

**DRAFT ENVIRONMENTAL IMPACT ASSESSMENT DESCRIPTION**

**Applicant:**

Epembe Investments (Pty) Limited and Piosol (Pty) Limited Solar Consortium.

**Report Title:** Draft Environmental Impact Assessment Report [EIAR] Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ.

**Competent authority and reference numbers:**

Department of Environmental Affairs (DEA)

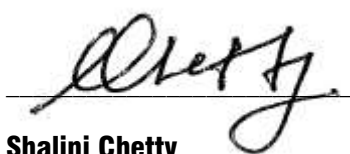
DEA Ref No: 14/12/16/3/3/2/444

NEAS Ref No: DEA/EIA/0001604/2012

**Legal:**

This Scoping Report has been prepared in terms of the requirements of Regulation 28 (1), (2) & (3) of the Environmental Impact Assessment Regulations of 18 June 2010 as per Government Notice R 543.

**Report compiled by:**



**Shalini Chetty**

**Date:**

27 February 2013

**Reviewed and approved by:**



**Abbigail El Mohamadi**

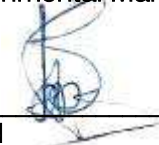
**Date:**

27 February 2013

**DECLARATION OF INDEPENDENCE**

We declare that we act as independent environmental assessment practitioners for this application, with no affiliation with or vested financial interests in the proponent other than for work performed in terms of the requirements of the Environmental Impact Assessment Regulations 2010 and the National Environmental Management Act, 1998 (Act 107 of 1998).

We have no conflicting interests in the undertaking of this activity and have no interest in secondary developments resulting from the possible authorisation of this application. Remuneration for our professional services rendered is not dependent on approval by any decision making authority responsible for authorising this application. We undertake to disclose to the competent authority any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the National Environmental Management Act, 1998 (Act 107 of 1998).



Signed \_\_\_\_\_

27/02/13

Date

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## ABBREVIATIONS

DAFF:	Department of Agriculture, Forestry and Fisheries
DEA:	Department of Environmental Affairs
DWA:	Department of Water Affairs
EAP:	Environmental Assessment Practitioner
EIA:	Environmental Impact Assessment
EIAR:	Environmental Impact Assessment Report
EMF :	Environmental Management Framework
EMPr:	Environmental Management Programme
EWT:	Endangered Wildlife Trust
IAIA:	International Association of Impact Assessment
I&AP's:	Interested and/or Affected Parties
LDEDET:	Limpopo Department of Economic Development, Environment & Tourism
NEMA:	National Environmental Management Act
NEMBA:	National Environmental Management: Biodiversity Act
NEMPAA:	National Environmental Management Protected Areas Act
NEMWA:	National Environmental Management: Waste Act
SAHRA:	South African Heritage Resources Agency
SACLAP:	South African Council for the Landscape Architectural Profession
SDF:	Spatial Development Framework
SUDS:	Sustainable Urban Drainage Systems
TIS:	Traffic Impact Study
TFSC:	Thin Film Solar Cell
TFPV:	Thin Film Photovoltaic Cell
WDM:	Waterberg District Municipality

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## GLOSSARY OF TERMS

- Alien Vegetation:** Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area.
- Alien Species:** A plant or animal species introduced from elsewhere: neither endemic nor indigenous.
- Alternatives:** in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to – The property on which or location where it is proposed to undertake the activity; The type of activity to be undertaken; The design or layout of activity; The technology to be used in the activity; and The operational aspects of the activity.
- Applicant:** Any person who applies for an authorization to undertake an activity or to cause such activity to be undertaken as contemplated in the National Environmental Management Act (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2006.
- Arable Potential:** Land with soil, slope and climate components where the production of cultivated crops is economical and practical.
- Buffer zone:** is a collar of land that filters out inappropriate influences from surrounding activities as described by Shafer (1999) according to Pfab (2001:11), also known as edge effects, including the effects of invasive plant and animal species, physical damage and soil compaction caused by trampling and harvesting, abiotic habitat alterations and pollution. According to Pfab (2001:11), buffer zones can also provide more landscape needed for ecological processes, such as fire, as pointed out by Shafer (1999).
- Construction Activity:** A Construction Activity is any action taken by the Contractor, his subcontractors, suppliers or personnel during the construction process as defined in the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 107 of 1998).
- Critically Endangered:** A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild, in the immediate future.
- Ecology:** The study of the inter relationships between organisms and their environments.
- Environment:** All physical, chemical and biological factors and conditions that influence an object and/or organism.
- Environmental Impact:** An Impact or Environmental Impact is the degree of change to the environment, whether desirable or undesirable, that will result from the effect of a Construction Activity within the limits that define the construction site. An Impact may be the direct or indirect consequence of a Construction Activity.
- Environmental Impact Assessment:** Assessment of the effects of a development on the environment.
- Environmental Management Plan:** A legally binding working document, which stipulates environmental and socio-economic mitigation measures that must be implemented by several responsible parties throughout the duration of the proposed project.
- Indigenous:** means a species that occurs, or has historically occurred, naturally in a free state within the borders of South Africa. Species that have been introduced to South Africa as a result of human activity are excluded (South Africa (Republic) National Environmental Management: Biodiversity Act, 2004: Chapter 1).

- Interested and Affected Party:** any person, group of persons or organization interested in or affected by an activity contemplated in an application, or any organ of state that may have jurisdiction over any aspect of the activity
- Road Reserve:** The road reserve is a corridor of land, defined by co-ordinates and proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.
- Road Width:** For the purposes of the EMP, the Road Width is defined as the area within the Road Reserve i.e. fence line to fence line, but also includes all areas beyond the Road Reserve that are affected by the continuous presence of the road i.e. a reach of a water course.
- Mitigate:** The implementation of practical measures to reduce adverse impacts
- Public Participation Process:** is a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters
- Record of Decision:** A brief description of the proposed activity, the extent or quantities involved, the surface areas involved, the infra structural requirements and the implementation programme for which the authorization is issued
- Red data plant species:** are fauna and flora species that require environmental protection based on the World Conservation Union (IUCN) categories and criteria.
- Soil Compaction:** Mechanically increasing the density of the soil, vehicle passage or any other type of loading. Wet soils compact easier than moist or dry soils.
- Species:** means a kind of animal, plant or other organism that does not normally interbreed with individuals of another kind. The term “species” include any sub-species, cultivar, variety, geographic race, strain, hybrid or geographically separate population (South Africa [Republic] National Environmental Management: Biodiversity Act, 2004: Chapter 1).
- The Contractor:** the contractor as the developers agent on site, is bound by the ROD and EMP conditions through his/her contract with the developer, and is responsible for ensuring that conditions of the EMP and ROD are strictly adhered to at all times. The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site agent in terms of the EMP.
- The Developer:** remains ultimately responsible for ensuring that the development is implemented according to the requirements of the EMP and the conditions of the Record of Decision (ROD) throughout all phases of the project.
- The Environmental Control Officer (ECO):** the ECO is appointed by the developer as an independent monitor of the implementation of the EMP i.e. independent of the developer and contractor.
- The Environmental Liaison Officer (ELO):** the Contractor shall submit to the Site Agent a nominated representative of the Contractor as an ELO to assist with day to day monitoring of the construction activities for the contract
- Vegetation:** is a collective word for plants. Vegetation can be regarded as the first link in any food chain.
- Vulnerable:** A taxon is ‘Vulnerable’ when it is not ‘Critically Endangered’ or ‘Endangered’ but is facing a high risk of extinction in the wild in the medium term future.
- Watercourse:** is “A river or spring; a natural channel in which water flows regularly or intermittently; a wetland, lake or dam into which, or from which, water flows; and any collection of water which the Minister may by notice in the Government Gazette, declare to be a watercourse,





INTERDESIGN  
L A N D S C A P E  
A R C H I T E C T S

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

and a reference to a watercourse includes, where relevant, its bed and banks” (South Africa [Republic] National Water Act, 1998).



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11	Other	<b>Registered Stakeholder as per the Stakeholder database</b>

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**EXECUTIVE SUMMARY**

**1. INTRODUCTION**

Interdesign Landscape Architects (Pty) Ltd (ILA) has been commissioned by **Epembe Investments (Pty) Limited and Piosol Limited Solar Consortium** to undertake the appropriate environmental process [EIA Process] to apply for Environmental Authorisation (EA) for the PV (Photovoltaic) Solar Farm with a maximum generating capacity of up to 75 MW in terms of the South African IPP Procurement Program under tender Number DOE 001/2011/2012 (“RFP”) on the Remainder of the Farm Vangpan 294 LQ.

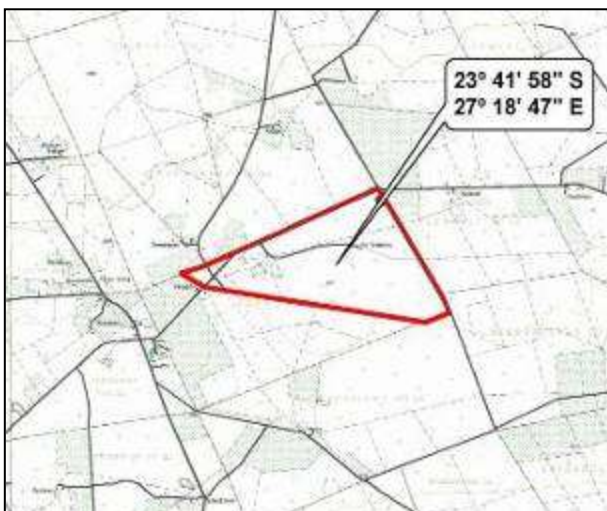
The Environmental Impact Assessment (EIA) process followed is in compliance with the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations of 2010 (Government Notice No’s R543, 544 and 546 of 2010). The proposed development involves ‘listed activities’, as defined by the NEMA, 1998. Listed activities are activities, which may have potentially detrimental impacts on the environment and therefore require environmental authorisation from the relevant authorising body.

The proposed development is situated on The Remainder of the Farm Vangpan 294 LQ, which extends to approximately 731,4915 ha in extent (SG Code: T0LQ0000000029400000). The Farm falls within the jurisdictional boundaries of the Lephalale Local Municipal area in the Waterberg District of Limpopo. The Department of Environmental Affairs (DEA) will be the responsible regulatory authority and the final decision making powers rests with the DEA.

The project was initially registered with the Limpopo Department of Economic Development, Environment and Tourism (LDEDET) under LDEDET reference number: 12/1/9/2-W30 and NEAS reference number: LIM/EIA/0000457/2012 (**Refer Appendix A**). Upon making the Final Scoping Report available for public review the application was changed over to the DEA after the LDEDET confirmed that they would not be able to authorise the project. The project was registered with the DEA on 10 December 2012 and the process as stipulated by the said Department is being followed. The DEA reference numbers are as follows NEAS Reference DEA/EIA/0001604/2012 and DEA Reference 14/12/16/3/3/2/444) (**Refer to Appendix B: Letter from DEA**).

**2. LOCALITY**

The subject property is located in the Limpopo Province, within the Lephalale Local Municipality of the Waterberg District, approximately 50 km west of the town Lephalale. The application property consists of the Remainder of the Farm Vangpan 294 LQ, approximately 731, 4915 ha in extent. (**Refer Appendix C for A3 copies of topographical and orthophoto Locality Map**)



**Figure 1: Locality Map**

**Figure 2: Locality in Regional Context**

### 3. GENERAL PROJECT DESCRIPTION

The project will consist of construction, operation and maintenance of a PV power plant with a maximum installed power capacity up to 48 MWdc with associated infrastructure and structures on an area measuring 120 hectares. The 48MW will secure the 40MW delivery into the ESKOM National Grid. **(Refer Appendix D for letter from Eskom). (However the application is for up to 75 MW).**

The associated infrastructure and structures will consist of the following:

- ⌚ Internal and external access roads and a small parking area;
- ⌚ Fencing of the plant and video security control systems;
- ⌚ Foundations / mini piles for the mounted photovoltaic arrays;
- ⌚ Electricity access point for the construction phase, operation phase (if necessary) and UPS (Uninterruptible Power Supply) devices;
- ⌚ Storm water collection system;
- ⌚ Administrative areas & control room;
- ⌚ Cabling linking Photovoltaic strings and other internal cabling;
- ⌚ Medium voltage stations designed to host inverters and medium voltage transformers;
- ⌚ A medium voltage receiving station, parallel connecting the MV stations;
- ⌚ one small high voltage substation with one or more high-voltage power transformers and a small switching station (if necessary); and
- ⌚ Overhead power line and/or underground cables connecting the Vangpan Solar Park to a 132 kV busbar to be commissioned and equipped into the Eskom 132kV/22kV substation called "Theunispan", adjacent to the project site. The connection will also entail interventions on the Eskom's grid according to Eskom's connection requirements/solution.

The aim of the solar energy facility is to obtain maximum electricity production through exposure to the solar resource, whilst in turn minimising infrastructure, operational and maintenance costs together with social and environmental impacts. Refer to **Appendix E** for a copy of the proposed lay-out.

