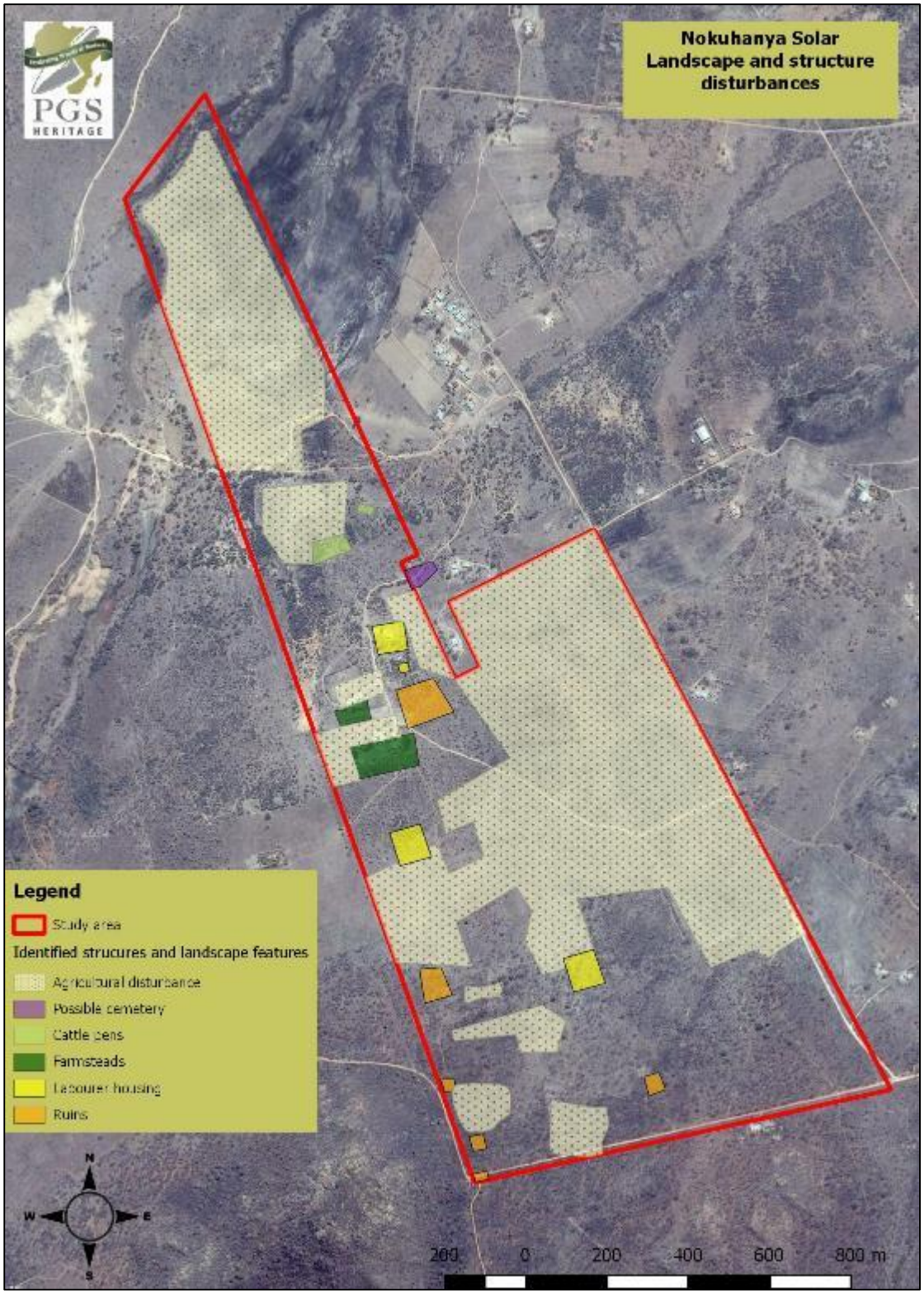

Figure 23: Structures and cultural disturbances in study area

To be able to compile a heritage management plan to be incorporated into the Environmental Management Plan the following further work will be required for the EIA.

- Archaeological walk through of the areas where the project will be impacting;

2.12 **Socio-economic Environment**

The Socio-economic Assessment was conducted by Elena Broughton of Urban-Econ Development Economists. The full report is included in Appendix 6F. The environmental baseline from a socio-economic perspective is presented below.

2.12.1 Baseline Information

This section addresses the key socio-economic characteristics of the study area, it primarily considers Elias Motsoaledi LM but also includes the Thembisile Hani LM. Limpopo is spatially the fifth-largest province within South Africa with a land mass of 125 754 km^2 equating to approximately 10.3% of South Africa's spatial composition (Stats SA, 2014). It holds a population of approximately 5.4 million people that represents 10.4% of the total national population (Stats SA, 2014). It is made up of five DMs, namely Capricorn, Mopani, Sekhukhune, Vhembe and Waterberg, as well as 25 local municipalities. Limpopo is in the savanna biome, an area of mixed grassland and trees generally known as bushveld. It has borders with three provinces on the southern side, namely Mpumalanga, Gauteng and the North West. It is also a gateway to the rest of Africa as it borders the countries of Botswana to the west, Zimbabwe to the north and Mozambique to the east.

The Sekhukhune DM lies in the south-eastern part of the province with an area of 13 528 km^2 (i.e. 10.8% of the Limpopo Province), most of which is rural. It comprises the five municipalities of the Makhuduthamaga, the Greater Tubatse, Elias Motsoaledi, Ephraim Mogale, and Fetakgomo. There are 740 villages in the district; and the main urban centres include Groblersdal, Marble Hall, Burgersfort, Jane Furse, Ohrigstad, Steelpoort, and Driekop (Sekhukhune District Municipality, 2014). Elias Motsoaledi LM is Sekhukhune's second largest LM with an area of about 3 713 km^2, constituting 27.4 % of the district's area. It is situated about 180 km from Polokwane, 135 km from Pretoria, and 150 km from Nelspruit. The municipality is predominantly rural and is made up of about 151 villages and 30 wards (Sekhukhune District Municipality, 2014). The main business nodes within the municipality are Groblersdal, Dennilton, Monsterlus, and Tafelkop. The main topography and geography of the area is characterised by undulating slopes interrupted by koppies, mountains and valleys (Elias Motsoaledi Local Municipality, 2013). To the south and south-west of the municipality where the proposed project location is, are the following mountains namely Mapule, Boshalala, and Phooko (Elias Motsoaledi Local Municipality, 2013).

The area is traversed by a number of roads, including one national road (the N11), two regional roads (R25 and R33/R555), and one district road (D1547) that the municipality defines as strategic. Sekhukhune recognises that "the growth of the economy of the district is highly dependent on road connectivity and on quality roads"; however, it highlights that connectivity and quality of roads in the district are inadequate (Sekhukhune District Municipality, 2014). In

the response to this challenge, the LM established the roads construction and storm water management unit to work on addressing the problem (Elias Motsoaledi Local Municipality, 2013). There are also three railway lines in the Sekhukhune District, originally developed to support the mining industry. Since then, these have not been extended or re-routed, placing extreme pressure on the road network. However, a new commuter rail link, known as the "Moloto Rail Corridor", between Pretoria is being envisaged (Thembisile Hani Local Municipality, 2013).

As already mentioned, the proposed project is situated next to the Thembisile Hani LM, which is part of the Nkangala District in the Mpumalanga Province. It is, therefore, important to provide some information about these different administrative areas.

Mpumalanga is the eighth-largest province within South Africa with a land mass of 76 495 km^2 equating to 6.3% of South Africa's spatial composition. It holds a population of 4.04 million people which represents 7.8% of the total national population (Stats SA, 2014). It is made up of three DMs, namely Gert Sibande, Nkangala and Ehlanzeni, and 18 local municipalities. The province borders with Mozambique and Swaziland to the east, the Free State Province to the south, and the Gauteng Province to the west. Mpumalanga has a network of excellent roads and railway connections; it also hosts the Kruger Mpumalanga International Airport (KMIA). The Nkangala District lies in the north-western part of the Mpumalanga Province with an area of 16 758 km^2 (i.e. 22% of the Mpumalanga Province). The DM comprises of six local municipalities, namely Delmas, Dr J.S. Moroka, Emalahleni, Emakhazeni, Steve Tshwete, and Thembisile. Nkangala is "the economic hub of Mpumalanga and is rich in minerals and natural resources" (Nkangala District Municipality, 2014).

Thembisile Hani has an area of approximately 23 84.37km2, constituting 14.2 % of the district's area. The principal business nodes of the municipality are Mathyzensloop, Kwaggafontein, Verena, Miliva, and KwaMhlanga. Most of the urban, peri-urban and agricultural settlements in the municipality are situated along the R573, also known as the Moloto Road (Thembisile Hani Local Municipality, 2013). As mentioned earlier, a 198 km railway line, the "Moloto Rail Corridor" linking Gauteng to Limpopo, is in the pipeline for development. The project feasibility is currently being assessed (SABC News, 2014). The railway line will serve the Thembisile and Dr. JS Moroka municipalities within the Nkangala District. It is also envisaged to extend the rail corridor through the Elias Motsoaledi municipal area (Thembisile Hani Local Municipality, 2013).

The area where the proposed project is to be located forms part of the western population concentration point of the Elias Motsoaledi LM. The closest major town to the site is Dennilton, while the area includes numerous villages that largely form part of the tribal area (Figure 24). Most of these villages are situated in the Elias Matsoaledi LM, with only a few of the settlements located in close proximity to the project site that are situated in the Thembisile Hani LM. Aside from Dennilton, the villages and other towns located in vicinity of the project site in the Elias Motsoaledi LM include Kolofane, Ten Morgan, Elandsdoorn, Theareng, and others. The area in the Thembisile Hani LM that borders with the Elias Motsoaledi LM is dominated by nature reserves with only the Matshipe and Boekenhouthoek settlements observed in proximity to the proposed project's locality. Dennilton is regarded as one of the main business nodes within the

Elias Motsoaledi LM, together with Groblersdal, Monsterlus and Tafelkop (Elias Motsoaledi Local Municipality, 2013). It is situated in a tribal and traditional area, which is of rural nature. It has a population of 2 408 people representing 632 households. The regional road (R25) runs through the centre of the town and connects it to Groblersdal. The town provides a range of social facilities and amenities, including schools, a post office, sport stadium and a police station.

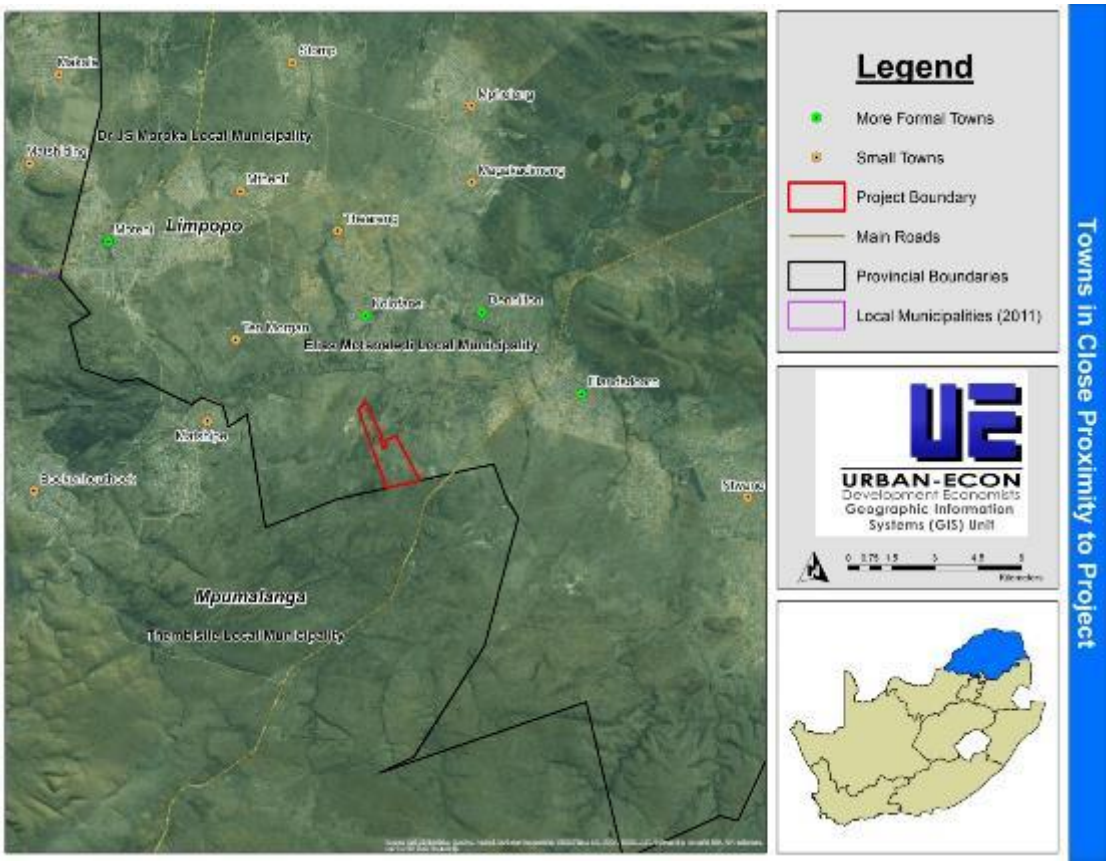

Figure 24: Major towns and villages in the vicinity of the project site

2.12.2 Access to Services and the State of the Local Built Environment

Access to shelter, water, electricity, sanitation, and other services are indicators that assist to determine the standard of living of the people in the area under investigation. Infrastructure and the state of local infrastructure is another indicator to contemplate when considering living standards. The availability of social and economic infrastructure including roads, educational facilities, and health facilities further indicates the nature of the study area, which is valuable in developing a complete profile of the circumstances in which communities are living. These measurements create a baseline against, which the potential impacts of the proposed project can be assessed.