### 4. PURPOSE OF THE EIA

The purpose of the Environmental Impact Assessment (EIA) is specified in Guideline Document 3: A General Guide to the EIA Regulations, 2006 Published by the Department of Environmental Affairs (DEA) as follows:

- ⌚ Address issues that were raised during the scoping phase;
- ⌚ Assess alternatives to the proposed activity in a comparative manner;
- ⌚ To rank environmental issues identified during the environmental scoping exercise through application of a methodology for the determination of significance, based on the Guidelines compiled by the Department of Environmental Affairs and Tourism;
- ⌚ To assess the relevant biophysical environmental components of the site to an appropriate level of detail. This includes the physical, biological, and socio-economic components;
- ⌚ To reflect all the required information/ findings in a logical and systematic way in order to assist the DEA with the evaluation of the proposed development in terms of the requirements of National Environmental Management Act, 1998 (Act No. 107 of 1998) as amended; and
- ⌚ To describe/ recommend specific measures in an Environmental Management Programme (EMP) to be implemented to address significant aspects/ impacts associated with the proposed development.

The public participation phase is an essential part of the EIA process. During the EIA process, public participation is conducted in accordance with the Plan of Study for EIA, which is included in the Scoping Report. In this instance that entails the following:

The draft EIA report will be made available to all registered I&AP's, Departments, Organisations and other key stakeholders for a 40 day review period; and

All comments received on the draft report will be included in the final EIA report to be submitted to the DEA for issuing of a decision.

### 5. APPROACH AND METHODOLOGY

The approach to the study is based on a thorough evaluation of possible environmental aspects and associated impacts that the proposed development may have on the receiving environment, with the focus on the relevant physical, biological, and socio-economic characteristics of the development site, as well as

the surrounding areas. Impacts identified by key stakeholders, Departments and relevant organisations are addressed in this report.

The function of the Environmental Impact Report [EIR] is to help the Competent Authority in making informed decisions, the public in understanding the likely impacts of the proposal and the proponent in managing these impacts. [DEAT (2004) Environmental Impact Reporting, Integrated Environmental Management, Information Series 15, Department of Environmental Affairs and Tourism (DEAT), Pretoria]

Furthermore this EIR serves to document and communicate, clearly and impartially:

- ~ the context of the proposed activity;
- ~ the probable impacts and risks associated with the proposed activity and its alternatives;
- ~ measures to mitigate and manage negative impacts and enhance benefits - associated with the proposed activity and its alternatives, and the residual significance of impacts if mitigation measures were to be implemented effectively;
- ~ the concerns of the interested public, authorities, and the communities affected by the proposal; and
- ~ the level of confidence in predicting and evaluating impacts, any gaps in knowledge and areas of uncertainty which could substantially influence the findings.

### **5.1 ASSESSMENT OF SENSITIVITY – BIOPHYSICAL ENVIRONMENT**

On-site assessment of the environmental characteristics is supported by literature studies.

The following specialist investigations have been undertaken:

- ~ Avifaunal Assessment [AGES (Pty) Ltd];
- ~ Ecological Assessment (Flora and Fauna) [AGES (Pty) Ltd];
- ~ Soil, Land-use, Agricultural Potential and Land Capability Assessment [AGES (Pty) Ltd]; and
- ~ Desktop Geotechnical Investigation [Mr J Louis van Rooy].

### **5.2 ASSESSMENT OF SENSITIVITY – SOCIO-ECONOMIC ENVIRONMENT**

The following studies were undertaken which identified impacts associated with the socio-economic environment:

- ~ Heritage Impact Assessment [Dr J van Schalkwyk]; and
- ~ Traffic Impact Study [Civil Concepts Consulting Engineers].

### **5.3 EIA PROCESS CONDUCTED IN LINE WITH ENVIRONMENTAL LEGISLATION**

ILA has proceeded with the EIA Process, as described in Regulations 26-35 of GNR 543 of 18 June 2010 and as described in the following Guideline Documents published by the Department of Environmental Affairs:

- ~ Guideline Documents 3, 4 and 5 of 2006;
- ~ Integrated Environmental Management Guideline Series 7 – Public Participation in the EIA Process;
- ~ Integrated Environmental Management Guideline Series 5 – Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010;
- ~ Environmental Impact Reporting, Integrated Environmental Management, Information Series 15, Department of Environmental Affairs and Tourism (DEAT), Pretoria 2004]

Documents produced comply with the requirements stipulated in the Environmental Impact Assessment (EIA) Regulations promulgated 18 June 2010 as read with Government Notices R 543 (Regulations 26-35), R544, R545 and R546 as amended.

### **5.4 PUBLIC PARTICIPATION CONDUCTED IN LINE WITH THE REQUIREMENTS OF THE EIA REGULATIONS 2010**

The approach followed regarding Interested and Affected Parties during the EIA process is as per the requirements of the Environmental Impact Regulations published in the National Environmental Management Act, 1998 (NEMA) (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations of 2010 (Government Notice No's R543, R544, R545 and R546 of 18 June 2010).

The following Guideline Documents published by the DEA were also utilised to guide the Public Process;

- ↺ Guideline Document 4 of 2006; and
- ↺ Integrated Environmental Management Guideline Series 7 – Public Participation in the EIA Process;

## 5.5 ASSESSMENT OF IMPACTS

Aspects and impacts (cumulative impacts, degree of impacts, nature of impacts, degree to which impacts can be reversed upon implementation of mitigation measures), associated with the planning, construction and operational phases identified during the Scoping phase are extensively assessed as determined through application of a methodology, which is based on DEAT (2006) Guideline 5: Assessment of Alternatives and Impacts in support of the Environmental Impact Regulations, Integrated Environmental Management Guideline Series, Department of Environmental Affairs and Tourism (DEAT), Pretoria.

Comprehensive mitigation measures informed by the finalised specialist reports as well as consultation with key stakeholders are included in the report as well as in the draft Environmental Management Programme.

The EIA process to be followed is furthermore:

- ↺ open and transparent and will be maintained throughout the entire lifecycle of the EIA-process; and
- ↺ respects the democratic rights and obligations of the participants/ stakeholders.

## 6. RISKS AND KEY ISSUES

Risks, key aspects and impacts were identified following consultation with and written correspondences received from Interested and Affected Parties, Departments and Key Stakeholders, as well as a site visit. A list of impacts identified associated with the proposed solar plant development for the construction and operational phases follows:

### ANTICIPATED ENVIRONMENTAL AND SOCIAL ASPECTS PRE-CONSTRUCTION AND CONSTRUCTION PHASES

- ↺ Surveying, fencing, search-and-rescue, clearing and grubbing, topsoil stripping and access road construction;
- ↺ Transport of material to site;
- ↺ Construction of the temporary site camp which involves clearing of the vegetation, fencing of the camp and related structures including store-rooms and vehicle parking areas;
- ↺ Earthworks include clearing of vegetation;
- ↺ Road and infrastructure construction includes clearing of vegetation;
- ↺ Site clearance including removal of all building material, temporary structures and any other waste material generated during construction. All such material to be removed from site and disposed of appropriately once construction is complete.

### OPERATIONAL PHASE

- ↺ Maintenance of solar plant infrastructure

### 6.1.2 ANTICIPATED IMPACTS CONSTRUCTION PHASE

#### Beneficial Impacts

- ↺ Skills development and creation of job opportunities

#### Adverse Impacts

- ↺ De-vegetation of specific areas of construction will result in loss of habitat for fauna, invertebrates and flora (habitat destruction and fragmentation)
- ↺ Damage to and removal of protected tree species
- ↺ Invasion by weeds and invasive alien plants as a result of surface disturbance
- ↺ Potential impact on soil due to possible hydrocarbon spills by construction vehicles
- ↺ Loss of agricultural potential and land capability due to construction of solar farm
- ↺ Loss of grazing and roosting land for existing faunal and avian species
- ↺ Increased risk of erosion due to site clearance, removal of vegetation, soil disturbance and compaction
- ↺ Increased rate of stormwater run-off from solar panels

- ↺ Dust generation on site
- ↺ Sanitation (toilet facilities) could impact on soil and ground water.
- ↺ Waste management could impact on soil and groundwater
- ↺ Unsupervised and misuse of fire on site could impact negatively on the environment.
- ↺ Poaching of game by construction team
- ↺ Impact of heavy vehicles (damage to the D1675) as well as dust and noise
- ↺ Possible damage to existing powerlines/ infrastructure
- ↺ Possible damage/loss of subterranean artefacts
- ↺ Traffic obstruction and traffic safety due to construction vehicles
- ↺ Crime may increase as a result of construction workers

## OPERATIONAL PHASE

### Beneficial Impacts

- ↺ Promotion of clean renewable energy
- ↺ Skills development and creation of job opportunities [solar farm maintenance]
- ↺ Contribution to infrastructure upgrades
- ↺ Contribute to improving grid strength by putting back 40mw of electricity into the system

### Adverse Impacts

- ↺ Increase of hard surface area i.e. increased stormwater run off, resulting from solar panels
- ↺ Possible electrocution of avian species due to presence of powerlines
- ↺ Collision with associated power lines and solar panel infrastructure

### 6.1.3 ANTICIPATED CUMULATIVE IMPACTS

The majority of impacts associated with the activity both adverse and beneficial and for both the construction and operational phases have been identified as resulting in cumulative impacts due to the number of development activities that will be undertaken in the area. The Remainder of the Farm Vangpan and its surrounds will be under pressure until such time as developments are operational and are operating responsibly. The mining company Resgen South Africa (Pty) Limited have already obtained various Environmental Authorizations from the LDEDET (Limpopo Department of Economic Development, Environment & Tourism) to use a 150 meter wide strip of the farm Vangpan for the construction of a railway line as well as for the construction of a portable water line to suit their development needs. The EA reference numbers issued by LDEDET is 12/1/9/2-W08 dated 2012/03/20 and 12/1/9/1-W51 dated 25/10/2012. Resgen South Africa (Pty) Ltd has also applied for a Basic Assessment to obtain permission from LDEDET for the construction of a 132KV Power line for the Boikarabelo Coal Mine which will run over the farm Vangpan. Cumulative impacts can be minimised if development proposals take cognisance of surrounding development proposals and if designs are supportive of each other.

## 7. IMPACTS AND MITIGATION MEASURES

Each impact was evaluated in terms of the proposed lay-out, land use & parameters applicable to the environmental management. Mitigation measures have been identified that will mitigate the impacts of high significance successfully. The development proposal has considered the factors as indicated in NEMA (Act 107 of 1998) in order to result in the development of a sustainable land use.

## 8. CONCLUSION AND RECOMMENDATIONS

The potential negative impacts on the environment can be successfully mitigated; provided that strict implementation of the Environmental Management Programme and auditing thereof takes place and recommendations as indicated under Section 9 & 10 are implemented.

From the findings of the Environmental Impact Assessment, the following can be concluded:

- ↺ The solar farm will add new generation capacity from renewable energy to the national electricity grid and aid in accomplishing the goal of a 42% share of all new installed generating capacity from renewable energy forms as per the target set by the Department of Energy (DoE)
- ↺ Possible environmental impacts associated with the proposed development are described in Section 8 of this report. The impacts will be minimised by implementation of the recommendations in Section 9 and implementation of the EMPr;
- ↺ No "fatal flaws" or adverse impacts, that cannot be mitigated, are anticipated to be associated with the



- proposed solar farm; and
- The mitigation measures, described in the EMP must be applied during the pre-construction, construction and operational phases of the proposed development by the responsible parties and within the specified time frames, in order to ensure responsible management of the aspects and associated impacts of the proposed development on the receiving environment.

It is believed that both the beneficial and adverse impacts were thoroughly assessed. Site specific mitigation measures have been provided by specialist consultants and have been included in the EMP. Compliance with the requirements stipulated in the EMP and adherence to the mitigation measures will minimise and manage the environmental impacts identified in Section 8 of this Report

## SECTION 1: INTRODUCTION

### [Regulation 28 (1)(a)]

#### 1.1 DETAILS OF APPLICANT

The applicant is:

**Epembe Investments (Pty) Limited and Piosol (Pty) Limited Solar Consortium**

PO Box 14547

SINOVILLE

0129

Contact Person: Mr Johan Visagie

Cell: 083 227 2224

Fax: 012 808 5116

Email: jovico@worldonline.co.za

#### 1.2 DETAILS OF THE INDEPENDENT ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

### [Regulation 31(2)(a)(i)]

The Environmental Assessment Practitioner is:



**INTERDESIGN LANDSCAPE ARCHITECTS (PTY) LTD (ILA)**

P.O. 74648

LYNNWOOD RIDGE

0040

Tel: (012) 348-1922

Fax: (012) 348-7154

Contact person: Abbigail El Mohamadi

Email: abbigail@ilaweb.co.za

#### 1.3 EAP EXPERTISE

### [Regulation 31(2)(a)(ii)]

ILA performs comprehensive Environmental Impact Assessments (EIA's), as required by the Environmental Conservation Act as well as the National Environmental Management Act, 1998. ILA has expertise and experience to assess the visual and aesthetic impacts of proposed developments, as part of an EIA. ILA also conducts ecological planning and rehabilitation, which entails a process of site surveying and assessment of the physical, biotic and social-economic environment. This database is analysed to assist during the planning process of developments.

The Environmental Assessment Practitioners' team consist of the following individuals:

↻ **Ms Karen Botes – Managing Director:** Qualifications: BL (UP) MTech (Hort) *cum laude* PrLArch

↻ **Ms Abbigail El Mohamadi – Director:** Qualifications: BSc LArch (UP)

↻ **Ms Claudia Coetzee – Environmental Assessment Practitioner**

↻ **Ms Shalini Chetty – Environmental Assessment Practitioner** Qualifications: BA Environment and Development (UKZN)

The Managing Director of ILA in her personal capacity is a member of the South African Council for the Landscape Architectural Profession (SACLAP), registration number 99102. Karen Botes, Abigail El Mohamadi, Claudia Coetzee and Shalini Chetty are also members of the International Association of Impact Assessment (South Africa) IAIA.

#### 1.4 LIMITATIONS AND GAPS IN KNOWLEDGE

[Regulation 31(2)(m)]

- ⚡ This draft EIAR is project specific therefore the EAP team has not evaluated other power generation alternatives
- ⚡ Studies assume that the potential impacts on the environment resulting from the proposed development can be mitigated or avoided.

### SECTION 2: SITE DESCRIPTION & SURROUNDING LAND USES

#### 2.1 DESCRIPTION OF APPLICATION SITE AND PROPOSED ACTIVITY

##### 2.1.1 APPLICATION SITE

[Regulation 31 (2)(c)]

The application property consist of the

- ⚡ Remainder of the Farm Vangpan 294 LQ, approximately 731, 4915 ha in extent.  
**(Refer Appendix C for copies of topographical and orthophoto Locality Map)**

The subject property is located in the Limpopo Province, within the Lephalale Local Municipality of the Waterberg District, approximately 50 km west of the town Lephalale.

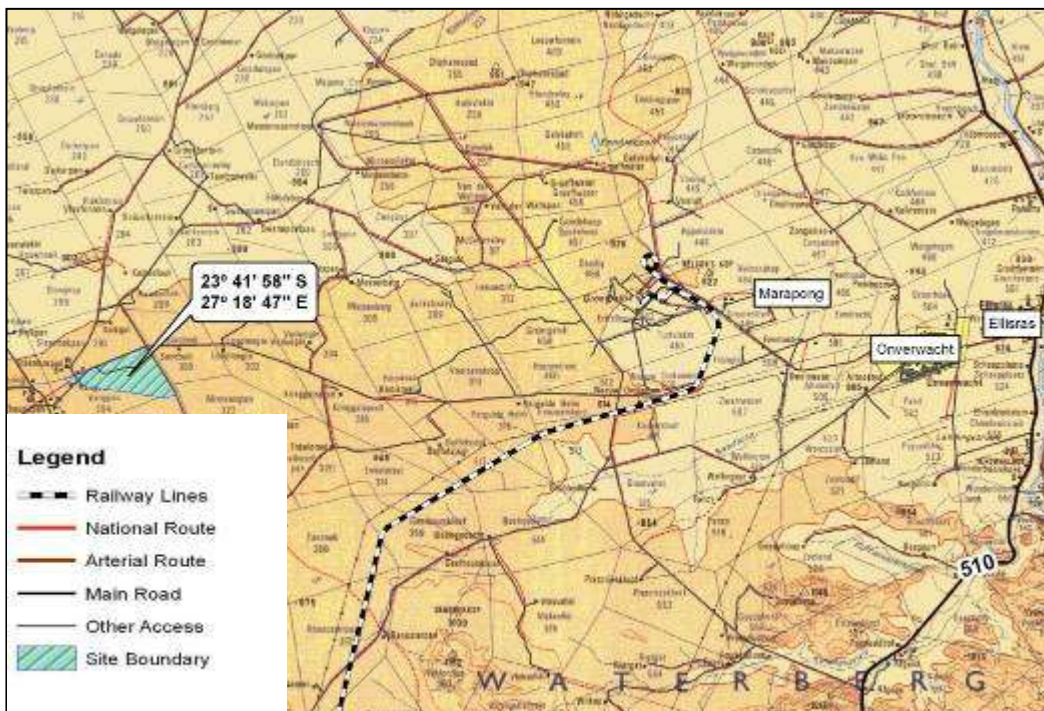


Figure 3: Locality in relation to nearest towns

The farm portion is situated in the Lephalale Local Municipality of the Waterberg District, along the Steenbokpan Road approximately 50km west of the town Lephalale in the Limpopo Province. The D1675 is located along the northern boundary of the development site.

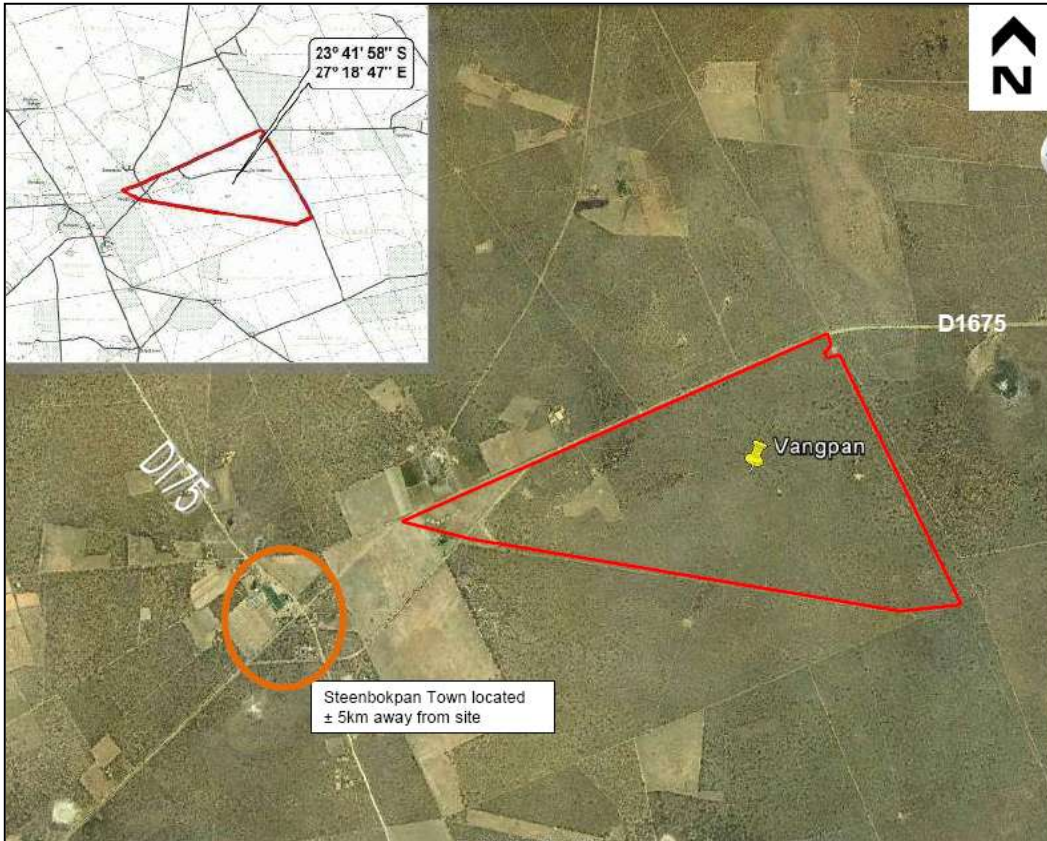


Figure 4: Location of Steenbokpan Town (Google Earth)

## 2.2 SURROUNDING LAND USES

The direct surrounding land-uses are as follows:

- ↻ To the North - Mixed Agricultural uses;
- ↻ To the South - Department of Minerals and Energy, mining and prospecting uses;
- ↻ To the East - Mixed Agricultural uses; and
- ↻ To the West - Mixed Agricultural uses.

The small town of Steenbokpan is situated approximately 5 km away from the application site.

## 2.3 PROJECT PROPOSAL AND DESCRIPTION

The project will consist of construction, operation and maintenance of a PV power plant with a maximum installed power capacity up to 48 MWdc with associated infrastructure and structures on an area measuring 120 hectares. The 48MW will secure the 40MW delivery into the ESKOM National Grid. **(Refer Appendix D for letter from Eskom).**

The associated infrastructure and structures will consist of the following:

- ↻ Internal and external access roads and a small parking area;
- ↻ Fencing of the plant and video security control systems;
- ↻ Foundations / mini piles for the mounted Photovoltaic arrays;
- ↻ Electricity access point for the construction phase, operation phase (if necessary) and UPS (Uninterruptible Power Supply) devices;
- ↻ Storm water collection system;

- ⌚ Administrative areas & control room;
- ⌚ Cabling linking Photovoltaic strings and other internal cabling;
- ⌚ Medium voltage stations designed to host inverters and medium voltage transformers;
- ⌚ A medium voltage receiving station, parallel connecting the MV stations;
- ⌚ one small high voltage substation with one or more high-voltage power transformers and a small switching station (if necessary); and
- ⌚ Overhead power line and/or underground cables connecting the Vangpan Solar Park to a 132 kV busbar to be commissioned and equipped into the Eskom 132kV/22kV substation called “Theunispan”, adjacent to the project site. The connection will also entail interventions on the Eskom’s grid according to Eskom’s connection requirements/solution.

**Project specific details:**

⌚ Technology	-	Photovoltaic
⌚ Maximum installed capacity	-	48MWdc (peak)
⌚ Maximum generation capacity at delivery point	-	40MWac (nominal)
⌚ Average Annual energy production	-	210 KWh/m2 per year
⌚ Load factor	-	20% (load factor = 20% (Lephalale irradiation 1750 *100/ 8760).
⌚ Type of PV module	-	(245W ÷ 295 W)
⌚ PV module orientation	-	(azimuth) 0 °N
⌚ PV module tilt angle	-	26° to the horizontal
⌚ Number of PV modules	-	195,000
⌚ Number of structures	-	8,744
⌚ Type of structures	-	Fixed ground mounted
⌚ Minimum structure height above ground level	-	1.0 m
⌚ Maximum structure height above ground level	-	3 meters
⌚ Footprint area, including internal roads	-	120 hectares
⌚ PV power plant lifetime	-	25 - 30 years
⌚ Lay down area (temporary)	-	7.4 hectares
⌚ Construction timeframe	-	8 Months

The Photovoltaic Power Plant with associated infrastructures and structures will be constructed and operated on a footprint area 120 hectares. The connection to the Eskom grid will be undertaken according to the Eskom connection solution, which requires the construction of a high voltage substation and (if necessary) a small switching station having transformers to increase the voltage from 20 kilovolts to 132 kilovolts, and a new power line and/or underground cables, at a voltage of 132 kilovolts, linking the PV power plant to the Eskom’s Theunispan 132kV/22kV substation, located on the Remainder of the Vangpan 294 LQ.

Refer to **Appendix E and F** for a copy of the proposed lay-out plan as well as construction phase plans. The layout has been informed following the findings of Biodiversity and Heritage Assessments.

**2.4 PROJECT FUNCTIONING**

The project envisages the establishment of a solar power plant with a target installed power capacity up to 48MW, having a power generation capacity at delivery point up to 40MW.

- ⌚ The estimated annual energy production is calculated in approximately 1,750 kWh/kWp/year (load factor = 20 % (1750\*100/8760). Therefore, the solar farm will generate approximately 84 GWh per year. The calculation is made by the professional tool "PVSYST" and the simulation is done for 1 MWp (1 "PV field").
- ⌚ The site data (irradiation, temperature, etc.) charged on the database consists of hourly meteor data registered by NASA satellites (NASA-SSE satellite data 1983-1993, release 6) and the simulation is made for the timeframe of 1 year.
- ⌚ The output (1,750 kWh/kWp/year) is also called “Full net equivalent hours”, which represents the average energy injected into the grid per 1 kWp of installed power. The theoretic gross energy production from PV modules is approximately 2,100 kWh/kWp/year. The global horizontal irradiation of the site is 2,029 kWh/m2/year (NASA-SSE satellite data, 1983-1993, release 6).

- ↻ Values from Meeonorm and PVGIS is Hor. Global Meeonorm: 2103,9 kWh/m<sup>2</sup> Hor. Global PVG is: 2099
- ↻ The energy generated by the solar farm will reduce the quantity of pollutants and greenhouse gases emitted into the atmosphere. The reduced amount of CO<sub>2</sub> will be the emissions that would have been generated by a thermal power plant using fossil fuels for producing the same quantity of energy that it is produced by the proposed solar farm.
- ↻ The quantity of the avoided CO<sub>2</sub> was calculated to be approximately 51,200 tons of CO<sub>2</sub> per year.
- ↻ Furthermore, considering that 1 kg of coal generates approx. 3.7 kWh (supposing a caloric value of 8000 kcal/kg and a coal plant efficiency of 40%), the coal that would be saved by the solar farm will be approximately 13,620 tons of coal / year.