The two municipalities under analysis are characterised by the following access to services:

- Access to water in the area is a pressing problem. In 2011, 33.3% of households in the municipality did not have any access to piped water and only 47.1% had access to water on site, i.e. either in their dwellings, inside their yards and community stand pipe <200 (Stats SA, 2014). However, when focusing on Dennilton in particular, figures are better; 86% of households have access to piped water, including 58% on site. In comparison, 95.4% of households had access to water in Thembisile Hani, including 88.4% on site.
- Access to sanitation is also a key development challenge in the Municipality. In 2011, only 12.9% of households in Elias Motsoaledi had access to flush toilets and 79.3% used pit latrine, while 4.3% had no access to sanitation in 2011 (Stats SA, 2014). Regarding Thembisile Municipality, the use of pit latrine is also widespread (85.2% of households) but the Municipality performs better in terms of access (2.6% of households with no access to sanitation).
- In 2011, 88.5% of households in the municipality had access to some form of formal housing, which primarily was a house or a brick structure on a separate stand or yard or on a farm (86.1%). These figures are quite similar in the case of Thembisile Hani municipality with 84.5% of households living in some form of formal housing (Stats SA, 2014).
- Access to electricity examined through a proxy indicator "energy for lighting" was not universal in the municipality in 2011 but 91.4% of households used electricity for lighting (Stats SA, 2014). The rest of the households primarily made use of candles, i.e. 7.5% (Stats SA, 2014). The Sekhukhune Integrated Development Plan 2014/2015 reads that Eskom is the main provider of electricity on the District and that local municipalities implement electrification projects to assist in reducing electricity backlogs. In 2011, the electricity backlog was estimated at 37 124 households, which represented 14% of the households in Sekhukhune. It is further indicated that the majority of the villages that did not have access to electricity were in Greater Tubatse Local Municipality (69); Elias Motsoaledi Local Municipality (32); Fetakgomo Local Municipality (6); Makhuduthamaga Local Municipality (5) and finally Ephraim Mogale Local Municipality (2), (Sekhukhune District Municipality, 2014). As to Thembisile Hani, the figures are quite similar to these of Elias Motsoaledi with 92.3% of households using electricity for lightning and 6.8% using candles.

2.12.3 Potential Socio-Economic Impacts

The need for renewable energy projects has been identified by a number of national policies. Both the promulgated IRP 2010-2030 and revised draft IRP re-affirm the importance of solar PV in the future national energy mix. The provincial and to some extent local governments have long recognised the potential for roll-out of renewable energy projects with respect to bringing much needed development to the area and creating jobs.

After reviewing all relevant policies on national, provincial and local level, no socio-economic fatal flaws or divergence away from legislation and plans was found, indicating the compliance of the proposed project to national and lower administrative levels objectives. However, it was determined that part of Elias Motsoaledi and Thembisile Hani more specifically are endowed with area of tourist value. Furthermore, the Thembisile Hani LM plans to further develop tourism

in the area bordering the proposed project site (i.e. project of a conservation area belt). Tourism is considered as a key sector of the economy of both LM, which means that any development pursued in the area should be sensitive to the impact on this industry. Moreover, it was determined that agricultural sector is an important contributor to job creation in the local economy of Elias Motsoaledi and some if the areas where the proposed project is to be located have been used for agriculture. This means that a further investigation into the agricultural potential and agricultural activities on site will need to be undertaken in order to determine the potential impact of the project on agricultural land sterilisation.

Having said the above, the economy and communities of Elias Motsoaledi and Thembisile Hani are in need for investment injection. This is the case particularly considering the limited economic base of these municipalities, the stagnation of their economies since the recession in 2009, above average unemployment rates, and high levels of poverty. Both economies need to be diversified and the development of a solar PV plant in the area will offer such an opportunity. Furthermore, the project will have the potential to contribute to the improvement of the standards of living of the communities living close to the project and increase the employment rate in the area.

2.13 **Geotechnical**

The Geotechnical Assessment was conducted by Cecilia Canahai of Jeffares and Green. The full report is included in Appendix 6G. The environmental baseline from a geotechnical perspective is presented below.

2.13.1 Geology

According to the 1:250 000 geological map 2528 Pretoria, the study area is underlain entirely by grey to pink, coarse grained granite and red, medium grained near top granite known as Nebo Granite, of the Lebowa Suite, of the Bushveld Complex (Figure 25).

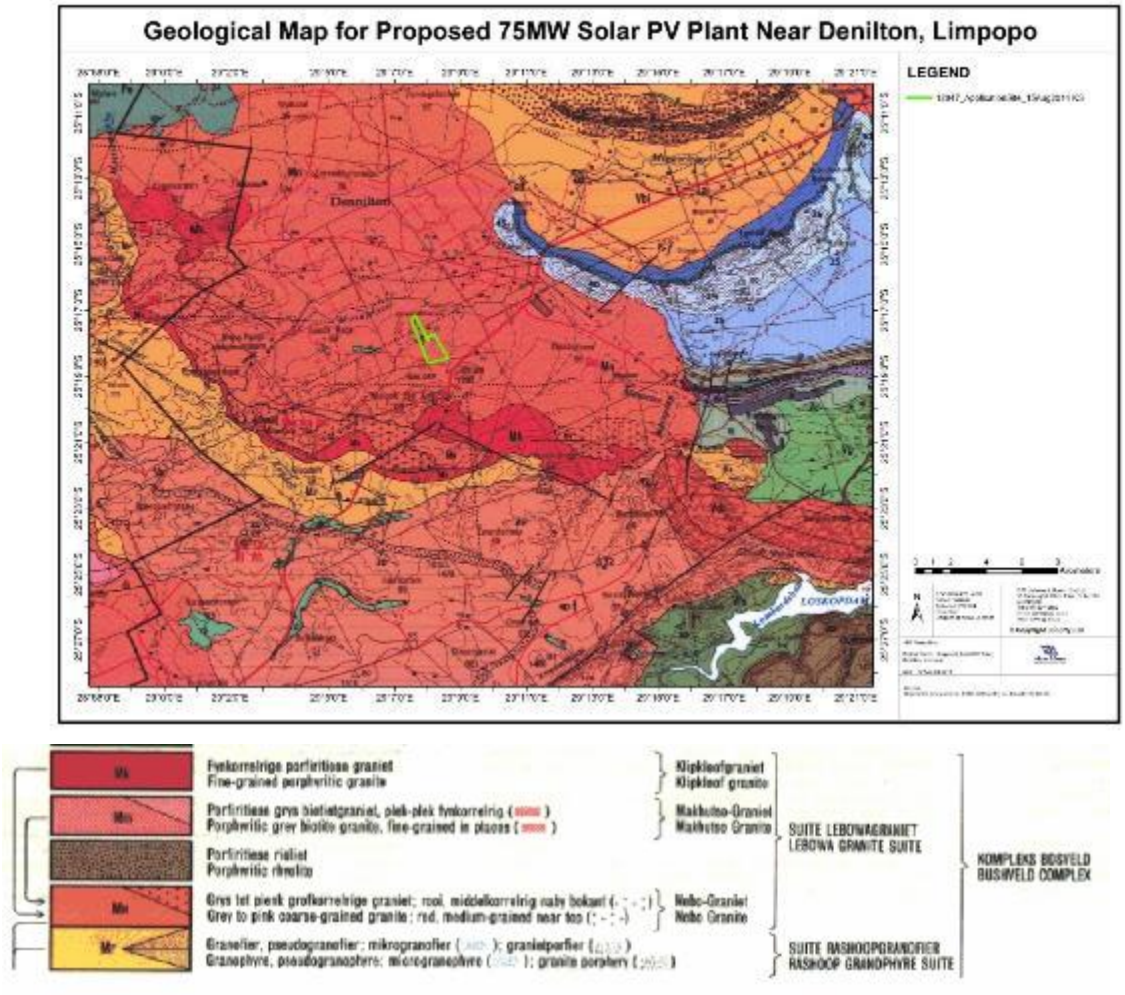

Figure 25: Geological Map

2.13.2 Topography

The site presents gentle to flat gradients and slopes in a northerly direction. Surface drainage features are limited to a non-perennial streams, most notably a tributary to the Moses River, which runs alongside the northern border of the site. Another non-perennial drainage feature crosses half way down the middle of the site.

There are no ridges on site and hence no related sensitivity.

From the aerial photography it seems that a small number of non-perennial pans occur within the site. These will be confirmed at the EIA stage during Phase 2 of the geotechnical specialist study.

2.13.3 Climate

The climatic regime plays a fundamental role in rock weathering and the development of a soil profile. Weinert (1964), through his work on basic igneous rocks in southern Africa,

demonstrated that mechanical disintegration is the predominant mode of rock weathering in areas where his climatic “N-value” is greater than 5, while chemical decomposition predominates where the N-value is less than 5. The climatic N-value at the site is between 3 and 4, which implies that the climate is still dry, and that both chemical as well as mechanical disintegration are the modes of rock weathering at the site.

2.13.4 Subsurface Conditions

Based on the geological maps, the following near-surface materials may be encountered at the site. Nebo granites will occur over the entire site and will comprise the parent bedrock. The site is expected to be overlain by a mantle of alluvial, colluvial and residual soils. Very shallow or surface rock outcrops may be expected in certain areas such as riverbeds.

- Alluvial Soils:
  Alluvial soils, which are soils transported and deposited by water, are expected to occur in the vicinity of streams and rivers. The deposits are expected to consist of rounded alluvial gravel, cobbles and small boulders with interstitial sands. The consistency of the materials is expected to be loose to medium dense.

- Colluvial Soils:
  Colluvial soils, which are soils transported and deposited by gravity, are expected to occur over the majority of the site. The deposits are expected to consist of gravel, cobbles and small boulders with interstitial sands and clays. The consistency of the materials is expected to be loose to medium dense.

- Residual Granite Soils:
  Residual soils, which are soils derived from the chemical and mechanical decomposition of the parent rock, are expected to occur over the majority of the site underlying the colluvial soils. The deposits are expected to consist of gravel, cobbles and small boulders with interstitial sands and clays. The consistency of the materials is expected to be loose to medium dense.

- Nebo Granite (Mn):
  The Nebo granite is a hypersolvus, coarse-grained, equigranular rock, and is typically grey, pink or pinkish-red in colour. The granite is composed principally of quartz, perthite, interstitial biotite and/or hornblende and some minor oxides, with hornblende occurring more abundantly at the base of the granite sheet and biotite in the more fractionated portions. It is commonly porphyritic with K-feldspar phenocrysts and quartz phenocrysts, which weather prominently.

  The colouration of the granites intensifies and reddens towards the top, as the Fe2+/ Fe3+ ratio decreases in the upper, more fractionated portions (Bailie, 1997). Changes in the mineralogy are characterised by an increase in K-feldspar/perthite over plagioclase, and ascendant proportions of biotite, as the principal femic mineral over hornblende. The upper Nebo granites are further characterised by the formation of linked chains and clusters of quartz. Typically these granites weather to flat plains as noticed on this particular site.

None of the formations discussed above are sensitive or protected.

2.13.5 Groundwater

Given the dry climate, groundwater seepage is not expected to be problematic for the majority of the year. However a shallow, perched water table may be encountered on site during the rainy season. This will be most problematic in depressions and near the existing pans.

3 ENVIRONMENTAL ISSUES, POTENTIAL AND CUMULATIVE IMPACTS

3.1 Identification of Potential Impacts

The proposed development is likely to result in a variety of positive and negative impacts. Moreover, the proposed development could potentially result in collective and long term impacts more commonly known as cumulative impacts. A cumulative impact is 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.

The Scoping report assists in the identification of these potential and cumulative impacts, which will then be assessed at a more detailed level during the EIA stage.

Moreover, further details associated with the construction and operation of the various activities (as listed in the Project Description) in light of the above types of impacts that become available later in the EIA process will be discussed in detail in the EIR Phase.

The impacts that have been identified as being potentially significant are elaborated on in the sub-sections below.

3.1.1 Biodiversity Impacts

The following potential impacts have been identified for the proposed solar power facility development and will be further investigated in the EIA phase of the biodiversity assessment.

Table 8: Impact resulting from loss, fragmentation or degradation of faunal habitat (terrestrial and aquatic)

ISSUE	**Impact: Loss, fragmentation or degradation of faunal habitat (terrestrial and aquatic)**
DISCUSSION	Losses of faunal habitat would be suffered where areas need to be cleared of natural vegetation. This may also cause habitat fragmentation. Red listed species are more likely to be negatively affected.
EXISTING IMPACT	Parts of the site are transformed by cultivation. Other parts are degraded by grazing and other impacts. Areas of natural vegetation still occur on site and various species of concern could potentially use this habitat.
PREDICTED IMPACT	Moderate to Low as some natural vegetation will be lost, but may not necessarily be important for species of concern.
EIA INVESTIGATION REQUIRED	Yes

ISSUE	Impact: Loss, fragmentation or degradation of faunal habitat (terrestrial and aquatic)
CUMULATIVE EFFECT	Predicted to be low as given that the majority of the site will potentially be retained once the infrastructure is in place.

Table 9: Impact resulting from the displacement of populations of mobile species (terrestrial)

ISSUE	Impact: Displacement of populations of mobile species (terrestrial)
DISCUSSION	Fauna may be displaced due to noise and habitat disturbances on site, as well as general activities on site.
EXISTING IMPACT	Parts of the site are transformed by cultivation. Other parts are degraded by grazing and other impacts. Areas of natural vegetation still occur on site and various species of concern could potentially use this habitat.
PREDICTED IMPACT	Low as some populations may be displaced, but for species of concern, these are mostly mobile species.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Predicted to be low as populations will return to surrounding habitats after construction activities have been completed.

Table 10: Impact of the mortality of populations of sedentary species during construction and mortality of individuals due to secondary factors

ISSUE	Impact: Mortality of individuals of fauna
DISCUSSION	Direct impacts during the construction phase are unlikely to have an impact on individual animals, since most are highly mobile and will move out of harm's way. Vertical infrastructure may affect flying animals due to collisions. Some Red List species may, however, be vulnerable to this impact.
EXISTING IMPACT	There is little vertical infrastructure currently on site.
PREDICTED IMPACT	Low as most species will avoid vertical infrastructure and none of the vertical infrastructure will have large moving parts.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Predicted to be low as most flying individuals will avoid vertical infrastructure and infrastructure does not have large moving parts.

Table 11: Impact of loss of indigenous natural vegetation during construction

ISSUE	Impact: Loss of indigenous natural vegetation during construction
DISCUSSION	Losses would be suffered where areas need to be cleared of natural vegetation.

ISSUE	Impact: Loss of indigenous natural vegetation during construction
EXISTING IMPACT	Previous cultivation on significant parts of site and degradation of vegetation in much of the remaining areas.
PREDICTED IMPACT	Moderate as some natural vegetation will be lost.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Predicted to be low as given that a large proportion of the infrastructure will probably be placed within existing disturbance.

Table 12: Impact of the loss of populations of threatened plants species during construction

ISSUE	Impact: Impacts on threatened plants
DISCUSSION	There are no threatened plant species listed for the grids that include the study area. There is one Near Threatened, one Declining and one Rare plant species that could potentially occur on site.
EXISTING IMPACT	Previous cultivation on significant parts of site and degradation of vegetation in much of the remaining areas.
PREDICTED IMPACT	Moderate to Low as some natural vegetation will be lost, but not sure whether species occur on site or not.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Predicted to be low as given that a large proportion of the infrastructure will probably be placed within existing disturbance and populations of species of concern, if they occur on site, will probably not be affected or can be avoided.

Table 13: Impact of the introduction and/or spread of declared weeds and alien invasive plants in terrestrial habitats

ISSUE	Impact: Establishment and spread of declared weeds
DISCUSSION	There is a moderate possibility that alien plants could be introduced to areas within the footprint of the proposed infrastructure from surrounding areas in the absence of control measures.
EXISTING IMPACT	Unknown to what extent alien invasive species currently occur on site, but existing transformation and disturbance on site has probably created conditions favourable for these species.
PREDICTED IMPACT	Moderate to Low due to existing conditions on site. Impact can be easily managed with control measures.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Predicted to be low due to existing impacts on site and high ability to control any additional impact.

Table 14: Impact of the loss of individuals of protected tree species during construction

ISSUE	**Impact: Loss of individuals of protected tree species**
DISCUSSION	There are eight protected trees species that could occur on site, but it is unknown whether any of these occur or not.
EXISTING IMPACT	Existing transformation and disturbance on site has probably has probably resulted in loss of individuals of these species.
PREDICTED IMPACT	Moderate to Low due to existing impacts on site.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Predicted to be low due to existing impacts on site.

3.1.2 Surface Water Impacts

The following potential impacts (Table 15 to Table 26) have been identified for the proposed solar power facility development and will be further investigated in the EIA phase of the surface water assessment.

- Construction Phase Impacts

Potential negative impacts associated with the construction phase include the following aspects (Table 15 to Table 22):

- Impacts associated with the construction lay-down area directly in the wetland(s)
- Impacts associated with establishing the foundations of the proposed development;
- Impacts associated with the clearing of vegetation for the proposed development;
- Impacts associated with the abnormal/heavy vehicle access into wetland areas and the associated buffer zones;
- Impacts associated with the general construction access near or in wetland areas and the associated buffer zones;
- Impacts associated with improper stormwater management effects on nearby surface water resources;
- Impacts associated with the oil, fuel and other soluble substances from construction activities, vehicles and machinery into nearby surface water resources
- Impacts associated with the 132kV power line installation into/over nearby surface water resources
- Impacts associated with erosion, run-off and sedimentation associated with the construction of the proposed development

Table 15: Impacts associated with the construction lay-down area directly in the wetland(s)

ISSUE	Impacts associated with the construction lay-down area directly in the wetland(s)
DISCUSSION	Where the placement of the construction lay-down area for the proposed development extends into wetland, the excavation of potential wetland soils could potentially result.
EXISTING IMPACT	No existing impacts are present in terms of construction lay-down areas.
PREDICTED IMPACT	Moderate predicted impact due to the instability of wetland soils making site locations in these sensitive areas unlikely. Furthermore, it is not likely that the proposed development will be placed in the watercourse areas. However, the proposed development may need to be placed in the buffer zones and as such places it in close proximity to sensitive surface water resources susceptible to indirect impacts such as run-off and consequent erosion.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Moderate predicted cumulative effect given that the size of the construction lay-down area may be significant and might need to be placed partially in or near the wetland and associated buffer zones close to where construction areas are located.

Table 16: Impacts associated with establishing the foundations of the proposed development

ISSUE	Impacts associated with establishing the foundations of the proposed development
DISCUSSION	Where the placement of the foundations extend into the wetland areas, the excavation of potential wetland soils are likely to be affected.
EXISTING IMPACT	No structures have been identified in the wetland areas.
PREDICTED IMPACT	Moderate to high predicted impact due to the instability of wetland soils. It is likely that the foundations of the various buildings and structures will be placed in the wetland areas (buffer zones included).
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Moderate to high predicted cumulative effect given the various buildings and structures that might need to be placed in or near the wetland areas and the associated buffer zones

Table 17: Impacts associated with the clearing of vegetation for proposed development

ISSUE	Impacts associated with the clearing of vegetation for proposed development
DISCUSSION	Vegetation within the proposed development site will have be removed for the construction phase to take place.
EXISTING IMPACT	Moderate impacts present due to the clearing required for the dirt roads and the cultivation practices present within the study area.
PREDICTED IMPACT	Moderate to high predicted impact due to the need for vegetation to be removed which is expected to be wetland vegetation, including potentially vegetation in the buffer zones.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Moderate to high predicted cumulative effect given that the proposed development is expected to occupy an area of approximately 160 hectares.

Table 18: Impacts associated with abnormal/heavy vehicle access into wetland areas and associated buffer zones

ISSUE	Impacts associated with abnormal/heavy vehicle access into wetland areas and associated buffer zones
DISCUSSION	During the construction phase, vehicles of variable size will need to access the site. Such vehicles may include conventional construction vehicles in addition to abnormal heavy vehicles that will need to transport the component parts of the PV plant. Where these vehicles need to cross wetland areas (buffer zones included), degradation can be caused to these sensitive environments.
EXISTING IMPACT	Minor impacts associated with access roads currently crossing wetlands areas evident from a desktop level.
PREDICTED IMPACT	Minor to moderate predicted impact due to the need for the various components to reach all areas of the study site in order to transport materials.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Minor to moderate predicted cumulative effect should access and internal roads need to cross any wetland areas.

Table 19: Impacts associated with general access near or in wetland areas and the associated buffer zones

ISSUE	Impacts associated with general access near or in wetland areas and the associated buffer zones
DISCUSSION	General access into wetland areas refers to activities such as physical destruction of wetlands caused by humans, excavation and degradation of wetlands by construction machinery, use of wetlands for sanitary facilities and ablutions and dumping of

ISSUE	Impacts associated with general access near or in wetland areas and the associated buffer zones
	materials, waste and litter into wetlands. This specifically relates to any construction areas that take place near wetlands.
EXISTING IMPACT	From a desktop level no existing impacts could be identified.
PREDICTED IMPACT	Minor to moderate predicted impact due to the need for construction activities to take place in most areas of the study site.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Minor to moderate predicted cumulative effect.

Table 20: Impacts associated with improper stormwater management effects on nearby surface water resources

ISSUE	Impacts associated with improper stormwater management effects on nearby surface water resources
DISCUSSION	Where the location of buildings, internal roads, the switching station and the construction lay down area are to be situated near surface water resources, increased run-off caused by rainfall events can produce potential erosion and sedimentation impacts to nearby surface water resources.
EXISTING IMPACT	From a desktop level, erosion is present in the west of the study area.
PREDICTED IMPACT	Moderate predicted impact due to the likelihood of this impact occurring.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Moderate predicted cumulative effect.

Table 21: Impacts associated with the oil, fuels and other soluble substances from construction activities, vehicles and machinery into nearby surface water resources

ISSUE	Impacts associated with the oil, fuels and other soluble substances from construction activities, vehicles and machinery into nearby surface water resources
DISCUSSION	Construction activities make use of fuels, oils, and other soluble substances (cement mix) which are necessary for the operation vehicles and in order to produce building materials. These pose a pollution risk to nearby surface water resources where spillage or leakage occurs.
EXISTING IMPACT	From a desktop level no such pollution impacts could be identified.
PREDICTED IMPACT	Minor to moderate predicted impact due to the likelihood of this impact occurring.

ISSUE	Impacts associated with the oil, fuels and other soluble substances from construction activities, vehicles and machinery into nearby surface water resources
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Moderate to high predicted cumulative effect.

Table 22: Impacts associated with the 132kV power line installation into/over nearby surface water resources

ISSUE	Impacts associated with the 132kV power line installation into/over nearby surface water resources
DISCUSSION	It is anticipated that the 132kV power lines will relay the generated energy to the switching station and subsequently to the power grid. It is also envisaged that the underground cable may need to be follow an overhead line over wetland areas where appropriate. Where overhead crossing is not possible, underground cabling may be required to course through wetlands and rivers.
EXISTING IMPACT	From a desktop level no power line impacts could be identified as the routes have not yet been established.
PREDICTED IMPACT	Minor to moderate predicted impact due to the likelihood of this impact occurring.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Moderate to high predicted cumulative effect.

- Operation Phase Impacts

Potential impacts associated with the construction phase include the following aspects (Table 23 to Table 26):

- Power line collision risks to fauna associated with wetlands (avifauna);
- Impacts associated with power line service roads through surface water resources;
- Stormwater run-off associated with the PV plant and associated infrastructure; and
- Oil leakages from the switching station.

Table 23: Power line collision risks to fauna associated with wetlands (avi-fauna)

ISSUE	Power line collision risks to fauna associated with wetlands (avi-fauna)
DISCUSSION	Power lines pose serious collision risks to avi-fauna.
EXISTING IMPACT	There are no existing impacts related to collision that could be identified from a desktop level.

ISSUE	Power line collision risks to fauna associated with wetlands (avi-fauna)
PREDICTED IMPACT	Minor predicted impact due to the likelihood of this impact occurring.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Moderate to high predicted cumulative effect.

Table 24: Impacts associated with service roads through surface water resources

ISSUE	Impacts associated with service roads through surface water resources
DISCUSSION	Service roads for linear infrastructure will be required, and may require crossing identified surface water resources.
EXISTING IMPACT	There are no existing impacts related to service roads that could be identified from a desktop level.
PREDICTED IMPACT	Moderate predicted impact due to the likelihood of this impact occurring, and the associated permanent nature.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Moderate predicted cumulative effect.

Table 25: Storm-water run-off associated with PV plant and associated infrastructure

ISSUE	Stormwater run-off associated with PV plant and associated infrastructure
DISCUSSION	The impact of stormwater run-off is primarily related to the types of structures and surfaces that will need to be established for the proposed development. Hard impermeable surfaces and foundations are to be laid over the extent of the proposed development. Flat and hard surfaces aid with the acceleration and generation of run-off which can impact on nearby wetlands through the onset of erosion at the interface between the proposed development and the surface water resources.
EXISTING IMPACT	From a desktop level, erosion is present in the west of the study area.
PREDICTED IMPACT	Moderate predicted impact due to the likelihood of this impact occurring.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Moderate to high predicted cumulative effect.

Table 26: Oil leakages from switching/substations

ISSUE	Oil leakages from switching station
DISCUSSION	The main potential impact that may result from the operation phase of the switching/substations is the potential spillage of oil from the transducers that are to be housed. If oil were to spill from the switching/substations, it could be transported via storm water run-off into the adjacent wetlands, thereby polluting not only the water but the soils as well causing possible groundwater and soil contamination.
EXISTING IMPACT	Pollution impacts were not identifiable from a desktop level.
PREDICTED IMPACT	Minor predicted impact due to the likelihood of this impact occurring.
EIA INVESTIGATION REQUIRED	Yes.
CUMULATIVE EFFECT	Minor to moderate predicted cumulative effect.