### SECTION 3: LEGAL FRAMEWORK

#### 3.1 REQUIREMENTS BY DEPARTMENT OF ENVIRONMENTAL AFFAIRS (DEA)

The project was initially registered with the Limpopo Department of Economic Development, Environment and Tourism (LDEDET) under LDEDET project reference number: 12/1/9/2-W30 and NEAS reference number: LIM/EIA/0000457/2012 (**Refer Appendix A**). Upon making the Final Scoping Report available for public review the application was changed over to the DEA.

The DEA acknowledged receipt of the application in a letter of correspondence dated 10 December 2012. The project received the following reference numbers (NEAS Reference DEA/EIA/0001604/2012 and DEA Reference 14/12/16/3/3/2/444) (**Refer to Appendix B: Letter from DEA**). ILA further prepared a Final Scoping Report which was submitted to the DEA. The Final Scoping Report was approved by the DEA in a letter of correspondence dated 25 January 2013 and the following information has been must be included in the Final EIR as per the Department's requirements (**Refer to Appendix G for a copy of the Final Scoping Report approval letter**):

- ↻ Comments from the Limpopo Department of Economic Development, Environment and Tourism, Department of Water Affairs and Department of Agriculture, Forestry and Fisheries must be obtained. Proof of correspondence with the various stakeholders must be included in the Final EIR  
**These Departments will be provided with hard copies of the Draft EIA Report for comment. Please refer to Appendix T for proof of notification thereof.**
- ↻ The total footprint of the proposed development should be indicated. Exact locations of the commercial blocks, Solar Facility and associated infrastructure should be mapped at an appropriate scale  
**The project proposal has been scaled down from a mixed use and solar farm development that would have been carried out on Portion 1 of the farm Steenbokpan 295 LQ as well as the Remainder of the farm Vangpan 294 LQ to only a solar farm development on the Remainder of the farm Vangpan 294 LQ. Refer to Appendix E and F for copy of proposed solar farm layout as well as detailed drawing for both construction phase and permanent layout of solar farm.**
- ↻ Should a Water Use License be required, proof of application for a license needs to be submitted  
**According to the Civil Services Report compiled by Siza Tech Consulting Engineers (Refer Appendix I) the contractor that is appointed for the construction of the solar facility will be responsible for provision of water to the site by means of transporting the water to site during the construction phase. Concrete will be required for the basements of: medium-voltage stations, medium voltage receiving station, high-voltage substation (if required) and control building, warehouse. The overall amount of concrete to be produced will be approx. 5,000 m<sup>3</sup>, this will however be procured as ready-mix from Lephalale and no water will be required. Should the applicant be selected as a preferred bidder in terms of the IPP Program then the applicant will apply for a Water-Use Licence Application for provision of water during the operational phase of the project. This was discussed with the DEA during a meeting held on 05/02/2013.**
- ↻ Possible impacts and effects of the development on the surrounding area  
**Noted and is addressed as part of this Draft EIA Report.**
- ↻ The EIR should include information on the following:

- Economic viability of the facility to the surrounding area and how the local community will benefit  
**Refer to Section on Socio Economic Environment and Appendix Y for report from developer.**
- Information on services required on the site, e.g. sewage, refuse removal, water and electricity.  
Who will supply these services and has an agreement and confirmation of capacity been obtained?

**Please refer to Section 5 for further details pertaining to civil services.**

- ⌚ A construction and operational phase EMP to include mitigation and monitoring measures  
**Please refer to the EMPr that includes mitigation measures as requested**
- ⌚ Should blasting be required, appropriate mitigation measures should be provided  
**Please refer to the EMPr**
- ⌚ The Final EIR includes at least one A3 regional map of the area and the locality maps included in the final EIR illustrate the different proposed alignments and above ground storage of fuel. The maps must be of acceptable quality and as a minimum, have the following attributes:
  - Maps are relatable to one another
  - Cardinal, points
  - Co-ordinates
  - Legible legends
  - Indicate alternatives
  - Latest land cover
  - Vegetation types of the study area; and
  - A3 size locality map

**Noted. No fuel tanks will be stored on site and therefore alignments are not applicable. Please refer to Appendix C, E and F for maps.**

### 3.2 GUIDELINES AND LEGISLATION

This section provides an overview of the relevant policy, legal and administrative requirements which are applicable to the proposed project.

#### 3.2.1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REQUIREMENTS

The Environmental Impact Assessment (EIA) process followed is in compliance with the National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations of 2010 (Government Notice No's R543, 544 and 546 of 2010). The proposed development involves 'listed activities', as defined by the NEMA, 1998. Listed activities are activities, which may have potentially detrimental impacts on the environment and therefore require environmental authorisation from the relevant authorising body.

The proposed development occurs in the Limpopo Province, the DEA will be the responsible regulatory authority and the final decision making powers rests with the DEA. The LDEDET will however remain the commenting local authority. The following activities apply to the proposed development. A description of which aspect of the development triggers the activity is highlighted in green:

- ⌚ The construction of a road, outside urban areas,
  - (i) with a reserve wider than 13,5 meters or,
  - (ii) where no reserve exists where the road is wider than 8 metres **[GNR 544. Activity (22)]**  
**Internal roads will be required within the proposed development where no road reserves exist and for which some of these roads will be wider than 8 metres as it will have to accommodate heavy vehicles are part of the industrial component.**
- ⌚ The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre -
  - (i) where the existing reserve is wider than 13,5 meters; or
  - (ii) where no reserve exists, where the existing road is wider than 8 metres **[GNR 544. Activity (47)]**  
**Internal roads will be required within the proposed development where the widening will be more than 6 metres.**
- ⌚ The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more **[GNR 545. Activity (1)]**  
**The project proposal entails a solar farm that consists of an array of photovoltaic (PV) panels with a generating capacity of up to 75 Megawatts [Request for Qualification and Proposals for New**

**Generation of Capacity under IPP program issued by the South African Department of Energy under Tender No. DOE/001/2011/2012 (“RFP”). It has been confirmed by Eskom that 40 megawatts may be generated on the Remainder of the farm Vangpan 294 LQ.**

↻ The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex **[GNR 545. Activity (8)]**

**Project proposal entails a solar farm.**

↻ 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 **[GNR 545. Activity (15)]**

**The site extends to approximately 731,4915 hectares. The solar farm is anticipated to extend to approximately 120 hectares and will result in the transformation of more than 20 hectares of land.**

### 3.3 OTHER LEGAL REQUIREMENTS AND GUIDELINES

The following list of legislation and guidelines are applicable to the proposed development.

#### 3.3.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The act provides 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 co-ordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

The EIA process is conducted in terms of Section 24 (5) of the Act. Section 24 states ‘(1) In order to give effect to the general objectives of integrated environmental management laid down in this Chapter. The potential impact on:

(a) the environment;

(b) socio-economic conditions: and

(c) the cultural heritage,

of activities that require authorisation or permission by law and which may significantly affect the environment, must be considered, investigated and assessed prior to their implementation and reported on to the organ of state charged by law with authorizing, permitting, or otherwise allowing the implementation of an activity.’

#### 3.3.2 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT, 2004 (ACT NO. 10 OF 2004)

The purpose of the Biodiversity Act is to provide for the management and conservation of South Africa’s biodiversity within the framework of the NEMA and the protection of species and ecosystems that warrant national protection.

**According to the Ecological Report (Flora and Fauna) compiled by AGES (Pty) Ltd (Refer Appendix H), certain protected tree species occur on site. These tree species may not be cut, disturbed or damaged, their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold, except under a license granted by the Department of Agriculture, Forestry and Fisheries (DAFF). The relevant permits are therefore needed prior to any impact on these tree species. The floral assessment has investigated the status of the tress affected by the proposed development.**

#### 3.3.3 NATIONAL WATER ACT, 1998 (ACT NO. 36 OF 1998)[NWA]

The National Water Act guides the management of water in South Africa as a common resource. The Act aims to regulate the use of water and activities, which may impact on water resources through the categorisation of ‘listed water uses’ encompassing water extraction, flow attenuation within catchments as well as the potential contamination of water resources, where the Department of Water Affairs (DWA) is the administering body in this regard.

**According to the Civil Services Report compiled by Siza Tech Consulting Engineers (Refer Appendix I) the contractor that is appointed for the construction of the solar facility will be responsible for provision of water to the site by means of transporting the water to site during the construction phase. Concrete will be required for the basements of: medium-voltage stations, medium voltage receiving station, high-voltage substation (if required) and control building, warehouse. The overall**



*amount of concrete to be produced will be approx. 5,000 m<sup>3</sup>, this will however be procured as ready-mix from Lephalale and no water will be required. Should the applicant be selected as a preferred bidder in terms of the IPP Program then the applicant will apply for a Water-Use Licence Application for provision of water during the operational phase of the project for use of borehole water as there are six boreholes located on site, four of which hold water that is suitable for human consumption. This was discussed with the DEA during a meeting held on 05/02/2013.*

### **3.3.4 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT, 2008 (ACT 59 of 2008)**

The Waste Act reforms the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for the licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

*According to the Civil Services Report compiled by Siza Tech Consulting Engineers (Refer Appendix I) the sewage effluent to be generated during the operational phase is estimated at 1168 m<sup>3</sup>/year. Therefore a waste management licence application will not be required as estimated annual throughput is below the threshold of 2000m<sup>3</sup>.*

### **3.3.5 NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT NO. 25 OF 1999)**

The National Heritage Resources Act legislates the necessity for cultural and heritage impact assessments in areas earmarked for development, which exceeds 0.5 hectares. The Act makes provision for the potential destruction to existing sites, pending the archaeologist's recommendations through permitting procedures. The South African Heritage Resources Agency (SAHRA) administers permits.

*In accordance with Section 38 of the NHRA, an independent heritage consultant was therefore commissioned by Interdesign Landscape Architects to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where development is planned. (Refer Appendix J).*

*Two sites were identified as follows:*

- ↪ An informal burial place with 3 marked graves, although there might be more that are not properly marked located on the Remainder of the farm Vangpan 294 LQ - it is recommended that this feature is formally fenced off with a buffer zone of at least 20 metres from the centre of the middle grave. This large buffer is necessary to accommodate possible unmarked graves. The recommended 20 meter buffer zone will be demarcated by means of a fence.*
- ↪ A small memorial dedicated to a person identified as Assie, who died on this spot in an aeroplane crash in 1995 also located on the Remainder of the farm Vangpan 294 LQ - this feature is already fenced off and does not require further fencing.*

*None of these features will be impacted upon by the proposed solar farm and remains within the open spaces as per the layout plan.*

### **3.3.6 NATIONAL FORESTS ACT, 1998 (ACT NO. 84 OF 1998)**

This Act provides for the management, utilisation and protection of forests through the enforcement of permitting requirements associated with the removal of protected tree species, as indicated in a list of protected trees (first promulgated in 1976 and updated since). The Department of Agriculture, Forestry and Fisheries (DAFF) administer permits in this regard.

*The following protected tree species occur on site:*

- ↪ Acacia erioloba*
- ↪ Boscia albitrunca*
- ↪ Combretum imberbe*
- ↪ Sclerocarya birrea*
- ↪ Spirostachys africana*

*Application in terms of the National Forests Act, 1988, as amended is required to DAFF prior to any of the protected tress species on site being removed or destroyed. The developer will appoint a specialist to undertake the application should he be selected as a preferred bidder during round three of the IPP Program. This was discussed with the DEA during a meeting held on 05/02/2013.*

### **3.3.7 OCCUPATIONAL HEALTH AND SAFETY ACT (ACT NO. 85 OF 1993)**

The purpose of this Act is to provide for the health and safety of persons at work, and for the health and safety of persons in connection with the use of plant and machinery. It serves also for the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work; to establish an advisory council for occupational health and safety; and to provide for matters connected therewith.

*Requirements in terms of this act relate mostly to working conditions of employees during the construction and operational phases. Aspects related to the Health & Safety Act have been included in the Environmental Management Programme (EMPr).*

### **3.3.8 NATIONAL VELD & FOREST FIRE ACT (ACT 101 of 1998)**

The purpose of this Act is to prevent and combat veld, forest and mountain fires throughout the Republic. The Act provides for a variety of institutions, methods and practices for achieving this purpose.

*It will be the responsibility of the Applicant [Epembe Investments (Pty) Limited and Piosol (Pty) Limited Solar Consortium] to ensure that a veldfire programme is properly implemented. As per Section 12 of the Act the Applicant is responsible for ensuring that firebreaks are implemented and maintained. It is the responsibility of land owners to adhere to the rules of the Lephalale Fire Protection Association and to ensure that all firebreaks, fire fighting equipment and fire fighting teams are up to standard. It is very important to inform neighbours when you plan to burn firebreaks or even arrange to burn firebreaks together. Especially during the burning season, communication through a core team is very important, informing neighbours when and where to report during run away veldfires. Measures have been included in the EMPr to prevent the misuse of fire which may result in veld fires during the construction phase.*

### **3.3.9 DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND TOURISM (DEAT) (2006) GUIDELINES 3,4 & 5**

The EIA process is being conducted according to the Guideline documents 3, 4 and 5 compiled by the Department of Environmental Affairs and Tourism [now known as the Department of Environmental Affairs (DEA)].