3.1.3 Soils and Agricultural Potential Impacts

The following potential impacts (Table 27) have been identified for the proposed solar power facility development and will be further investigated in the EIA phase of the soils and agricultural potential assessment.

Table 27: Summary of potential impacts from the Solar PV Facility

ISSUE	Loss of agricultural land.
DISCUSSION	Losses would be suffered where infrastructure is established
EXISTING IMPACT	Little or no cultivation evident on the site
PREDICTED IMPACT	Low, as the majority of the soils in the area are low potential for arable agriculture
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Predicted to be low as there will not be impacts on high potential soils.

3.1.4 Visual Impacts

The following potential impacts (Table 28) have been identified for the proposed solar power facility development and will be further investigated in the EIA phase of the visual assessment.

Table 28: Visual Impact Summary

ISSUE	Visual Impact of the proposed solar PV plant
DISCUSSION	▪ The concentration of large PV panels can make them visually intrusive, especially in relatively untransformed environments, and where potentially sensitive visual receptors are present. ▪ Majority of the surrounding area has a pastoral visual character and is not valued for its scenic significance. Overall it can be concluded that the visual impact of the PV plant would be reduced due to the number and nature of visual receptors present and the degree of transformation within the natural environment. The facility does not however correspond with the typical land use and would visually contrast with the existing character of the landscape. ▪ Relatively few sensitive receptors were identified within 5km from the proposed development.
EXISTING IMPACT	▪ Existing visual impact within the landscape includes built-up areas to the north-east and the west, the R25 tar road, a network of gravel access roads, several boundary fences, power lines, telephone lines and a few farm buildings.
PREDICTED IMPACT	▪ The natural visual character of the surrounding area could be altered as a result of PV panels being erected. ▪ Locating the PV plant on the generally flat terrain, could result in the facility being highly visible for great distances, particularly in areas to the north. ▪ The visual intrusion of the proposed development could adversely affect the identified sensitive receptor locations surrounding the proposed site. ▪ Vehicles and trucks travelling to and from the proposed site on the gravel access road would increase dust emissions both during the construction and operational phases. ▪ Surface disturbance during construction would expose bare soil which could visually contrast with the surrounding environment. Wind blowing over these disturbed areas could result in dust which would have a visual impact. ▪ Security and operational lighting could result in light pollution and glare, which could be an annoyance to surrounding viewers. ▪ Potential visual impacts as a result of the infrastructure associated with the proposed PV plant.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	None identified.

3.1.5 Heritage Impacts

The following potential impacts (Table 29 to Table 32) have been identified for the proposed solar power facility development and will be further investigated in the EIA phase of the heritage assessment.

Table 29: Impact on archaeological sites.

ISSUE	**Impact on archaeological sites**
DISCUSSION	As seen from the archival work and discussion in Section 4.3.1 the possibility of archaeological finds are possible in the study area. Linked with the LIA stone walled sites just outside of the study area the need for a field survey must be stressed.
EXISTING IMPACT	None known
PREDICTED IMPACT	Unidentified archaeological sites and the discovery of such sites during construction can seriously hamper construction timelines. Field work can thus provide valuable information on such site in the study area and provide timeous management of such site through realignment of development or mitigation of such sites where needed.
EIA INVESTIGATION REQUIRED	Archaeological walk down of the study area
CUMULATIVE EFFECT	None foreseen at this stage.

Table 30: Impact on palaeontological sites.

ISSUE	**Impact on palaeontological sites**
DISCUSSION	No palaeontological sensitivity due to the age and igneous nature of the geology
EXISTING IMPACT	No impact
PREDICTED IMPACT	No further impacts
EIA INVESTIGATION REQUIRED	No
CUMULATIVE EFFECT	None foreseen.

Table 31: Impact on historical sites.

ISSUE	**Impact on historical sites**
DISCUSSION	As seen from the archival work and discussion in section 4.3.1 the possibility of historical finds have been identified as being high and thus further field work is required to develop a comprehensive Heritage Management Plan.

EXISTING IMPACT	Old ruins identified in the study area are being degraded by natural weathering.
PREDICTED IMPACT	Unidentified historical structure and the discovery of such structures during construction can seriously hamper construction timelines. Field work can thus provide valuable information on such site in the study area and provide timeous management of such site through realignment of development or mitigation of such sites where needed.
EIA INVESTIGATION REQUIRED	Archaeological walk down of impact areas will identify possible impacted sites
CUMULATIVE EFFECT	None foreseen at this stage.

Table 32: Impact on graves and cemeteries sites.

ISSUE	**Impact on graves and cemeteries site**
DISCUSSION	The existence of graves and cemeteries has not been verified during the archival research. The existence of still born burials at historical African houses cannot be excluded. The possibility of a cemetery on the central eastern boundary of the site needs to be investigated. It has however been found that such structures are rarely noted in maps and documents and can only really be identified during field work.
EXISTING IMPACT	None known
PREDICTED IMPACT	Unidentified graves and cemeteries and the discovery of such structures during construction can seriously hamper construction timelines. In the event that these graves and cemeteries could not be avoided a grave relocation proses needs to be started. Such a process impacts on the spiritual and social fabric of the next of kin and associated communities. Field work can thus provide valuable information on such site in the study area and provide timeous management of such site through realignment of development or relocation of such sites where needed.
EIA INVESTIGATION REQUIRED	Archaeological walk down of impact areas will identify possible impacted sites

CUMULATIVE EFFECT	None foreseen at this stage.

3.1.6 Socio-economic Impacts

The following potential impacts identified in Table 33 have been identified for the proposed solar power facility development and will be further investigated in the EIA phase of the socio-economic assessment.

Table 33: Summary of potential socio-economic impacts.

ISSUE AND IMPACT	
ISSUE	Impact: Increase in production and GDP-R of the national and local economies due to project capital expenditure
DISCUSSION	The impact takes place due to the investment on the project that will be spent in the country. Besides the direct impact, it involves the indirect and induced effects that are created when either suppliers of goods and services to the project experience and increase in demand or when businesses servicing households experience an increase in demand for their products.
EXISTING IMPACT	The local economy has a small economic base.
PREDICTED IMPACT	High Positive
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Creation of temporary employment in the local communities and elsewhere in the country
DISCUSSION	The impact is generated through capital expenditure that shocks the economy. It involves the creation of direct new job opportunities related to the construction of the proposed solar PV and employment opportunities that will be indirectly created through the increased expenditure in sectors supplying goods and services to the construction activity and in sectors benefiting from the increase of consumer expenditure.
EXISTING IMPACT	The local and national economies have high unemployment rates and government set a target to create 11 million jobs by 2030. Limited employment opportunities exist in the Elias Motsoaledi.
PREDICTED IMPACT	Moderate Positive

ISSUE AND IMPACT	
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Skills development due to the creation of new employment opportunities
DISCUSSION	The impact takes place during construction and will last beneficiaries for an entire lifetime
EXISTING IMPACT	The local municipality has a very limited skills base and poor educational levels
PREDICTED IMPACT	Moderate Positive
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Improved standard of living of households directly or indirectly benefiting from created employment opportunities
DISCUSSION	The impact takes place during construction as a result of jobs created through direct, indirect and induced impacts
EXISTING IMPACT	The households in the local municipality are on average worse off than in the country in general.
PREDICTED IMPACT	Moderate Positive
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Increase in government revenue due to investment
DISCUSSION	The impact will take place as a result of domestic spending on construction activities and will be acquired by government through indirect and direct taxes on the project's activity.
EXISTING IMPACT	Due to limited economic base and how income levels, the local municipality's revenue base is limited, which in turn negatively impacts on its ability to provide services to its residents
PREDICTED IMPACT	Moderate Positive
EIA INVESTIGATION REQUIRED	Yes

ISSUE AND IMPACT	
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Potential sterilisation of agricultural land
DISCUSSION	The footprint of the proposed project will sterilise the land from potential use for agricultural activities
EXISTING IMPACT	Based on 2009 land use data, some commercial agricultural farming took place on certain portions of the site where the project is to be located; however this information will need to be confirmed during site visits
PREDICTED IMPACT	Low Negative
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Potential impact on surrounding tourism attractions
DISCUSSION	The construction activities will be associated with the greater traffic on the roads and will increase noise and as project is being developed visual effects; this may reduce the attractiveness of the local tourism spot and negatively impact their revenue and employment
EXISTING IMPACT	There are at least two nature reserves located in the vicinity of the project that may be sensitive to the environmental impacts exerted during construction
PREDICTED IMPACT	Low to Moderate Negative
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Change in demographics of the area due to influx of workers and job seekers
DISCUSSION	The construction activities will attract job seekers and will involve the migration of construction workers to the site.
EXISTING IMPACT	The local area has sufficient number of people that could fill unskilled and semi-skilled positions, but not skilled positions; nonetheless, the knowledge about the project may still attract job seekers to the area

ISSUE AND IMPACT	
PREDICTED IMPACT	Low to Moderate Negative
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Increase in social pathologies associated with influx of migrant labourers and job seekers to the area (health, crime, prostitution, xenophobia, etc.)
DISCUSSION	The construction activities may attract job seekers and may involve the migration of construction workers to the site. The increase in the number of job seekers and migrants in the municipality could cause an increase in social pathologies.
EXISTING IMPACT	The local area has sufficient number of people that could fill unskilled and semi-skilled positions, but not skilled positions; nonetheless, the knowledge about the project may still attract job seekers to the area
PREDICTED IMPACT	Low to Moderate Negative
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Added pressure on basic services and social and economic infrastructure
DISCUSSION	If the project attracts a great number of workers and job seekers, this could put further pressure on the local municipality as it will increase the demand for basic services, social and economic infrastructure
EXISTING IMPACT	Access to services in the area are among the major development challenges
PREDICTED IMPACT	Low to Moderate Negative
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Sustainable increase in production and GDP-R of the national and local economies through operation and maintenance activities
DISCUSSION	The impact will take place as a result of operational expenditure on the solar PV farm, which will also create sustainable multiplier effects

ISSUE AND IMPACT	
EXISTING IMPACT	The local economy has a small economic base and the need to diversify the economy is dire.
PREDICTED IMPACT	Moderate to High Positive
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Creation of long-term employment in local and national economies through operation and maintenance activities
DISCUSSION	The impact will take place as a result of operational expenditure on the solar PV farm, which will also create sustainable multiplier effects
EXISTING IMPACT	The local economy has a very high unemployment rate, which means that the area is in need for investment that would create new sustainable employment opportunities.
PREDICTED IMPACT	Low to Moderate Positive
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Skills development due to the creation of new sustainable employment opportunities
DISCUSSION	The impact takes place during operations of the solar PV farm and occurs due to on-job training
EXISTING IMPACT	The local municipalities has a very limited skills base and poor educational levels
PREDICTED IMPACT	Low Positive
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Improved standard of living of households directly or indirectly benefiting from created employment opportunities
DISCUSSION	The impact takes place as a result of jobs created through direct, indirect and induced impacts

ISSUE AND IMPACT	
EXISTING IMPACT	The households in the local municipalities are on average worse off than in the country in general.
PREDICTED IMPACT	Low to Moderate Positive
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Increase in government revenue stream
DISCUSSION	The project, through its operations, will contribute to government revenue through payments of income taxes and payroll taxes
EXISTING IMPACT	The local tax bases is small, which limits the ability of the municipalities to provide quality services.
PREDICTED IMPACT	Moderate Positive
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Investment in the local communities and economic development projects as part of a Social Economic Development and Enterprise Development plan
DISCUSSION	The project will form part of the Independent Power Producer Procurement Programme that implies that the operating company allocates a certain percentage of the project's revenue towards community development
EXISTING IMPACT	The area north of the site is highly populated and is in need to improve their access to services and create new sustainable employment opportunities
PREDICTED IMPACT	Moderate to High Positive
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Altered sense of place
DISCUSSION	The project is expected to have a notable visual impact, which will alter the landscape and ultimately affect the sense of place developed by local residents and visitors

ISSUE AND IMPACT	
EXISTING IMPACT	The area north of the site is densely populated and the area south and east of the site includes nature reserves
PREDICTED IMPACT	Moderate Negative
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Potential impact on surrounding tourism attractions
DISCUSSION	The project will create a visual impact that may negatively impact attractiveness of the area from a tourist-perspective
EXISTING IMPACT	There are at least two nature reserves located in the vicinity of the project that may be sensitive to the environmental impacts exerted during operations
PREDICTED IMPACT	Low to Moderate Negative
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.
ISSUE	Impact: Impact on commercial property and land values in the surrounding area
DISCUSSION	Change in the sense of place may reduce the property value, particularly those properties whose income is dependent on the attractiveness of the area from a tourism perspective
EXISTING IMPACT	There are at least two nature reserves located in the vicinity of the project that may be sensitive to the environmental impacts exerted during operations
PREDICTED IMPACT	Low Negative
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Unknown at this stage as no knowledge exists about other projects planned to be established or are investigated in the area.

3.1.1 Geotechnical Impacts

The following potential impact identified in Table 34 has been identified for the proposed solar power facility development and will be further investigated in the EIA phase of the geotechnical assessment.

Table 34: Impact on soils.

ISSUE	Soils
DISCUSSION	Soil disturbance during construction may destabilise the soil and lead to soil erosion. Construction and use of access roads by heavy duty vehicles and construction equipment may destabilise the soil and lead to soil erosion.
EXISTING IMPACT	Agriculture.
PREDICTED IMPACT	Low to moderate.
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Low as given that the majority of the soils will be reinstated once the infrastructure is in place.

Table 35: Impact on rock.

ISSUE	Rock
DISCUSSION	Rock disturbance during construction. Blasting may be needed for foundations for structures.
EXISTING IMPACT	None
PREDICTED IMPACT	Low to medium
EIA INVESTIGATION REQUIRED	Yes
CUMULATIVE EFFECT	Low. There are no protected ridges at the site. Once the foundations are placed on rock, these will be covered by either structures or infrastructure.

4 PUBLIC PARTICIPATION PROCESS

Public participation is the cornerstone of any EIA. The principles of NEMA as well as the EIA Regulations govern the EIA process, including public participation. These include provision of sufficient and transparent information on an ongoing basis to stakeholders to allow them to comment, and ensuring the participation of previously disadvantaged people, women and the youth.

The public participation process is primarily based on two factors; firstly, ongoing interaction with the environmental specialists and the technical teams in order to achieve integration of technical assessment and public participation throughout. Secondly, to obtain the bulk of the issues to be addressed early on in the process, with the latter half of the process designed to

provide environmental and technical evaluation of these issues. These findings are presented to stakeholders for verification that their issues have been captured and for further comment.

Input into the public participation process by members of the public and stakeholders can be given at various stages of the EIA process. Registration on the project can take place at any time during the EIA process up until the final EIA report is submitted to DEA. There are however set periods in which comments are required from Interested and / or Affected Parties (I&APs) in order to ensure that these are captured in time for the submission of the various reports. The comment periods during the scoping phase were implemented according to NEMA EIA Regulations. The comment periods during the scoping phase (as set out by DEA) are as follows:

- Background Information Document (BID): 4 Calendar weeks, but also as and when an I&AP registers.
- Comment period for the Draft Scoping Report (DSR): 5 Calendar weeks (40 days).
- Comment on the Amended DSR: should there be a significant change from the DSR an appropriate comment period will be set out in consultation with DEA. This period may be seven (7) days, fourteen days (14), etc., as to be approved or set by DEA. Should there be no significant changes, then the Final Scoping Report (FSR) will be submitted to DEA.

The EIA regulations emphasise the importance of public participation. In terms of the EIA regulations, registered interested and/or affected parties –

- may participate in the application process;
- may comment on any written communication submitted to the competent authority by the applicant or environmental consultant;
- must comment within the timeframes as stipulated by the EIA Regulations;
- must send a copy of any comments to the applicant or Environmental Assessment Practitioner (EAP) if the comments were submitted directly to the competent authority; and
- must disclose any direct business, financial, personal or other interests that the person has in the application being granted or refused.

Further, in terms of the EIA regulations, the EAP:

- manages the application process;
- must be independent;
- must undertake the work objectively – even if this results in views and findings that are not favourable to the applicant;
- must disclose material information that may influence the decision; and
- must conduct a public participation process.

The following actions were taken upon receiving comments/queries/issues:

- The contact details provided were entered into the project database for use in future notifications.
- Confirmation of receipt of comments.
- Addressed comments in the Issues & Response Report.

4.1 Objectives of Public Participation

An understanding of what the public participation is, and is what it is not, needs to be explored and must be clarified.

- Public Participation is:
    - A communication mechanism to inform I&APs regarding a proposed project.
    - A communication mechanism to record comments and/or concerns raised during the relevant phase of the EIA by I&APs regarding a proposed project.

- What Public Participation is not:
    - A marketing exercise.
    - A process to address grievances but rather to record comments raised.
    - One-on-one consultation with each I&AP during the EIA process (not relevant to possibly affected landowners identified).

The primary aims of the PPP are:

- To inform interested and affected parties (I&APs) and key stakeholders of the proposed development.
- To initiate meaningful and timeous participation of I&APs.
- To identify issues and concerns of key stakeholders and I&APs with regards to the proposed development
- To promote transparency and an understanding of the proposed project and its potential environmental impacts.
- To provide information used for decision-making.
- To provide a structure for liaison and communication with I&APs and key stakeholders.
- To assist in identifying potential environmental impacts associated with the proposed development.
- To ensure inclusivity (the views, needs, interests and values of I&APs must be considered in the decision-making process).
- To focus on issues relevant to the project and issues considered important by I&APs and key stakeholders.
- To provide responses to I&AP queries.
- To encourage co-regulation, shared responsibility and a sense of ownership.

In addition to the guidance of the PPP in the EIA Regulations, every effort was also made to conform to the requirements of the Promotion of Administrative Justice Act 2000 (Act 3 of 2000).

4.2 Overview of the Public Participation Process to date

The public participation process for the EIA was initiated on Tuesday the 7th of October 2014 with the issuing of the BID. The stages that will form part of the public participation process to date for this proposed project are reflected in Figure 26 below.

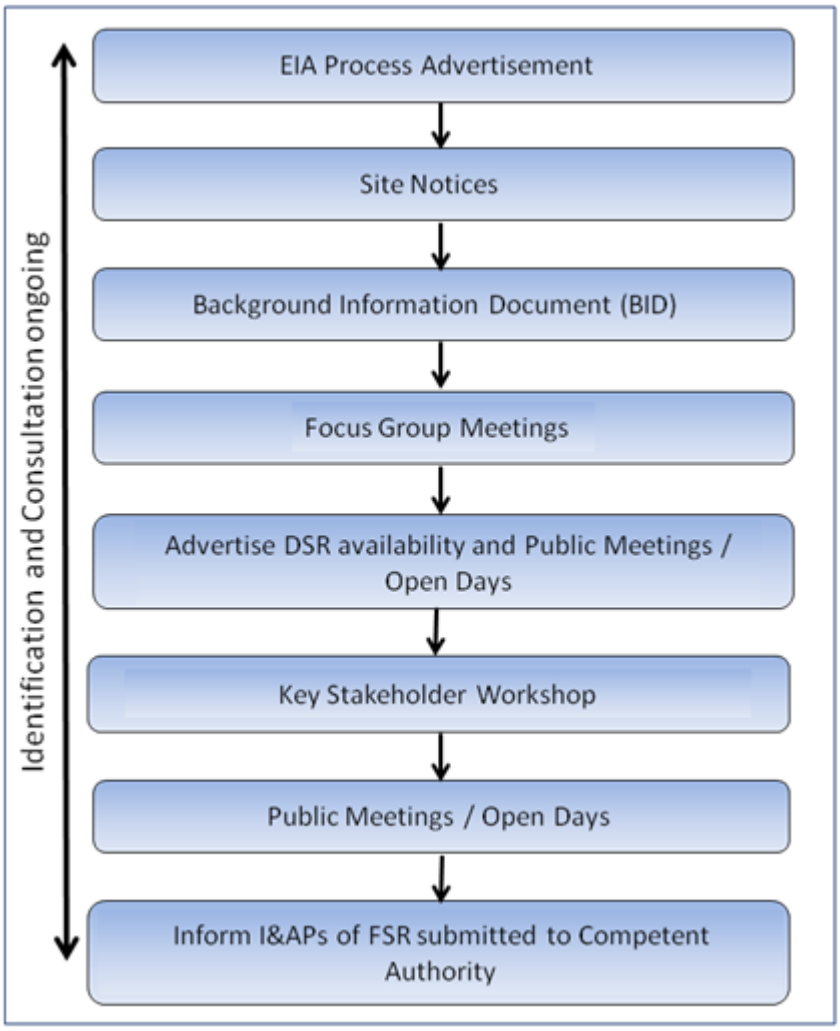

Figure 26: Public Participation Process

Members of the public who wished to be registered on the database as an I&AP were able to do so via telephone, fax, email, mail or SiVEST's website (www.sivest.co.za).

On-going consultation with key stakeholders (e.g. provincial, district and local authorities, relevant government departments, local business etc.) and identified I&APs ensured that I&APs were kept informed regarding the EIA process. Networking with I&APs will effectively continue throughout the scoping phase of the project until the Final Scoping Report and EIA Plan of Study are submitted to DEA. Where required, stakeholders and I&APs were engaged on an individual basis.

During the environmental studies, consultations were held with individuals, businesses, institutions and organisations, and the following sectors of society have been identified and were afforded the opportunity to comment (the full stakeholder database list is included in Appendix 7F):

- National Authorities;
- Provincial Authorities;
- Sekhukhune District Municipality;
- Elias Motsoaledi Local Municipality;
- Thembisile Hani Local Municipality;
- Government Structures such as SAHRA, SANRAL, Telkom, etc.;
- Agriculture Associations;
- Regional and local media (advertisements and public documents e.g. BID);
- Business and commerce;
- Environmental bodies / NGOs;
- Community representatives, CBOs, development bodies;
- Landowners; and
- Civil Aviation Authority (CAA).

4.3 Consultation and Public Involvement

Through the consultation process, issues for inclusion within the DSR will be identified and confirmed. Telephonic discussions and one-on-one consultation will be undertaken where relevant. Meetings and focus group meetings are scheduled to take place during the comment period of the DSR in order to identify key issues, needs and priorities for input into the proposed project. Special attention will be paid to the consultation with possibly affected landowners and communities within the study area to try and address their main concerns.

4.4 Stakeholders and I&APs

In order to identify possible I&APs, use was made of:

- print media – EIA process advertisements
    - The Sekhukhune Dispatch
- site notices throughout the study area (Proofs included in Appendix 7A)
- referrals
- requesting databases and/or contact information from NGOs / CBOs and other organisations

A full database list of registered I&APs was compiled and is included in Appendix 7F.

4.5 Announcing the Opportunity to Participate

The opportunity for stakeholders to participate in the EIA were invited as follows:

- EIA process advert (17 October 2014).
- Copies of the BID were posted to all registered I&APs on the project database.
- Those I&APs with e-mail addresses also received an electronic copy of the BID.
- BIDs were delivered to various locations within the study area:
- The letter of invitation to participate as well as the Registration and Comment Form accompanied the BID.

4.6 Notification of the Potential Interested and Affected Parties

Communication with I&APs were conducted by means of telephone, faxes and email in order to obtain the necessary background information to compile this report. The advertising process was followed in terms of regulation 56 of the EIA Regulations published in R543 in Government Gazette No. 33306 of 18 June 2010, as amended.

Advertisements will be placed in the bimonthly Sekhukhune Dispatch on the 17th of October 2014. In addition, many site notices (as per regulations) were placed near the study area during a site visit on Wednesday the 8th of October 2014.

As stakeholders respond to these advertisements, they will be registered on the project database and sent letters of invitation to participate as well as the BID.

4.6.1 Summary of Comments Received

I&AP	Date received	Summary of comments

None as yet.	None as yet.	None as yet.

4.7 Proof of Notification

Appendix 7 includes all proof of notification of Interested and Affected Parties. More specifically, the types of proofs are as follows:

- Site notice text (Appendix 7B)
- Photographs of site notices (Appendix 7A)
- Proof of advertisements in the newspapers (Appendix 7C)
- Background Information Document (Appendix 7B)
- Correspondence to registered I&APs and key stakeholders (To be included in the final scoping report in Appendix 7D)

4.8 Focus Group Meetings

Focus Group Meetings (FGMs) are to be held with the possibly affected landowners and the District and Local Municipalities during the comment period. FGMs are smaller meetings with specific groups or organisations who have similar interests in or concerns about the project. This process is ongoing and will continue throughout the EIA process.

Minutes of these meetings will be compiled and forwarded to all attendees for their review and comment. The primary aim of these meetings is to:

- disseminate information regarding the proposed development to I&APs
- provide I&APs with an opportunity to interact with the EIA team and the Mainstream Renewable Energy representatives present.
- supply more information regarding the EIA process;
- answer questions regarding the project and the EIA process;
- receive input regarding the public participation process and the proposed development.

4.9 Key Stakeholder Workshop

A Key Stakeholder Workshop is to take place during the review period and stakeholders will be invited by personalised invitation letters.

The Key Stakeholder Workshop will be held in order to provide stakeholders with any additional information regarding the proposed development, to present the environmental findings of the

scoping-phase studies and to invite stakeholders to submit their comments on the DSR and to raise any further comments and/or concerns.

Final minutes of this workshop will be compiled and forwarded to all attendees. The final minutes will be included in the Final Scoping Report and will be submitted to the Competent Authority.

4.10 Public Meetings / Open Days

A Public Meeting will take place during the review period of the DSR.

This meeting will be advertised in the same newspapers that were used for the EIA process. Advertisement and invitation letters will be sent by mail and e-mail to all registered I&APs on the project's database.

Furthermore, posters advertising the Public Meeting will be displayed at the public venues and various public places frequented by the public (i.e. cafés). Photos of proof of poster advertisements will be included in Appendix 7A.

The Public Meetings / Open Days will be held in order to provide I&APs with information regarding the proposed development, present the environmental findings (desk-top) and invite I&APs to raise any further comments and/or concerns.

Final minutes of this meeting will be compiled and forwarded to all attendees. The final minutes are to be included in the Final Scoping Report and will be submitted to the Competent Authority.