### **3.3.10 CONSERVATION OF AGRICULTURAL RESOURCES ACT 1983(ACT 43 OF 1983)**

The Act provides for control over the utilisation of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invade plants; and for matters connected therewith.

*All invader species classified in terms of the Conservation of Agricultural Resources Act 1983 (Act 43 of 1983) are to be identified and eradicated in an ecologically sensitive manner during the construction phase. Maintenance of weeds will be required during the operational phase. No chemicals may be used due to the existence of boreholes on the properties.*

### **3.3.11 FENCING ACT 1963 (ACT 31 OF 1963)**

The Act serves to consolidate the laws relating to fences and the fencing of farms and other holdings and matters incidental thereto.

*A security fence will be erected around the marked graves that were found on site. Fence specifications have been included in the EMPr.*

### **3.3.12 HAZARDOUS SUBSTANCES ACT 1973 (ACT 15 OF 1973)**

To provide for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products; to provide for the division of such substances or products into groups in relation to the degree of danger; to provide for

the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products; and to provide for matters connected therewith.

**Mitigation measures have been included in the EMP for the storage of hazardous goods during the construction phase. It is recommended that no fuel or oil be stored in bulk at the camp site but that only the amount required for a day's work is kept on site.**

## SECTION 4: PROPOSED ACTIVITY AND ALTERNATIVES

### 4.1 PROJECT BACKGROUND

*[Regulation 31 (2)(b)& (f)]*

Energy demand in the country and international petroleum market resuscitated demand for coal based products has brought numerous mining right applications to the Lephalale district, due to the vast coal fields that are found in the area with the coalfields west of the Lephalale town with Medupi already in operation and the potential future 'Mafutha' project by SASOL. Anglo Coal and other mining companies are known to be involved in exploration activities in this area. It is expected that beneficiation of coal to either gas or liquid will require certain down and upstream industries in close proximity. For this, certain special development considerations need to be conceded to support the development of these industries. The development of clean, green and renewable energy has been qualified as a priority by the Government of South Africa with a target goal for 2013 of 10,000 GWh, as planned in the Integrated Resource Plan 1 (REFIT 1 and REFIT 2 programme) and with the Kyoto Protocols. Therefore, the development of photovoltaic power plants will represent a key feature in the fulfilment of the proposed target goal and the reduction of CO<sub>2</sub> emissions. These are developments of national magnitude in terms of addressing the energy issues and their contribution to ASGISA in terms of job creation.

#### 4.1.1 NEED AND DESIRABILITY

The Lephalale Municipality has earmarked an area to accommodate developments of this nature. It involves the entire coal reserve up to the border of Botswana. Steenbokpan node is the centre of this potential development area. This means that specialised developments such as industrial parks, residential developments linked to operations may be considered through special resolution of Council. A clear motivation, linking a particular land-use to the main mining or industrial operation, needs to be submitted to Council for approval - Council is expected to consider each application on its own merits. According to the Integrated Development Framework 2012 – 2013, Steenbokpan was correctly identified as a future development node in the previous SDF. Noting national development pressures on the municipality, the area is upgraded to a level of a potential development area.

#### 4.1.2 RATIONALE

The main objective of the solar component is aimed to add new generation capacity from renewable energy to the national electricity grid and to aid in accomplishing the goal of a 42% share of all new installed generating capacity from renewable energy forms as per the target set by the Department of Energy (DoE). In terms of the Integrated Resource Plan (IRP), approximately 8,4% of the renewable energy mix is planned to be generated via PV technologies over the next thirty years. Should the project be approved, the solar component will contribute to the strengthening of the local electricity grid and will also contribute towards the target for renewable energy as indicated in the IRP. Further to this the proposed development will contribute to strengthening of the local economy as jobs will be created during the construction phase and further jobs that will become available during the operational phase as linked to the commercial and industrial component.

The project location was chosen for the construction of the PV facility for the following reasons:

- ~ The availability privately owned land
- ~ The site is uniformly irradiated by the sun
- ~ The fairly flat surface which is preferred for installation of the PV panels.
- ~ An Eskom 22/132 KVA substation (Eskom's Theunispan Substation) exists on the north eastern boundary on the Remainder of the farm Vangpan 294 LQ. The substation is being fed by Eskom lines that run from north to south along the eastern farm boundary.
- ~ Eskom is currently planning the 400 Delta-Mmamabula 1 & 2 400KV line and this 400KV line is running over the eastern boundary of Portion 1 of the farm Steenbokpan 295 LQ (located directly opposite the site)

The purpose of the solar farm is to add new capacity for the generation of renewable electric energy to the national electricity supply, in compliance with the IRP 2010, with the IPP Procurement Programme and together with the environmentally sustainable growth of the surroundings areas and immediate community.

#### 4.2 PROPOSED ACTIVITY

*[Regulation 31 (2)(b)& (c)]*

##### The following is proposed:

The project will consist of construction, operation and maintenance of a PV power plant with a maximum installed power capacity up to 48 MWdc with associated infrastructure and structures on an area measuring 120 hectares. The 48MW will secure the 40MW delivery into the ESKOM National Grid. **(Refer Appendix D for letter from Eskom). However please note that the application is being made for a generating capacity of up to 75MW to cater for possible future needs.**

##### The associated infrastructure and structures will consist of the following:

- ~ Internal and external access roads and a small parking area;
- ~ Fencing of the plant and video security control systems;
- ~ Foundations / mini piles for the mounted Photovoltaic arrays;
- ~ Electricity access point for the construction phase, operation phase (if necessary) and UPS (Uninterruptible Power Supply) devices;
- ~ Storm water collection system;
- ~ Administrative areas & control room;
- ~ Cabling linking Photovoltaic strings and other internal cabling;
- ~ Medium voltage stations designed to host inverters and medium voltage transformers;
- ~ A medium voltage receiving station, parallel connecting the MV stations;
- ~ one small high voltage substation with one or more high-voltage power transformers and a small switching station (if necessary); and
- ~ Overhead power line and/or underground cables connecting the Vangpan Solar Park to a 132 kV busbay to be commissioned and equipped into the Eskom 132kV/22kV substation called "Theunispan", adjacent to the project site. The connection will also entail interventions on the Eskom's grid according to Eskom's connection requirements/solution.

##### Project specific details:

- |   |   |   |
|---|---|---|
| ~ Technology                                    | - | Photovoltaic  |
| ~ Maximum installed capacity                    | - | 48MWdc (peak)   |
| ~ Maximum generation capacity at delivery point | - | 40MWac (nominal)  |
| ~ Average Annual energy production              | - | 210 KWh/m <sup>2</sup> per year                                 |
| ~ Load factor                                   | - | 20% (load factor = 20% (Lephalale irradiation 1750 *100/ 8760). |
| ~ Type of PV module                             | - | (245W ÷ 295 W)  |
| ~ PV module orientation                         | - | (azimuth) 0 °N  |
| ~ PV module tilt angle                          | - | 26° to the horizontal   |

~	Number of PV modules	-	195,000
~	Number of structures	-	8,744
~	Type of structures	-	Fixed ground mounted
~	Minimum structure height above ground level	-	1.0 m
~	Maximum structure height above ground level	-	3 meters
~	Footprint area, including internal roads	-	120 hectares
~	PV power plant lifetime	-	25 - 30 years
~	Lay down area (temporary)	-	7.4 hectares
~	Construction timeframe	-	8 Months

The Photovoltaic Power Plant with associated infrastructures and structures will be constructed and operated on a footprint area 120 hectares. The connection to the Eskom grid will be done according to the Eskom connection solution, which requires the construction of a high voltage substation and (if necessary) a small switching station having transformers to increase the voltage from 20 kilovolts to 132 kilovolts, and a new power line and/or underground cables, at a voltage of 132 kilovolts, linking the PV power plant to the Eskom's Theunispan 132kV/22kV substation, located on the Remainder of the Vangpan 294 LQ.

Refer to **Appendix E** for a copy of the proposed lay-out. The layout has been informed following the findings of Biodiversity and Heritage Assessments.

#### 4.3 INVESTIGATION OF ALTERNATIVES

*[Regulation 31 (2)(g)]*

According to the EIA regulations alternatives must be considered as part of the EIA process, which may refer to any of the following:

- ~ Land-use alternatives,
- ~ Site alternatives,
- ~ Design alternatives,
- ~ Layout alternatives,
- ~ Technology alternatives,
- ~ Operational alternatives, and
- ~ No-Go alternative.

The following alternatives are being considered for the current proposal:

##### 4.3.1 SITE ALTERNATIVES

###### Extent of Site

The subject property provided the space as required for the solar facility. The subject property was the only property which was available at the time and complied with the requirements of the applicant (location, availability of land and ability to connect to the existing substation on site that feeds into the Eskom power supply grid). The site is located in the Limpopo Province in the Lephalale District, approximately 50km west of the town of Lephalale, along the D1675 provincial road.

###### Climate and Gradient

The economic viability of a photovoltaic plant is dependent on annual direct solar irradiation values. The site experience moderate temperature which is suitable for PV technology. The site is located at an elevation of between 920 m and 90 m above mean sea level and has a slight gradient of less than 1° to the north. The farm portion is also fairly flat and therefore preferred for the installation of the PV panels as this decreases the need for extensive undertaking of earthworks in order to level the site, which also reduces environmental impacts.

### Access

The western boundary of the site is approximately 2km east of the D1675 and D175 crossing that is known as the Steenbokpan Crossing, and the eastern boundary is approximately 5,7km east of the Steenbokpan crossing along the D1675. Access will be gained off D1675 (Steenbokpan Road). At present Steenbokpan is known as a local service point. In terms of the Lephalale SDF 2012 the site lies along an Industrial Corridor. According to the Waterberg District Municipality EMF the area falls within Zone 5 which has been identified as a potential large industrial and related activities focus area.

### Grid Connection

An Eskom 22/132 KVA substation (known as Eskom's Theunispan Substation) exists on the north eastern boundary on the Remainder of the farm Vangpan 294 LQ. The substation is being fed by Eskom lines that run from north to south along the eastern farm boundary. Eskom is currently planning the 400 Delta-Mmamabula 1 & 2 400KV line that runs running in a western direction only 150 meters from the site. ESKOM has already obtained environmental authorisation for this new proposed line.

### The site is desirable for the following reasons:

- Availability of land
- The solar farm will be able connected to the Eskom Theunispan substation situated on the same property through a 132 KV line bay as foreseen in the Eskom cost estimation letter (**Appendix D**).
- The 132 kV line bay will be made available by Eskom as per the Eskom cost estimation letter (**Appendix D**).
- The connection will not affect other properties in terms of servitudes etc.
- The mining group Resgen Pty Ltd and Eskom has various EA's issued in their favour which means that the farm Vangpan and all the other surrounding farm portions will be under construction very soon. This is to build a railway line as well as the portable water line.
- Eskom has indicated that the proposed project does not interfere with Eskom's present and future developments, nor affect them negatively.

Taking the above into consideration, the applicant identified the proposed site for the development of the solar facility, which from a technical perspective is highly preferred.

### 4.3.2 LAND -USE ALTERNATIVES

The climate in the area is conducive to solar farms as the area experiences lots of sunny days. In terms of the solar farm Eskom Theunispan Substation exists along the north eastern boundary on the Remainder of the farm Vangpan 294 LQ as well as Eskom lines that run from north to south along the eastern farm boundary. The site is also affected by a future railway line that traverses the area. The site is therefore extremely desirable in terms of its size and location considering the infrastructure that exists in its vicinity. In terms of the Lephalale SDF the Steenbokpan node has been identified as the Potential Development Area 1 (Steenbokpan node) PDA1. The development area falls in Zone 5 of the EMF, within a major infrastructure corridor. This zone represents areas in close proximity to major coal fields which are being considered for the development of industrial activities to beneficiate the mineral product and where infrastructure like power generation facilities are being considered. The zone's relationship to existing and likely future transportation infrastructure and necessary urban development is also important. The land use proposal is also considered in line with the objectives of the Environmental Management Zones of the Waterberg EMF as there is a strong parallel between the site and the activities that surround it.

#### 4.3.2.1 PROPOSED SOLAR FARM (To be known as the Vangpan Solar Park)

The project will consist of construction, operation and maintenance of a photovoltaic power plant with a maximum installed power capacity up to 48 MWdc with associated infrastructure and structures on an area measuring 120 hectares. The 48MW will secure the 40MW delivery into the ESKOM National Grid. (**Refer Appendix D for letter from Eskom**). **However please note that the application is being made for a generating capacity of up to 75MW to cater for possible future needs.**

### The associated infrastructure and structures will consist of the following:

- Internal and external access roads and a small parking area;

- ~ Fencing of the plant and video security control systems;
- ~ Foundations / mini piles for the mounted Photovoltaic arrays;
- ~ Electricity access point for the construction phase, operation phase (if necessary) and UPS (Uninterruptible Power Supply) devices;
- ~ Storm water collection system;
- ~ Administrative areas & control room;
- ~ Cabling linking Photovoltaic strings and other internal cabling;
- ~ Medium voltage stations designed to host inverters and medium voltage transformers;
- ~ A medium voltage receiving station, parallel connecting the MV stations;
- ~ one small high voltage substation with one or more high-voltage power transformers and a small switching station (if necessary); and
- ~ Overhead power line and/or underground cables connecting the Vangpan Solar Park to a 132 kV busbar to be commissioned and equipped into the Eskom 132kV/22kV substation called "Theunispan", adjacent to the project site. The connection will also entail interventions on the Eskom's grid according to Eskom's connection requirements/solution.