4.11 One-on-One Consultation

Where possible, potentially directly affected landowners were consulted on a one-on-one basis and informed about the proposed project. Any comments and/or concerns received will be noted and included in the Comments and Responses Report.

This consultation process is seen as one of the important aspects of the EIA and Public Participation process. Should the proposed project be granted an Environmental Authorisation, these particular stakeholders will be directly affected and their properties impacted upon. The consultation process will also ensure that as many uncertainties and concerns as possible are raised upfront and channelled to Nokukhanya to ensure that the stakeholders and the applicant are informed about these issues throughout the process.

4.12 Comments and Response Report

Issues, comments and concerns raised during the public participation process will be captured in the Comments and Response Report (C&RR) in will be included as Appendix 7E in the Final Scoping Report. This C&RR provides a summary of the issues raised, as well as responses which were provided to I&APs. This information will be used to feed into the evaluation of social impacts. A separate section to the C&RR will be added to the Final Scoping Report to reflect the comments received during the review period from I&APs on the DSR.

4.13 Public Comments on Draft Scoping Report

The Draft Scoping Report will be made available for public review prior to submission of the Final Scoping Report to DEA (the competent authority). The availability of the DSR will be advertised in Sekhukhune Dispatch. Proof of the advertisement will be included in Appendix 7C.

The report will be out for public review and comment for a period of 30 calendar days. The comment period will run from **Thursday the 9th of October 2014 to Friday the 7th of November 2014**. Written notice will be given to all registered I&APs as well as all key stakeholders on the database that the DSR was available for public review.

Electronic copies (CD) of the report will also be made available and were distributed on written request. The Draft Scoping Report was made available at the following venues:

Table 36: Venue where Scoping Report will be publically available

Venue	Street Address	Hours	Contact No.
Groblersdal Library	2 Grobler Street Groblersdal 0470	Monday – Fridays 08h45 – 16h45 Saturdays 08h00 – 13h00	013 262 3056

5 ASSESSMENT IN TERMS OF EQUATOR PRINCIPLES

The Equator Principles ("EP") is a financial industry benchmark for determining, assessing and managing social & environmental risk in project financing. A number of banks, exchanges and organisations worldwide have adopted the Principles as a requirement to be undertaken for funding to be granted. However, certain funding institutions may not have formally adopted the Principles, although will require clients to be compliant with them in order to qualify for loans. The principles are summarised below:

Principle 1: Review and Categorisation
When a project is proposed for financing, the Equator Principles Funding Institution ("EPFI") will categorise the project based on the magnitude of its potential impacts and risks.

Principle 2: Social and Environmental Assessment
For each project assessed as being either Category A or Category B, the client / borrower must conduct a Social and Environmental Assessment ("Assessment") process to address the relevant impacts and risks of the proposed project. The Assessment should also propose mitigation and management measures relevant and appropriate to the nature and scale of the proposed project.

Principle 3: Applicable Social and Environmental Standards
The Assessment will refer to the applicable IFC Performance Standards and applicable Industry Specific EHS Guidelines.

Principle 4: Action Plan and Management System
The client / borrower must prepare an Action Plan ("AP") or management system that addresses the relevant findings, and draws on the conclusions of the Assessment. The AP will describe and prioritise the actions needed to implement mitigation measures, corrective actions and monitoring measures necessary to manage the impacts and risks identified in the Assessment. The management measures are required to comply with applicable host country, social and environmental laws and regulations, and requirements of the applicable Performance Standards and EHS Guidelines, as defined in the AP.

Principle 5: Consultation and Disclosure
The client / borrower or third party expert must consult with project affected communities in a structured and culturally appropriate manner. For projects with significant adverse impacts on affected communities, the process will ensure their free, prior and informed consultation and facilitate their informed participation as a means to establish, to the satisfaction of the EPFI, whether a project has adequately incorporated affected communities' concerns.
In order to accomplish this, the non-technical summaries must be made available to the public by the borrower for a reasonable minimum period in the relevant local language and in a culturally appropriate manner.

Principle 6: Grievance Mechanism

To ensure that consultation, disclosure and community engagement continues throughout construction and operation of the project, the borrower must, scaled to the risks and adverse impacts of the project; establish a grievance mechanism as part of the management system. This will allow the borrower to receive and facilitate resolutions of concerns and grievances about the project's social and environmental performance raised by individuals or groups from among project-affected communities.

Principle 7: Independent Review

For all Category A projects and, as appropriate, for Category B projects, an independent social or environmental expert not directly associated with the borrower must review the Assessment, AP and consultation process documentations in order to assist the EPFIs due diligence, and assess Equator Principles compliance.

Principle 8: Covenants

An important strength of the Principles is the incorporation of covenants linked to compliance. For Category A and B projects, the client / borrower will covenant in financing documentation:

- To comply with all relevant host country, social and environmental laws, regulations and permits in all material respects
- To comply with the AP (where applicable) during the construction and operation of the project in all material respects
- To provide periodic reports in a format agreed with EPFIs (with the frequency of these reports proportionate to the severity of impacts, or as required by law, but not less than annually), prepared by in-house staff or third party experts, that i) document compliance with the AP (where applicable), and ii) provide representation of compliance with relevant local, state and host country social and environmental laws, regulations and permits
- To decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan

Principle 9: Independent Monitoring and Reporting

To ensure ongoing monitoring and reporting over the life of the loan, EPFIs will, for all Category A projects, and as appropriate, for Category B projects, require appointment of an independent environmental and/or social expert, or require that the borrower to retain qualified and experienced external experts to verify its monitoring information, which would be shared with EPFIs.

Principle 10: EPFI Reporting

Each EPFI adopting the Equator Principles commits to report publicly at least annually about its Equator Principles implementation processes and experience, taking into account appropriate confidentiality considerations.

5.1 Assessment Results

This section details the current compliance level with which the solar PV power plant project meets with the Equator Principles and the related Performance Standards which are outlined below.

Table 37: Solar PV power plant Compliance Level in terms of Equator Principles and Related Performance Standards.

The coding key is as follows:

Compliance Level			
Clear			
Not assessed/ determined	Not compliant	Partially compliant	Compliant

Principles	**Compliance Level**	**Reference**
General, Performance Standard 1 Environmental & Social Reporting		
1. Baseline Information		Refer to Chapter 2
2. Impacts and risks		Refer to Chapter 3
3. Global impacts		N/A
4. Transboundary		N/A
5. Disadvantaged / vulnerable groups		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
6. Third party		Refer to section 1.1.
7. Mitigation measures		To be addressed as part of the EMP during the EIA phase
8. Documentation process		Refer to section 1.2
9. Action Plans		To be addressed during the EIA phase
10. Organisational capacity		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)

Principles	Compliance Level	Reference
11. Training		To be addressed as part of the EMP during the EIA phase
12. Grievance mechanism		To be addressed during the EIA phase
13. Report content		To be addressed as part of the EMP during the EIA phase
Performance Standard 2, Labour & Working Conditions		
1. Human Resource Policy		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
2. Working relationship		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
3. Working conditions with and terms of employment		To be addressed as part of the EMP during the EIA phase
4. Workers organisation		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
5. Non discrimination and equal opportunities		Refer to Chapter 2, section 2.15. This issue will also be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
6. Grievance mechanism		To be addressed during the EIA phase
7. Occupational Health and Safety		To be addressed during the EIA phase
8. Non-employee workers		To be addressed as part of the EMP during the EIA phase
9. Supply Chain		N/A
10. Labour Assessment Component of a Social and Environmental Assessment		To be addressed as part of the EMP during the EIA phase (CSI and Labour Plan)
Performance Standard 3, Pollution		
1. Pollution Prevention, Resource Conservation & Energy Efficiency		To be addressed as part of the EMP during the EIA phase
2. Wastes		To be addressed as part of the EMP during the EIA phase

Principles	Compliance Level	Reference
3. Hazardous material		To be addressed as part of the EMP during the EIA phase
4. Emergence preparedness & response		To be addressed as part of the EMP during the EIA phase
5. Technical guidance – ambient considerations		To be addressed as part of the EMP during the EIA phase
6. Greenhouse gas emissions		N/A
Performance Standard 4, Health & Safety		
1. Hazardous materials safety		To be addressed as part of the EMP during the EIA phase
2. Environmental and natural resource issues		Refer to sections 2.3-2.15
3. Emergency preparedness and response		To be addressed in the EMP during the EIA phase
Performance Standard 5, Land Acquisition		Refer to Chapter 4
Performance Standard 6, Biodiversity		Refer to Chapter 2, section 2.7
Performance Standard 7, Indigenous People		Refer to Chapter 4
Performance Standard 8, Cultural Heritage		Refer to Chapter 2, section 2.12 and 2.13

It is important to note that, most of the issues listed per performance standard in the table above will only be addressed during the EIA phase. Therefore at this stage (scoping phase), most of the issues are categorised as “not assessed/ to be determined”. Full compliance with the EPs will only be realised following EIA assessments.

6 CONCLUSIONS AND RECOMMENDATIONS

The above report provides a broad introduction to the issues that are pertinent to the proposed Nokukhanya solar PV power plant, and highlights important issues to be investigated during the EIA Phase of the project. The EIA Phase will draw on the above information and make use of the recommended specialist studies to reach an objective decision on the overall impact of the proposed development.

The EIA Phase will culminate in the compilation of mitigation measures to reduce impacts, the identification of the least impactful routing of the power lines, the identification of least impactful locations for the solar PV arrays, the identification of least impactful locations for building structures and the identification of sensitive areas within the study area which may require more specific management measures. The EIA Phase will also aim to optimise and improve potential positive impacts that may result from the proposed development.

6.1 Conclusions

No specialist study conducted during the Scoping phase for the proposed development has identified any fatal flaws for the Nokukhanya Site.

However, a number of potentially significant (positive and negative) environmental impacts have been identified and will need to be evaluated during the detailed EIR phase of the project. In addition, the EIR Phase will provide a more detailed comparative analysis of these potential impacts against the “no-go” alternative.

Detailed mitigation and management measures will be developed during the Environmental Management Programme (EMPr) phase of the project, in response to the detailed assessment, and will be run towards the end of EIR phase of the project. Should this project receive a positive environmental authorisation, the EMPr will guide the project proponent and appointed contractor(s) through the final design, construction and operational phases of the proposed project.

6.1.1 Layout Alternatives

One of the aims of the Scoping report is to identify a preferred layout for the proposed location of the each of the components of the solar PV power plant to carry through to the EIA phase of the investigation for detailed assessment. The selection of a preferred layout during the scoping phase of the project usually helps to focus future investigations, both in terms of the environmental investigations required and the scope of the public participation process. However, as no fatal flaws have been identified, and as most of the studies have recommended that further detailed EIR-level studies are required in order to comparatively assess the

alternatives and recommend a preferred alternative, layout alternatives will only be fully investigated in more detail in the EIA phase of the projectSummary of Findings

A summary of the findings for each identified environmental impact evaluated in the context of the proposed development (both biophysical and social) is provided in the table below.

Table 38: Summary of environmental issues identified in Specialist Studies.

Aspect	Potential impacts
Biodiversity (Fauna, Avi-Fauna, and Flora)	▪ Loss, fragmentation or degradation of faunal habitat (terrestrial and aquatic); ▪ Displacement of populations of mobile species (terrestrial); ▪ Mortality of populations of sedentary species during construction (terrestrial and aquatic) and mortality of individuals due to secondary factors, such as trampling by vehicles and collisions of flying animals with fixed structures (terrestrial and flying); ▪ Loss of indigenous natural vegetation during construction; ▪ Loss of populations of threatened plants species during construction; ▪ Introduction and/or spread of declared weeds and alien invasive plants in terrestrial habitats; ▪ Loss of individuals of protected tree species during construction
Surface Water	▪ Impacts associated with the construction lay-down area directly in the wetland(s) ▪ Impacts associated with establishing the foundations of the proposed development ▪ Impacts associated with the clearing of vegetation for proposed development ▪ Impacts associated with abnormal/heavy vehicle access into wetland areas and associated buffer zones ▪ Impacts associated with general access near or in wetland areas and the associated buffer zones ▪ Impacts associated with improper stormwater management effects on nearby surface water resources ▪ Impacts associated with the oil, fuels and other soluble substances from construction activities, vehicles and machinery into nearby surface water resources ▪ Impacts associated with the 132kV power line installation into/over nearby surface water resources ▪ Power line collision risks to fauna associated with wetlands (avi-fauna) ▪ Impacts associated with service roads through surface water resources ▪ Stormwater run-off associated with PV plant and associated infrastructure ▪ Oil leakages from switching station
Soils and Agricultural Potential	▪ Loss of potentially productive agricultural land due to construction of the solar PV power plant and associated infrastructure. ▪ Reduction in land capability.

Aspect	Potential impacts
	▪ Disturbance to soils as a result of underground cabling.
Visual	▪ The natural visual character of the surrounding area could be altered as a result of PV panels being erected; ▪ Locating the PV plant on the generally flat terrain, could result in the facility being highly visible for great distances, particularly in areas to the north; ▪ The visual intrusion of the proposed development could adversely affect the identified sensitive receptor locations surrounding the proposed site; ▪ Vehicles and trucks travelling to and from the proposed site on the gravel access road would increase dust emissions both during the construction and operational phases. ▪ Surface disturbance during construction would expose bare soil which could visually contrast with the surrounding environment. Wind blowing over these disturbed areas could result in dust which would have a visual impact. ▪ Security and operational lighting could result in light pollution and glare, which could be an annoyance to surrounding viewers. ▪ Potential visual impacts as a result of the infrastructure associated with the proposed PV plant.
Heritage	▪ Impact on archaeological sites; ▪ Impact on palaeontological sites; ▪ Impact on historical sites; and ▪ Impact on graves and cemeteries.
Socio-economic	Negative Impacts ▪ Potential sterilisation of agricultural land; ▪ Potential impact on surrounding tourism attractions; ▪ Change in demographics of the area due to influx of workers and job seekers; ▪ Increase in social pathologies associated with influx of migrant labourers and job seekers to the area (health, crime, prostitution, xenophobia, etc.); ▪ Added pressure on basic services and social and economic infrastructure; ▪ Altered sense of place; ▪ Impact on commercial property and land values in the surrounding area Positive Impacts ▪ Increase in production and GDP-R of the national and local economies due to project capital expenditure; ▪ Creation of temporary employment in the local communities and elsewhere in the country; ▪ Skills development due to the creation of new employment opportunities;

Aspect	Potential impacts
	▪ Improved standard of living of households directly or indirectly benefiting from created employment opportunities; ▪ Increase in government revenue due to investment; ▪ Sustainable increase in production and GDP-R of the national and local economies through operation and maintenance activities; ▪ Creation of long-term employment in local and national economies through operation and maintenance activities; ▪ Skills development due to the creation of new sustainable employment opportunities; ▪ Investment in the local communities and economic development projects as part of a Social Economic Development and Enterprise Development plan; ▪ Potential impact on surrounding tourism attractions
Geotechnical	▪ There are no ridges on site and hence no related sensitivity; ▪ None of the formations occurring at the site are sensitive or protected; ▪ A shallow, perched water table may be encountered on site during the rainy season. This will be most problematic in depressions and near the existing pans.

Based on the specialist studies, the following conclusions can be reached for each environmental parameter assessed.

Table 39: Conclusions of Specialist Studies.

Biodiversity (Fauna, Avi-Fauna and Flora)	▪ Remaining areas of natural vegetation appear from aerial imagery to have been impacted upon to varying degrees and are not in good condition. ▪ There are two regional vegetation types occurring in the study area, neither vegetation type is listed in the National List of Ecosystems that are threatened and in need of protection ▪ There is one Near Threatened, one Declining and one Rare plant species that could occur in habitats that are available in the study area. Eight species of protected trees could potentially occur on site, but no protected plants are likely to occur there. ▪ There are no threatened amphibian or reptile species of conservation concern that have a geographical distribution that includes the study area and habitat requirements which are met by those found on site. ▪ There are eleven mammal species and ten bird species of conservation concern that could potentially use the site, mostly for foraging. The protected species, the Black-footed Cat, Brown Hyaena, Serval, Honey Badger, Leopard, Cape Fox, Southern African Hedgehog, Southern African Python and some of the birds (Blue Crane, Grey-crowned Crane, Martial Eagle, Cape Vulture and Lappet-faced Vulture) have a likelihood of occurring on site, but are all, except the Southern African Hedgehog, considered to be mobile animals that are unlikely to be

	significantly affected by the proposed development of the solar power facility and associated infrastructure
Surface water	▪ Database findings revealed that two (2) natural channelled valley-bottom wetlands are located within the study area, with several surface water resources located within close proximity to the study area; ▪ The study area spans across a CBA 2, an ESA 1 and ESA 2, as identified by the Limpopo C-Plan V2. ▪ The desktop findings supported the presence of a channelled valley-bottom wetland observed in the database findings. However, this surface water system was observed to be larger in size, and incorporated a larger portion of the study area. Furthermore, the desktop findings revealed an additional surface water resource, in the form of a depression wetland, located within the study area.
Soils and Agricultural Potential	▪ Soils are generally shallow, yellow-brown, structureless, sandy loam to sandy clay loams with low to moderate agricultural potential. ▪ The construction of the photovoltaic plant at the chosen site will have minimal impact on the loss of agricultural land, due to the small percentage (1.6%) of high potential agricultural land indicated by the Land Type survey information. These somewhat deeper soils could occur anywhere within the area of land type Ba4.
Visual	▪ A major portion of the study area has a pastoral visual character and is not valued for its scenic significance. ▪ Overall it can be concluded that the visual impact of the PV plant would be reduced due to the number and nature of visual receptors present and the degree of transformation of the natural environment. ▪ The facility does not however correspond with the typical land use and would visually contrast with the existing character of the landscape. ▪ Despite the low density of sensitive visual receptors, the nature of visual impacts associated with a PV plant of this size entail that the visual impact exerted on a receptor in the study area could still be significant
Heritage	▪ Archival research and evaluation of aerial photography suggests that the sites may have heritage resources present on the property. ▪ The historical significance of the region with regards to the Ndebele and the proclamation of the KwaNdebele homeland have been described in the background research. The presence of Late Iron Age (LIA) stone walling, on the south western boundary the study area, as well as the numerous historical ruins of African homesteads necessitate extensive fieldwork to evaluate and recommend the necessary mitigation measures, where required. ▪ Due to the age and igneous nature of the Nebo Granite, no fossils will be present and a Low Palaeontological Sensitivity is allocated. No further Palaeontological mitigation is recommended.
Socio-economic	▪ After reviewing all relevant policies on national, provincial and local level, no socio-economic fatal flaws or divergence away from

	legislation and plans was found, indicating the compliance of the proposed project to national and lower administrative levels objectives. ▪ Tourism is considered as a key sector of the economy of both LMs, which means that any development pursued in the area should be sensitive to the impact on this industry. ▪ The agricultural sector is an important contributor to job creation in the local economy of Elias Motsoaledi and some if the areas where the proposed project is to be located have been used for agriculture. ▪ The economy and communities of Elias Motsoaledi and Thembisile Hani are in need for investment injection, particularly considering the limited economic base of these municipalities, the stagnation of their economies since the recession in 2009, above average unemployment rates, and high levels of poverty. Both economies need to be diversified and the development of a solar PV plant in the area will offer such an opportunity. ▪ The project will have the potential to contribute to the improvement of the standards of living of the communities living close to the project and increase the employment rate in the area.
Geotechnical	▪ Soils have low bearing capacity at founding level, and therefore collapsible soil fabric; ▪ Inundation could occur as a result of shallow ground water conditions; ▪ Hard excavation conditions are present.

6.2 Recommendations

Table 40: Outcomes and recommendations of Specialist Studies

Aspect	Fatal flaws	Site refinement recommendations	Further Investigations
Biodiversity (Fauna, Avi-Fauna and Flora)	None	▪ The site contains potential sensitivities and, should the project proceed, care is required to manage potential impacts on biodiversity on site.	Yes
Surface water	None	▪ It is provisionally recommended that all structures and associated infrastructure be located outside of any wetlands to avoid and minimise potential impacts on surface water features. ▪ Detailed studies in the impact phase will be required to investigate and verify the desktop findings of this report.	Yes.
Agricultural potential	None	▪ Relatively deeper soils could occur anywhere within the area of land type	Yes

Aspect	Fatal flaws	Site refinement recommendations	Further Investigations
		Ba4. As a result, it is recommended that a detailed soil survey be undertaken to properly delineate the soil pockets in any areas potentially identified for construction.	
Visual	None	▪ Further assessment will be required in the EIA-phase to rate the visual impact of the PV plant and the associated infrastructure on each receptor location.	Yes.
Heritage	None	▪ The historical significance of the region necessitates extensive fieldwork to evaluate and recommend the necessary mitigation measures, where required. ▪ These findings provide the basis for the recommendation of further field thruthing through an archaeological walk down, covering the site. ▪ The aim of this will be to compile a comprehensive database of heritage sites in the study areas, with the aim of developing a heritage management plan for inclusion in the Environmental Management Plan as derived from the EIA.	Yes.
Socio-economic	None	▪ Assessment of the impacts of the PV plant will require a more comprehensive understanding of the local socio-economic conditions surrounding the site. ▪ A site visit inclusive of the interviews with the local authorities, managers of the local tourism attractions, and community leaders will be undertaken. ▪ Developments pursued in the area should be sensitive to the impact on the tourism industry. ▪ Further investigation into the agricultural potential and agricultural activities on site will need to be undertaken in order to determine the	Yes.

Aspect	Fatal flaws	Site refinement recommendations	Further Investigations
		potential impact of the project on agricultural land sterilisation.	
Geotechnical	None	▪ Increase founding size ▪ Increase foundation depth, into underlying granite bedrock ▪ Pre-compaction ▪ Avoid founding within or near water bodies ▪ Dewater excavations during construction ▪ Plan construction during the dry season ▪ Pneumatic drilling required for pylon embedment	Yes

It is therefore recommended that the following studies be taken through to the EIA Phase:

- Biodiversity (flora, avi-fauna and fauna) Assessment (Dr. David Hoare – David Hoare Consulting)
- Surface Water Impact Assessment (Shaun Taylor and Alistair Fyfe– SiVEST)
- Soils and Agricultural Potential (D.G. Paterson – ARC Institute for Soil, Climate and Water)
- Visual Impact Assessment (Andrea Gibb – SiVEST)
- Heritage Assessment (Wouter Fourie – Professional Grave Solutions)
- Socio-economic Impact Assessment (Elena Broughton – Urban-Econ Development Economists)
- Geotechnical Impact Assessment (Cecilia Canahai – Jeffares and Green)

The proposed scope of work and methodology to assess each of the above impacts has been detailed in the plan of study to undertake an EIA, as per the EIA Regulations. The Plan of Study is included below.

7 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT ASSESSMENT

Issues identified during the Scoping phase will be investigated further during the EIA phase of the project. Various specialist studies will be conducted during the EIA phase to assess these issues. Mitigation measures will be formulated and these will be included in the Environmental Management Programme.

This information will assist DEA in making an informed decision with regards to the proposed development.

7.1 Aim of the EIA Phase

The aim of the impact assessment phase is to:

- Conduct a detailed impact assessment of the issues identified
- Identify potential mitigation measures to reduce impacts
- Ensure information is disseminated to Interested and / or Affected parties and there is a constant flow of communication

The following tasks will form part of the Environmental Impact Assessment Phase:

- A comprehensive Public Participation Process (as above)
- Conduct specialist studies
- Conduct alternatives assessment
- Compilation of an Environmental Impact Report (EIR)
- Compilation of an Environmental Management Programme
- Make Final EIR available for public comment
- Submit Final EIR to DEA
- Await decision

The following specialist studies will form part of the Environmental Impact Report:

- Biodiversity (flora, avi-fauna and fauna) Assessment (Dr. David Hoare – David Hoare Consulting)
- Surface Water Impact Assessment (Shaun Taylor and Alistair Fyfe– SiVEST)
- Soils and Agricultural Potential (D.G. Paterson – ARC Institute for Soil, Climate and Water)
- Visual Impact Assessment (Andrea Gibb – SiVEST)
- Heritage Assessment (Wouter Fourie – Professional Grave Solutions)
- Socio-economic Impact Assessment (Elena Broughton – Urban-Econ Development Economists)
- Geotechnical Impact Assessment (Cecilia Canahai – Jeffares and Green)

The terms of reference for these studies involve assessing the potential impacts that have been identified in the Scoping Report in addition to any new issues that are identified during the detailed assessments. The qualifications of these specialists are included in their CV's which are included in Appendix 2.

7.2 Authority Consultation

The stages at which the competent authority will be consulted are as follows:

- Submission of Draft Scoping Report;
- Submission of Final Scoping Report;
- Receipt of comments and confirmation of approval of the Final Scoping Report;
- Submission of draft Environmental Impact Report for comment;
- Submission of final Environmental Impact Report with comments; and
- Response from competent authority regarding acceptance of final Environmental Impact Report.

Additional consultation may occur with DEA during the EIA process should the need arise.

7.3 Proposed Method of Assessing Environmental Issues

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

A brief Terms of Reference for each specialist study is included below:

7.3.1 Biodiversity Assessment

The scoping study provided a general assessment of potential impacts on flora, vertebrate fauna and ecology by the proposed project. The ecological impact assessment will aim to determine potential impacts of the proposed project on the ecological receiving environment.

The general approach that will be adopted for this study will be to identify any critical biodiversity issues that may lead to the decision that the proposed project cannot take place, i.e. to specifically focus on red flags and/or potential fatal flaws. Biodiversity issues will be assessed by documenting whether any important biodiversity features occur on site, including species,

ecosystems or processes that maintain ecosystems and/or species. The assessment will be based on a combination of desktop studies, field-based studies and detailed mapping from aerial photographs.

During the scoping study a description and characterisation of the broad study area was undertaken. A description of the receiving environment was provided and any major sensitivities within the study area were identified. Potential impacts on biodiversity, sensitive habitats and ecosystem function were listed and described.

During the EIA phase the study area will be visited and assessed in to confirm patterns identified from the desktop assessment. The field survey should take place during the growing season in order to properly assess habitat condition. Specific features of potential concern will be investigated in the field, including the following:

- General vegetation status;
- Presence of habitats of conservation concern;
- Presence of protected trees;
- Potential presence of species of concern.