**Project specific details:**

~ Technology	-	Photovoltaic
~ Maximum installed capacity	-	48MWdc (peak)
~ Maximum generation capacity at delivery point	-	40MWac (nominal)
~ Average Annual energy production	-	210 KWh/m <sup>2</sup> per year
~ Load factor	-	20% (load factor = 20% (Lephalale irradiation 1750 *100/ 8760).
~ Type of PV module	-	(245W ÷ 295 W)
~ PV module orientation	-	(azimuth) 0 °N
~ PV module tilt angle	-	26° to the horizontal
~ Number of PV modules	-	195,000
~ Number of structures	-	8,744
~ Type of structures	-	Fixed ground mounted
~ Minimum structure height above ground level	-	1.0 m
~ Maximum structure height above ground level	-	3 meters
~ Footprint area, including internal roads	-	120 hectares
~ PV power plant lifetime	-	25 - 30 years
~ Lay down area (temporary)	-	7.4 hectares
~ Construction timeframe	-	8 Months

The Photovoltaic Power Plant with associated infrastructures and structures will be constructed and operated on a footprint area 120 hectares. The connection to the Eskom grid will be done according to the Eskom connection solution, which requires the construction of a high voltage substation and (if necessary) a small switching station having transformers to increase the voltage from 20 kilovolts to 132 kilovolts, and a new power line and/or underground cables, at a voltage of 132 kilovolts, linking the PV power plant to the Eskom's Theunispan 132kV/22kV substation, located on the Remainder of the Vangpan 294 LQ.

The Photovoltaic Power Plant will require the installation of the following components:

- ~ **Photovoltaic modules:** PV modules are formed by cells made in silicone that act as semiconductors used to produce the photovoltaic effect, by conversion of the solar radiation into electricity. Individual PV cells are linked and placed behind a protective glass sheet to form a photovoltaic panel. The facility will use photovoltaic modules with high efficiency.
- ~ **Strings, branch strings and string boxes:**
  - The PV modules are connected in series in order to form strings, so that the string voltage fits into the voltage range of the inverters.
  - Branch cables are designed in order to connect in parallel groups of strings, to form branch strings. Branch strings are devised in order to be connected to DC connection boxes (string boxes) with a parallel connection solution (PV sub-field). String Boxes monitor the currents in photovoltaic modules and can promptly diagnose faults. String boxes are also designed with a circuit breaker in

order to disconnect the photovoltaic sub-fields from the inverters.

**~ Medium voltage stations:**

- The PV sub-fields are conceived to be linked to central inverters, located in prefabricate medium voltage stations. Each station is composed by two adjacent prefabricate buildings, which host two inverters and two medium voltage transformers. Inverters are deemed to convert the direct current (DC) to alternative current (AC) at low voltage; subsequently the AC will pass through a medium-voltage transformer in order to step-up the voltage up to 20 kV (or 22 kV).
- Medium-voltage stations will be arranged with the necessary protection & control system, for the conversion of the direct current (DC) at low voltage (450 ÷ 820 V) generated in the photovoltaic fields into alternating current (AC) at medium voltage (20kV or 22kV).

**~ Receiving medium voltage station:**

- The energy from the medium voltage stations will be collected into a receiving medium voltage station, linking in parallel all the PV fields of the PV generator.

**~ High voltage substation:**

- From the receiving medium voltage station, the energy is delivered to a high-voltage substation, where two 30 MVA high-voltage transformers (one as spare) will step-up the energy from the medium voltage (20 kV or 22 kV) to the high voltage (132 kV).

**~ Connection to the Eskom grid:**

- The energy produced by the PV generator will be delivered to the existing Eskom's Theunispan HV substation, through a 132 kV power line or underground cables, 30 m long. One 132 kV busbay will be commissioned and equipped in the Eskom substation.

**~ Electrical system and UPS (Uninterruptible Power Supply) devices:**

- They are necessary for the nominal and auxiliary alimentation of the electrical devices(inverters, transformers, circuit breakers, air conditioning system, lighting, etc.) of the MV stations, receiving stations and HV substation.

**~ Support structures:**

- PV modules will be assembled on steel or aluminium frames, positioned northwards and with an optimized tilt angle. The mounting system contemplates driven or drilled piles as frame supports.

**4.3.3 LAY-OUT ALTERNATIVES**

Key criteria determining the preferred developable areas were dependent on the recommendations and conclusions of the specialist studies undertaken including other site factors addressed as part of the scoping, namely:

- ~ slope,
- ~ location of existing facilities,
- ~ future planning in the area,
- ~ ecological (fauna and flora),
- ~ soil and agricultural potential, and
- ~ cultural heritage resources.

The development proposal below which entailed a mixed use component as well as solar farm on two properties namely, Portion 1 of the farm Steenbokpan 295 LQ and the Remainder of the farm Vangpan 294 LQ was considered after making the draft scoping report available for public review. Following ecological investigations and well as an investigation into the availability of services, this option was deemed unviable due to the lack of availability sewerage and water to accommodate the mixed use component on Portion 1 of the farm Steenbokpan 295 LQ. Further to this it was discovered that Eskom has an approved future Mmamabula 400KVa powerline that would affect Portion 1 of the farm Steenbokpan 295 LQ as shown in red below. Taking these issues into consideration, the applicant decided to scale down the application to only apply for environmental authorisation for the solar component on the Remainder of the farm Vangpan 294 – LQ.



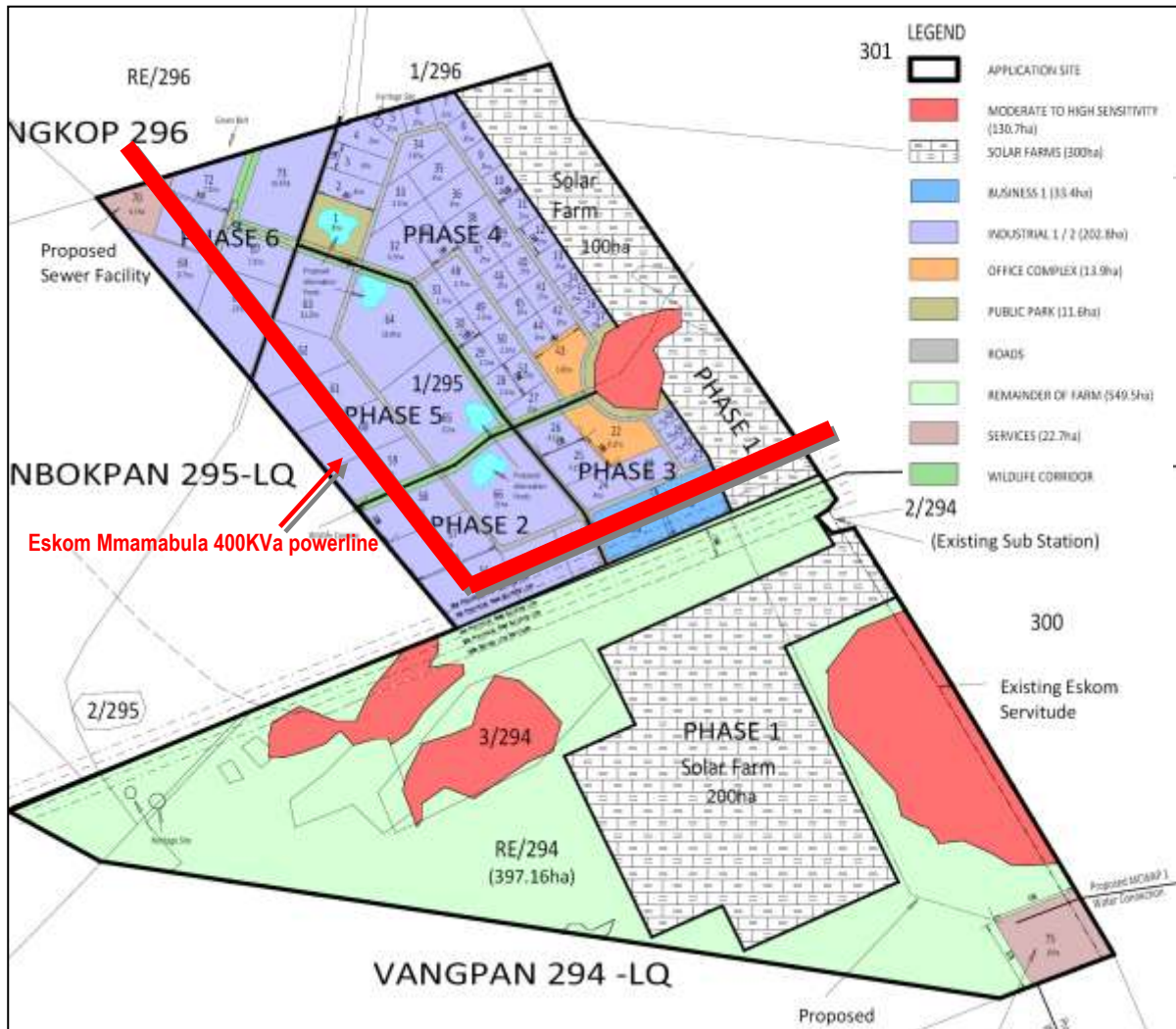
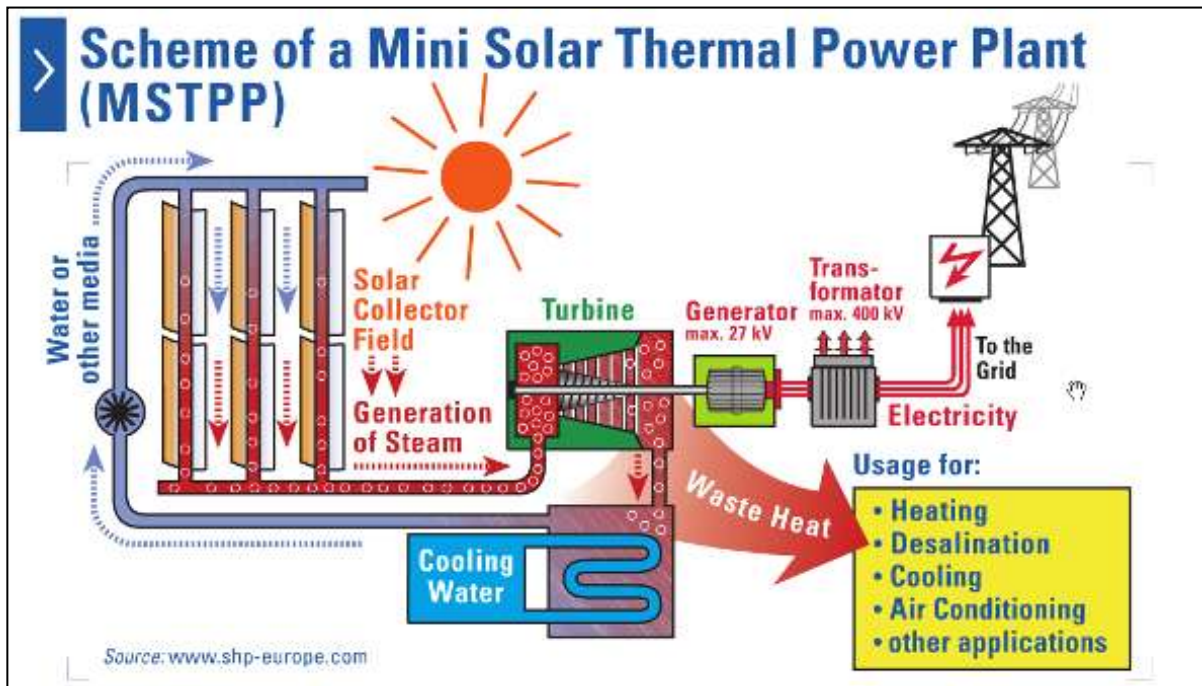


Figure 5: Initial layout on both farm Portions

#### 4.3.4 TECHNOLOGY ALTERNATIVES

##### Solar Thermal Power Plant:

The alternative to photo voltaics for producing energy from the sun is the thermal solution. There are different forms of this technology: linear fresnel, parabolic through or tower. These technologies can also be with or without thermal storage and they can use diathermic oils or, the more sophisticated ones can use water and/or molten salts.