Impacts identified from the Scoping (Desktop) Phase will be assessed according to standard criteria (nature, extent, duration, magnitude, probability, significance, status as well as the degree to which impacts can be reversed, the degree to which impacts will cause irreplaceable loss of resources and the degree to which impacts can be mitigated). The EIMS impact assessment methodology will be followed.

7.3.2 Surface Water Impact Assessment

The surface water assessment during the EIA phase would primarily entail more detailed field investigation of surface water bodies (identified during the scoping phase) within the project site.

The fieldwork would be focused on:

- Larger wetland and drainage systems;
- Those wetland systems identified as sensitive or as having a high functionality; and
- Riparian zones of larger river systems.

The primary aim of the EIA-level assessment would be to determine the boundaries of the relevant wetland / riparian systems so that the solar PV power plant can be placed outside of the wetlands / riparian areas. The wetland / riparian area boundary delineation would be undertaken using the DWAF guideline ‘A practical field procedure for the identification and delineation of wetlands and riparian areas’.

The surface water analysis would propose measures to mitigate any identified potential negative impacts associated with the solar PV power plant, and these would inform the EMP phase. Mitigation measures would possibly entail slight changes to the proposed locations and

extent of the solar PV power plant to avoid impacts on surface water bodies, where significant or likely impacts have been predicted.

Input will be given to the proposed layout and buffers recommended.

The study will culminate in the compilation of a Surface Water Impact Assessment as well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

7.3.3 Soils and Agricultural Potential Assessment

A full agricultural assessment during the EIA Phase will encompass the following:

- More detailed assessment of soil conditions

  The EIA phase assessment will include a field investigation of soils and agricultural conditions across the site. This field investigation will be aimed at ground proofing the existing land type information and understanding the specific soil and agricultural conditions on site. It will not be based on a grid spacing of test pits but will comprise a reconnaissance type of soil mapping exercise based on an assessment of surface conditions, topography, and hand augered samples in strategic places, if necessary. Such a soil investigation is considered adequate for the purposes of this study. A more detailed soil investigation is not considered likely to add anything significant to the assessment of agricultural soil suitability for the purposes of determining the impact of the development on agricultural resources and productivity.

- Assessment of erosion and erosion potential on site

  The field investigation will involve a visual assessment of existing erosion and erosion potential on site, taking into account the proposed development layout.

- Assessment of the impacts of specific construction activities and layout on soil conditions

  The EIA phase will include an assessment of the specifics of construction activities and the proposed development layout on potential loss of topsoil.

- Assessment of specific on-site agricultural activities

  The EIA phase will gather more detail on agricultural activity on the site and identify any locally important soil and agricultural issues. This will be done through interviews with farmers and agricultural role players in the area.

This study will comply with the requirements of the Department of Agriculture, Forestry and Fisheries. The study will culminate in the compilation of an Agricultural Impact Assessment as

well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

7.3.4 Visual Impact Assessment

The focus of the EIA-phase will be to undertake a more detailed, GIS-based assessment of both the magnitude and significance of the visual impact of the proposed development in both a day-time and night-time context.

This assessment will focus on areas where potential sensitive receptors are located. Detailed GIS-based assessment will be used to identify the visual envelope of the areas potentially exposed to visual impacts associated with the proposed solar energy facility. Should data be available, digital terrain models will be generated for the areas of focus. This analysis will be conducted using the ArcView 10, Spatial Analyst and 3D Analyst extensions where necessary. The analysis will rely on the generation of viewsheds from sensitive receptor locations to identify the extent to which the solar power plant would be visible from these points. A further assessment of the intensity of potential visual impact, expressed in terms of bands of differing visual significance will be undertaken. Site visits would allow for the correction and refinement of the analysis.

The overall significance of visual impacts associated with the proposed solar energy facility will be assessed through a rating matrix. Once this has been undertaken, measures to mitigate potential visual impacts will be identified, and if practical, site and layout alternatives within the study area will be considered and suggested to minimise visual impact of the proposed development.

A separate rating matrix will be used to assess the visual impact of the proposed development on the visually sensitive receptors, as identified. This matrix would be based on the distance of a receptor from the proposed development, the primary focus / orientation of the receptor, the presence of screening factors and the visual character of views from the receptors and degree to which the development would conform with the nature visual environment. Thereafter, the alternatives will be comparatively assessed, in order to ascertain the preferred alternative from a visual perspective.

Interested and Affected Parties will be consulted through the public participation process, and if necessary through a detailed consultation process in order to establish how the proposed solar energy facility will be perceived from the various receptor locations and the degree to which this impact will be regarded as negative.

It is envisaged that the main deliverable of the study would be the generation of a spatial databases / maps indicating the zones of visual impact and visualization imagery, as well as a detailed report indicating the findings of the study.

7.3.5 Heritage Assessment

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

- Determination of Significance of Impacts

  Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence.

  Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

- Impact Rating System

  Impact assessment must take account of the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

  - planning
  - construction
  - operation
  - decommissioning

  Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

- Rating System Used To Classify Impacts

  The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating.

7.3.6 Socio-economic Impact Assessment

A socio-economic impact assessment will be conducted during the EIA phase in order to:

- Delineate the zone of influence that stretches beyond the directly affected sites following the discussions with other specialists on the team
- Collect primary socio-economic data (through personal or telephonic interviews) of the communities and economic activities that will be directly or indirectly affected (positively or negatively) by the proposed developments (per project and its components)
- Quantify the potential positive and negative effects of the proposed project and its alternatives (if applicable) on the socio-economic environment in the delineated study area in terms of the following:
    - Changes in production (direct, indirect and induced)
    - Changes in value added (direct, indirect and induced)
    - Changes in employment (direct, indirect and induced)
    - Changes in household income (direct, indirect and induced)
    - Changes in government revenue (direct, indirect and induced)
    - Changes in living standards
    - Changes in access to infrastructure
    - Changes to social fabric
- Evaluate the change in the size and composition of the local and regional economies that will be stimulated by the proposed development, as well as the state of local communities
- Evaluate the potential positive and negative impacts following the environmental specialist's methodology
- Assess cumulative impacts
- Develop a management and mitigation plan by proposing mitigation measures for negative effects and enhancement measures for positive impacts, supported by methods for the implementation, timeframes, costs and responsibilities information

The following methods will be employed in undertaking the study.

- Surveys and interviews

  Surveying is one of the fastest ways to obtain primary information. Surveys can be conducted over the telephone, internet, e-mail, or personal interviews. The latter is relatively expensive but since it involves one person interviewing another, it is a way to get in-depth and comprehensive information. The use of surveys and interviews is particular applicable for collecting primary data of the community that could potentially be affected by the project or collecting specific data from an identified official or stakeholder.

  The following data will be sourced using surveys and interviews:
    - Land use information and type of economic activity on properties within the affected environment
    - Economic profiles of the activities within the affected environment
    - Demographic and social characteristics of the local environment (population, income levels, crime levels, etc.)

- Mapping

  Land use mapping technique would be used to illustrate and analyse the land uses in the affected area. The map will be created based on the information collected during the surveys and include the following data:
    - Types and location of tourism facilities in the area
    - Land uses in the area surrounding the facility (defined by the visual impact)

- Economic modelling and impact assessment

  Assessment of economic impacts will be done using economic models developed for the South African economy and the Northern Cape. The former will be used to assess the impacts on the country's economy, whilst the latter will be used to estimate the impact on the provincial and local economies.

  Economic models are compiled on the basis of Social Accounting Matrices that illustrate the linkages between various economic agents. The use of economic models allows identifying the industry-specific multipliers on production, capital formation, Gross Domestic Product (GDP), employment, and income. Such multipliers can also be broken in terms of various effects that can be observed as a result of an exogenous change introduced into the economy, be it capital investment or operating expenditure. Three types of effects are distinguished, inter alia:
    - Direct – these represent the original purchases for the project's establishment or operations
    - Indirect – these are effects that spill over the industries that supply goods and services required for the implementation of the project or for its operation, whether directly to the contractor or operator, or through their suppliers
    - Induced – these are the effects that are stimulated by the change in income levels of households that would directly or indirectly be affected by the project and businesses.

7.3.7 Geotechnical Assessment

An impact phase geotechnical assessment will be undertaken to assess potential geotechnical impacts of the proposed development. The geotechnical impact assessment report will involve the following:

- A review of the Phase 1 study in relation to the alternative layout options
- A site visit to confirm the desktop information

The site visit will involve the following:
- Visual assessment for cuttings, outcrops and soils exposures
- Assessment of surface features, topography, drainage

- Excavation of a limited number of hand auger holes to provide an initial assessment of the soil conditions

The results of the Phase 2 investigation will be included in a geotechnical report that will provide a comparative assessment of the alternative layout options. Further detailed geotechnical investigations will be required for engineering design purposes.

The study will culminate in the compilation of a Geotechnical Impact Assessment as well as mitigation measures which will feed into the Environmental Management Programme (EMPr).

7.4 Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics which include context and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in Table 42.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

7.5 Impact Rating System

Impact assessment must take account of the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- Planning;
- Construction;
- Operation; and
- Decommissioning.

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

7.5.1 Rating System Used To Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into

one rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

Table 41: Description of terms.

NATURE		
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.		
GEOGRAPHICAL EXTENT		
This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	International and National	Will affect the entire country
2	Province/region	Will affect the entire province or region
3	Local/district	Will affect the local area or district
4	Site	The impact will only affect the site
PROBABILITY		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Irreversible	The impact is irreversible and no mitigation measures exist.
2	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
3	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
4	Completely reversible	The impact is reversible with implementation of minor mitigation measures

IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects
3	Medium Cumulative impact	The impact would result in minor cumulative effects
4	High Cumulative Impact	The impact would result in significant cumulative effects
INTENSITY / MAGNITUDE		

Describes the severity of an impact		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

SIGNIFICANCE

Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula:

(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.

The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	**Impact Significance Rating**	**Description**
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.

29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

The table below is to be represented in the Impact Assessment section of the report.

Table 42: Rating of impacts.

IMPACT TABLE	
Environmental Parameter	*A brief description of the environmental aspect likely to be affected by the proposed activity e.g. Surface water*
Issue/Impact/Environmental Effect/Nature	*A brief description of the nature of the impact that is likely to affect the environmental aspect as a result of the proposed activity e.g. alteration of aquatic biota The environmental impact that is likely to positively or negatively affect the environment as a result of the proposed activity e.g. oil spill in surface water*
Extent	*A brief description indicating the chances of the impact occurring*
Probability	*A brief description of the ability of the environmental components recovery after a disturbance as a result of the proposed activity*
Reversibility	*A brief description of the environmental aspect likely to be affected by the proposed activity e.g. Surface water*
Irreplaceable loss of resources	*A brief description of the degree in which irreplaceable resources are likely to be lost*
Duration	*A brief description of the amount of time the proposed activity is likely to take to its completion*
Cumulative effect	*A brief description of whether the impact will be exacerbated as a result of the proposed activity*
Intensity/magnitude	*A brief description of whether the impact has the ability to alter the functionality or quality of a system permanently or temporarily*
Significance Rating	*A brief description of the importance of an impact which in turn dictates the level of mitigation required*

IMPACT TABLE		
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	4	1
Probability	4	1
Reversibility	4	1
Irreplaceable loss	4	1
Duration	4	1
Cumulative effect	4	1
Intensity/magnitude	4	1
Significance rating	-96 (high negative)	-6 (low negative)
Mitigation measures	*Outline/explain the mitigation measures to be undertaken to ameliorate the impacts that are likely to arise from the proposed activity. Describe how the mitigation measures have reduced/enhanced the impact with relevance to the impact criteria used in analyzing the significance. These measures will be detailed in the EMPR.*	

7.6 Recommendations

It is recommended that the specialist studies pertaining to certain aspects be carried forward into the EIR Phase, namely, those studies mentioned above. Various issues and concerns have been identified which require detailed assessment and thus it is recommended that the EIA phase be allowed to continue in order to assess these and the impacts associated.

7.7 Public Participation

The Public Participation during the EIR Phase will involve the following:

Table 43: Public Participation activities still to take place.

ACTIVITY	FUNCTION
Prepare and distribute EIA newsletter	Notify registered I&APs of outcome of the Scoping Phase (including timeframes and when their input is required).
Focus Group Meetings / Key Stakeholder Workshops	Meeting to report back to key stakeholders
Public Meetings	Report back on the process to the general public.

ACTIVITY	FUNCTION
Public comment period	Notification of I&APs of the availability of the EIR report for public comment.
Notification of granting or refusal of Environmental Authorisation	Informing of all registered I&APs of the EA
Environmental Authorisation appeal period	Receive any appeals and forward to DEA

7.8 Proposed Project Schedule going forward

The table below represents the proposed schedule of events for the project till closure upon DEA's decision.

Table 44: Proposed Project Schedule

	November 2014	January 2015	February 2015	March 2015	May 2015
Start of FSR Comment period	Dates to be confirmed in the impact phase				
Submission of FSR to DEA	Dates to be confirmed in the impact phase				
DEA Decision on FSR		Dates to be confirmed in the impact phase			
Distribution of EIA Newsletter		Dates to be confirmed in the impact phase			
DEIR Comment period		Dates to be confirmed in the impact phase			
Hold Meetings (FGM, PM and KSW)			Dates to be confirmed in the impact phase		
Submission of FEIR to DEA				Dates to be confirmed in the impact phase	
DEA Decision					Dates to be confirmed in the impact phase

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