**Figure 6: Functioning of a thermal power plant**

**Photo Voltaic Power Plant:**

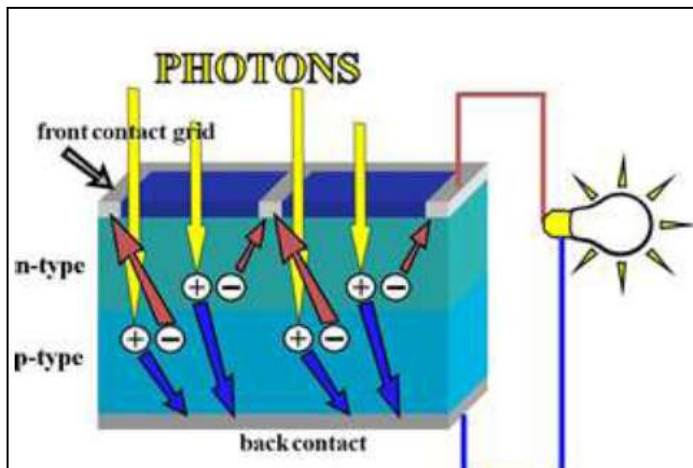
In terms of this project the PV option has been selected for the following reasons:

- ⚡ Lower construction costs
- ⚡ Lower operating and maintenance costs
- ⚡ It is a simpler, quicker and more experienced technology
- ⚡ The PV solution requires minor quantity of water.

**Description of Photovoltaics**

Photovoltaic (PV) technology converts sunlight into electricity and is also known as solar electricity. Solar photovoltaic (solar cell) is a direct conversion of the sun's electromagnetic radiation to electricity, and is not limited by Carnot cycle efficiency considerations. PV cells employ a solid-state diode structure with a large area on a silicon wafer. The surface layer is very thin and transparent so that light can reach the junction region of the silicon sandwich. In that region the photons are absorbed, releasing charges from their atomic bonds. These charges migrate to the terminals, raising the potential. A single cell has an open circuit the voltage of approximately 0.6-1.0 volts and a short circuit current of a few mA (milliamp). In order to increase both current and voltage, the individual cells are placed into (solar) arrays where cells may be connected in series to raise the voltage and current output can be raised by parallel connection of cells. A square solar cell with 10 cm a side produces about 3.5 A and about 0.5 V at full sunlight. Higher voltages are obtained by connecting the solar cells in series.

Typical modules used for terrestrial applications contain up to 72 silicon solar cells. The series-connected solar cells are encapsulated and sealed, most with a tempered glass cover and a soft plastic backing sheet. Modules may be connected in series to obtain required system voltages or in parallel to obtain higher currents. Photovoltaic panels include one or more PV modules assembled as pre-wired, field-installable units. Due to the modularity, the photovoltaic system designer has a high degree of freedom to obtain the required level of voltage and current of an array with various types of modules by connecting them in series, parallel or mixed configurations.



**Figure 7: Absorption of Photons**

The PV module arrays produce direct current electricity (DC). The for grid applications, solar inverters are used to convert the variable DC output of the PV array into alternative current (AC) with a utility frequency. The AC current can be fed into the commercial electrical grid or used by a local, offgrid electrical network. Solar inverters have special functions adapted for use with PV arrays, including maximum power point tracking and ant islanding protection.

Even though PV technology exploits both direct and indirect solar radiation, higher energy yields can be generated by pointing the modules along the path of the maximum achievable direct radiated power, with the direct radiated part on the module surface being at a maximum when the solar radiation is perpendicular to the PV module surface. As solar radiation deviates from this, the attainable electrical power production decreases as a function of the loss angle (meaning deviation from perpendicularity between irradiation path and module surface).

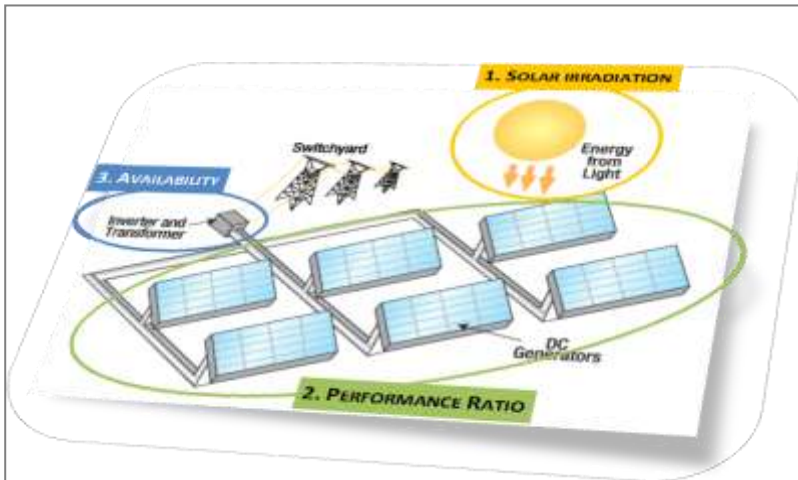
The generation of electricity by PV technology had a boost in recent years, megawatt and multi-megawatt facilities were constructed as a result of the policies pursued by countries like Germany, Spain, Italy Japan and recently USA. It is estimated that the in 2010, the newly installed PV capacity worldwide was between 14.3 and 16.5 GW in 2010. The sector has experienced growth of approximately 100% in comparison to 2009. In year 2000, the total installed capacity was less than 500 MW, the total accumulated PV capacity until 2010 is estimated in 38 GW.

**Advantages of Solar Energy:**

- ⚡ Its non-polluting nature
- ⚡ It cannot be depleted
- ⚡ It is reliable and free
- ⚡ Easier to build than conventional power plants
- ⚡ Reduction in CO<sub>2</sub> emissions
- ⚡ Boost national economy by creating many new solar companies and jobs

**Disadvantages of Solar Energy:**

- ⚡ Are that the solar energy concentration is very dilute, so collectors with large surface area are needed.
- ⚡ Solar radiation in certain areas is neither constant nor continuous for terrestrial applications (i.e. low capacity factor)
- ⚡ The solar energy received depends on latitude, season, time-of-day, and atmospheric conditions
- ⚡ Very expensive to install depending on technology to be utilised



**Figure 8: Solar Photovoltaic Power Plant Diagram [Source: Tennessee Valley Authority (TVA)].**

The following technologies have been considered:

**Monocrystalline silicon cells:** the material used has a greater degree of purity and ensures the best solar conversion efficiency reaching approximately 16%. The cell colour is dark blue and has a circular or octagonal form. Its geometrical dimensions vary from 8 to 12 cm diameter and 0.2 - 0.3 mm thickness.

**Polycrystalline silicon cells:** the material used has a lower degree of purity results a lower solar conversion efficiency (12% to 16%). It has a deep blue iridescent colour due to the polycrystalline structure. Its shape is square or octagonal and thickness is similar to the previous type.

**Amorphous Silicon film (thin-film):** it is prepared with the deposition of a thin layer of crystalline silicon (1-2 microns) onto a surface of another material, such as glass or plastic substrates.. The solar conversion efficiency of this technology is significantly lower (about 8%) than crystalline silicon modules. Thin-film modules, compared to crystalline modules, have an increased sensitivity to the diffuse solar radiation and therefore a superior efficiency during low irradiance conditions (e.g. cloudy weather). This technology is more performing at high temperatures since it has a lower degradation. In particular, efficiency of the mono or polycrystalline modules reduces by 0.45% for each degree of temperature, while the thin-film modules efficiency reduces only by 0.25%.

For this reason, thin film is widely used in hot climate regions. **Tandem Thin-film:** this is an evolution of the thin-film type. It consists of an amorphous and microcrystalline silicon layer. This micro amorphous tandem structure absorbs not only visible light but also invisible portion of the solar spectrum. The solar conversion efficiency may reach values around 10%. At this moment, it seems to be the best cost-effective solution for the hot climate in South Africa, and in particular in the Limpopo province.

The preferred option is tandem thin-film modules because it provides higher efficiency at high temperatures and therefore, a more attractive cost-efficiency curve. However, it is important to consider that the PV technology is in continuous evolution and it may be possible that mono crystalline and/or polycrystalline silicon modules achieve lower losses at high operating temperatures. Moreover, it should be kept into account the high volatility of prices of PV modules which depends on the (worldwide) availability of modules. Therefore it is also possible that the cost-efficiency curve may change and become more attractive for the PV mono crystalline and polycrystalline solution. If the chosen PV technology for the solar farm would be redirect to mono crystalline and or polycrystalline, the footprint of the PV solar park would be the same. Therefore, it would not be any additional visual or environmental impacts or the necessity of specific or different mitigation measures.



**Figure 9: Example of crystalline panels**



**Figure 10: Example of thin filmed panels**

**Alternatives for Mounting System of the PV Modules**

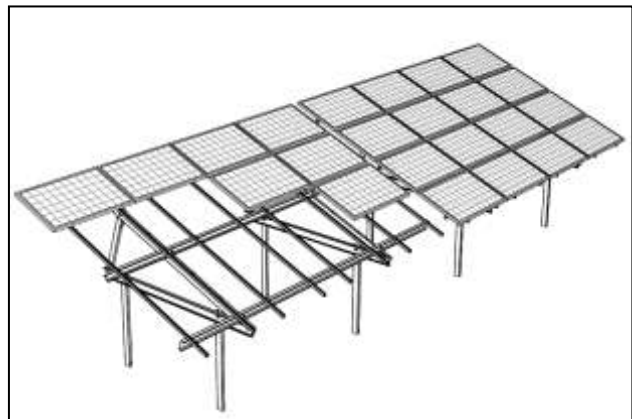
A **fixed mounting system** was chosen for the installation of the PV Modules. The reduced weight which every supporting structure should bear allows the use of support mini piles driven or drilled into the ground without the need for heavy foundations. A technical solution foreseeing PV modules mounted on tracking mounting systems is also possible and feasible, with the advantage to achieve an energy production approximately 15% more if compared with fixed systems.

In spite of this, currently this type of technology does not represent the preferred solution, because it is characterized by higher technical complexity and deeper installing and maintenance costs, if compared with the fixed mounting solution.

The technology of **tracking systems** is under continuous evolution and it may possible, also in the very near future, that this solution will become more competitive, achieving lower installing and maintenance costs. Consequently the choice of the mounting system would be re-directed in favour of the tracking technology.



**Figure 11: Fixed system**



**Figure 12: Horizontal single-axis system**

In this case, the preferred solution would be the horizontal single-axis tracker, which doesn't differ from the fixed system, except for the presence of the tracking devices and of the orientation of the rows of the PV arrays (north – south instead of west – east direction). The development will not exceed the currently planned footprint. Therefore, if, at the commissioning date, the final decision about the mounting system technology is addressed toward the horizontal single-axis tracker, the layout of the PV power plant will not imply any additional visual or environmental impacts or the necessity of specific or different mitigation measures. Both fixed and horizontal single-axis tracking

**solutions grant the reversibility of the development in respect of the terrain's morphology, geology and hydrogeology. This means that at the end of the PV plant's lifetime, the site can easily be returned to its status prior to the establishment of the PV plant.**

#### **4.3.5 PROPOSED ACTIVITIES DURING THE DEVELOPMENT STAGES**

##### **CONSTRUCTION PHASE (Refer Appendix F for construction phase layout)**

The construction phase is anticipated to extend of a period of 8 months in order to install the panels to produce an output of 40MW. It is anticipated to create more than 300 jobs during the construction phase. The unskilled and semi skilled workers are anticipated to be sourced from the nearby local towns of Steenbokpan and Lephalale. Transportation is also anticipated to be provided for workers to and from the construction site.

**Activities related to the construction phase are highlighted below:**

##### **Surveys**

Before construction commences on site various surveys must firstly be undertaken. The precise location of the panels must be determined as well as the location for installation of infrastructure. The design of earthworks as well as foundations must be subject to specialist geotechnical and geological inputs.

##### **Access Roads**

The site is currently accessed from the D1675 (Steenbokpan Road). No additional new access roads are anticipated to be constructed. Internal roads will be required in order to access the components within the facility.

##### **Preparation of the site**

Site preparation will include vegetation clearance as required for the footprint of the activity. This will entail the stripping of topsoil that will have to be stockpiled for re-use after construction. Trees may also be removed should they be within the footprint area. However, no protected or indigenous trees may be removed prior to obtaining permission from the DAFF. Rocks may also be removed for levelling of the land. The materials and infrastructure required for the solar plant will be transported to the site. Construction plant will also be transported to site.

##### **Camp for equipment**

Once all the construction materials and plant have been transported to the site, a designated equipment camp will have to be determined. The reason for the camp is to ensure that material and plant is stored safely on site and access to these must be restricted. Further it is to remain within this designated area in order to limit unnecessary disturbance to areas that fall outside the footprint area. Storage of fuel for use in construction vehicle must be done in a safely secured and banded area to prevent leaks and contamination. The area dedicated for the lay-down areas is approximately 7.4 ha.

##### **Establishment of PV Panels and Ancillary Infrastructure**

The panels will be constructed in single "strings". The reason for this is should one string break down or requires maintenance it will not affect the generation capabilities of the entire facility. Each "string" will be located a certain distance away from one another to prevent shadows from falling on the next "string". The panels will be placed onto fixed ground mountings. Foundations will be excavated mechanically. The installation of underground cabling will require the excavation of trenches that may vary between 40 cm – 100 cm in which they can be laid. Concrete necessary for the basements ancillary infrastructure such as the medium-voltage stations, the high-voltage substation, the control building will be supplied by a Ready-mix Company from Lephalale.

##### **Site Rehabilitation**

Remediation and rehabilitation will be conducted on a continuous basis where reasonably possible until all construction activities have ceased. As construction activities are completed in an area, and all plant has been removed, these areas will be rehabilitated to ensure quick recovery of the site.

**OPERATIONAL PHASE**

The electricity that is generated by the PV plant will be connected to the Eskom grid according to the Eskom connection solution, which requires the construction of a high voltage substation and (if necessary) a small switching station having transformers to increase the voltage from 20 kilovolts to 132 kilovolts, and a new underground cable, at a voltage of 132 kilovolts, linking the PV power plant to the Eskom’s Theunispan 132kV/22kV substation.

**DECOMMISSIONING PHASE**

The anticipated lifespan of the project is between 25 – 30 years. Following the operation of the plant and the economics related thereto, the plant could either be decommissioned or its operation could be extended. Should it be economically viable to continue then the current infrastructure would have to be upgraded or replaced dependent upon the technology that will be available at the time. Should it be decided to decommission the facility the following would apply:

- **Preparation of the site** – this should include confirming whether the current access to the site is sufficient in order to accommodate equipment as required or decommissioning.
- **Remove and replace existing infrastructure** – the infrastructure (panels and mountings) will be disassembled and removed. If possible this material will be recycled or re-used. Should either option fail, the material is to be disposed off as per regulatory requirements.

**4.3.6 DESIGN ALTERNATIVES**

**4.3.6.1 STORMWATER MANAGEMENT**

The current stormwater proposal indicated in the Civil Services report attached hereto as **Appendix I** proposes the following options that are considered for the management of stormwater

- Use of open grass lined channels
- When required concrete culverts to be constructed to cross roads

However it is recommended that provision be made in the Final Stormwater Management Plan [SMP] for implementation of a water quality management system:

**Bio swales:** The SMP should consider the provision of bio swales along the alignment of internal roads. Bio swales will contribute to improving water quality prior to discharge. Bio swales improve water quality by infiltrating the first flush of stormwater run off and filtering the large storm flows they convey. The majority of annual precipitation comes from frequent, small rain events. Much of the value of bio swales comes from infiltrating and filtering nearly all of this water.



**Figure 13: Bio swale**



**Figure 14: Grass lined channel**

**4.3.7 VISUAL IMPACTS**

ILA undertook a Visual Impact Assessment (**Refer Appendix K**). Herewith extracts from the report.

The development will have an impact on the overall landscape character due to the size (120ha) and harshness (existing vegetation to be cleared and replaced with an expansive set of monotonous and monochrome group of structures) of the solar farm.

It is anticipated that residents living within a radius of 5km will experience the highest degree of visual exposure due to their proximity and visual perception although it is expected that the solar farm will be screened to some degree due to the existing vegetation.

Views from a 5-10km radius will be screened more by existing vegetation and land users within a 10-20km radius will be exposed to the solar farm, but will not necessarily be able to recognise the structures.

The Steenbokpan area is home to a number of private game and safari farms that cater for international and local hunters. Tourists making use of these facilities travelling along the D1675 Road will be exposed to the solar farm which will have a negative impact on their overall experience of the rural and natural area.

Motorists using the D1675 Road will be exposed to the development during their travelling time. The degree of visual intrusion to be experienced by motorists is expected to be limited mainly due to their short-lived exposure to the potential visual impact.

It is evident from the district and municipal planning initiatives that the landscape in the area is subject to change. The proposed solar farm is considered to be in line with the proposed developments in the area and will therefore not detract from the future landscape character, but it will contribute to the change in the overall landscape character of the area.

The topics discussed in Section 7 of **Appendix K** (Mitigation) provide a platform for informed decision making with regard to minimising visual impacts. The mitigation measures should inform the development proposal and is intended to filter down into the detail level of the layout and design of the development and its individual components. The mitigation measures have been included in the EMPr.

Based on the finds of this report, it is recommended that:

- ↯ Surface disturbance must be limited during construction;
- ↯ Existing vegetation must be retained much as possible;
- ↯ Disturbed areas must be rehabilitated immediately after construction;
- ↯ Attractive views from public viewing areas e.g. at the entrance to the solar farm must be created;
- ↯ Finishes and forms must, as far as reasonably possible, be representative of the rural and natural surrounding area with a low level of reflectivity;
- ↯ Structures must be limited to a maximum height of 3.5m above ground level; and
- ↯ A lighting engineer must be appointed in order to provide to ensure that potential obtrusive lighting impacts are prevented.

#### 4.3.8 OPERATIONAL ALTERNATIVES

No operational alternatives will be assessed as no feasible and reasonable operational alternatives have been identified.

#### 4.3.9 THE NO-GO ALTERNATIVE

This is the option not to construct the solar facility. In essence, the no-go alternative would ultimately imply that the state of the environment would be retained as it is presently, with obvious advantages and disadvantages to the natural environment. The Department of Environmental Affairs (DEA) stresses that the no-go alternative should be considered in cases where the proposed development will have a significant negative impact that cannot be effectively or satisfactorily mitigated against. Should this alternative be selected, the impacts will have a bearing both locally and on a broader scale. The anticipated environmental and related impacts as follows will not occur:

- ↯ Clearing of vegetation
- ↯ Destruction of habitat both floral and faunal
- ↯ Pollution and Noise
- ↯ Visual impact

However, the environmental and socio-economic benefits related to the proposal will not be realised.



In the case of the development proposal, the following benefits would apply:

- Contribution of up to 40 MW from the project towards the Government target for renewable energy will not be realised;
- The current electricity crisis in South Africa shows the important role that renewable energy can play in terms of supply power. The opportunity for strengthening grid supply while reducing expensive transmission and distribution losses will not be achieved;
- As an already water stressed nation, the conventional coal fired plants require major amounts of water during their requisite cooling processes whereas with the solar farm this is not the case;
- Presently solar radiation, wind power etc. remains largely unexploited in our country, the use of these energy flows will assist in strengthening energy security through the development of a diverse energy portfolio;
- Renewable energy offers various benefits to society which includes reduced pollution concerns, ecosystem health, climate friendly development and improved human health;
- Surrounding and existing infrastructure will not be upgraded;
- Additional employment opportunities will not be available;
- No monitored clearing of vegetation will take place; and
- Contribution to meeting the targets set for the Steenbokpan node in the SDF and EMF will not be realised.

Further, with **specific reference to the solar component** as extracted from the South African Renewable Energy Feed-in Tariff (REFIT) Regulatory Guideline 15 May 2008 the following would also apply:

- **Increased energy security:** The current electricity crisis in South Africa highlights the significant role that renewable energy can play in terms of supplementing the power available, particularly the role of cogeneration technologies in providing additional base load or peak load support. In addition, given that renewables can often be deployed in a decentralised manner close to consumers, they offer the opportunity for improving grid strength and supply quality, whilst reducing expensive transmission and distribution losses.
- **Resource saving:** Conventional coal fired plants are major consumers of water during their requisite cooling processes. It is estimated that the achievement of the targets in the Renewable Energy White Paper will result in water savings of approximately 16.5 million kilolitres, where compared with wet cooled conventional power stations. This translates into a revenue saving of R26.6 million. As an already water stressed nation, it is critical that South Africa engages in a variety of water conservation measures, particularly as the detrimental effects of climate change on water availability are experienced in the future.
- **Exploitation of our significant renewable energy resource:** At present, valuable national resources, ranging from biomass by-products and solar insolation through to tidal currents, remain largely unexploited. The use of these energy flows will not only strength energy security through the development of a diverse energy portfolio, but reduce price shocks associated with conventional fuels.
- **Pollution reduction:** The release of oxides of nitrogen and sulphur is a major by-product of fossil fuel burning for electricity generation which has a particularly hazardous impact on human health and the living environment, which results in the degradation of ecosystems.
- **Climate friendly development:** The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner, contributing to the mitigation of climate change through the reduction of greenhouse gas (GHG) emissions. South Africa as a nation is estimated to be responsible for 1% of global GHG emissions and is currently ranked 9th worldwide in terms of per capita CO<sub>2</sub> emissions.
- **Support for international agreements and enhanced status within the international community:** The effective deployment of renewable energy provides a tangible means for South Africa to demonstrate its commitment to its international agreements under the Kyoto Protocol, and for cementing its status as a leading player within the international community.
- **Employment creation:** The sale, development, installation, maintenance and management of renewable energy facilities has significant potential for job creation in South Africa, particularly given that many of these technologies are labour intensive in comparison to their conventional counterparts.
- **Acceptability to society:** Renewable energy offers a number of tangible benefits to society including reduced pollution concerns, improved human and ecosystem health and climate friendly development.

Increasing awareness amongst national leaders and general populations alike of the importance of playing at least some part in combating climate change, highlights the role of renewable energy in supporting energy futures that are considered socially acceptable and just to future generations.

- **Support to a new industry sector:** The development of renewable energy offers the opportunity to establish a new industry within the South African economy. The development of this industry also makes available a variety of export and service led commercial opportunities, not simply in South Africa but within Sub-Saharan Africa also.
- **Protecting the natural foundations of life for future generations:** Actions to reduce our disproportionate carbon footprint can play an important part in ensuring our role in preventing dangerous anthropogenic climate change; thereby securing the natural foundations of life for generations to come.

Based on the findings of the investigation during this EIA Phase it is anticipated that the No-Go Option can be justifiably dismissed as this area is earmarked for development and an evident need exists for South Africa to diversify its electricity generation source, which this project would aid in contributing to.

## SECTION 5: PROVISION OF CIVIL SERVICES

Sizatech Consulting Engineers were commissioned to prepare a Civil Services Report. Herewith extracts from the report compiled by Sizatech Consulting Engineers (**Refer to Appendix I for a copy of the Full Report**).

The expected construction period for the PV solar farm is 8 months. Once completed, the plant will have a life-span of 25-30 years. Below is a description of the civil engineering requirements for this plant during the construction and operation phase.

### 5.1 WATER

#### 5.1.1 WATER REQUIRED DURING CONSTRUCTION

- Water will be used for the construction of internal gravel roads, in order to get the gravel being compacted to optimum moisture content (OMC). This water will however be the responsibility of the contractor appointed for this work and will probably be driven in by water carts.
- The estimated maximum number of workers will be 100, with a requirement of 50l/8 working hours. This will also have to be provided by the appointed contractor.
- Concrete will be required for basements of: medium-voltage stations, medium voltage receiving station, high-voltage substation (if required) and control building, warehouse. The overall amount of concrete to be produced will be approx. 5,000 m<sup>3</sup>, this will however be procured as ready-mix from Lephalale.
- Construction vehicles will only be cleaned once or twice a month. High pressure cleaners will be used to save water.

The peak water consumption will be during the construction of internal roads, planned between the third and the end of the 5th month, when the average monthly water requirement will be approximately 2500 m<sup>3</sup>/month (corresponding to a water flow of 1.3 l/s over 22 working days). Storage tanks will be sized in order to provide a three days reserve of approximately 400 cubic meters of water.

#### 5.1.2 OPERATIONAL WATER REQUIREMENTS

- The operational requirements are for the ablution facilities of the permanent staff complement of 12 day and 4 night staff. At 250l/c/d, this calculates to approximately 4000 litres/day.
- The solar panels will require an annual wash, if the rainfall is not sufficient; this will be done by external contractors who will provide their own water
- Average daily water consumption over 12 months l/day 4,000
- Annual water consumption for sanitary use m<sup>3</sup>/year 1,460

The owner of the property confirmed the existence of six boreholes on the Remainder of the farm Vangpan 294 LQ which could be used during the operational phase. All boreholes have been tested and the water of four of the six boreholes is fit for human consumption. **(Refer Appendix L).**

The delivery of the respective boreholes were tested as follows:

1. 12 000 litres per hour
2. 9 000 litres per hour
3. 4 000 litres per hour
4. 4 000 litres per hour
5. 18 000 litres per hour
6. 29 000 litres per hour.

Should the applicant be selected as a preferred bidder in terms of the IPP Program then the applicant will apply for a Water-Use Licence Application for provision of water during the operational phase of the project. This was discussed with the DEA during a meeting held on 05/02/2013.

## 5.2 SANITATION

### 5.2.1 CONSTRUCTION PHASE

During construction chemical toilets will be provided by the appointed contractor as is standard practice.

### 5.2.2 OPERATIONAL PHASE

A central ablution facility with a septic tank and French drain will be installed for the permanent employees. The sandy soil with expected high permeability is ideal for such an installation. The sewage effluent to be generated during the operational phase is estimated at 80% of the daily water use, thus 3200 l/d, which equates to 1168 m<sup>3</sup>/year.

## 5.3 STORMWATER

### 5.3.1 MANAGEMENT PHILOSOPHY

Runoff will be managed using open grass lined channels. These channels will be constructed in such a way as to break the speed and volume of runoff to allow infiltration of the stormwater into the soil. The in-situ soils have high permeability due to its sandy consistency. Where required, concrete culverts will be constructed to cross roads.

## 5.4 REFUSE REMOVAL

The applicant will enter into an agreement for the PV plant's refuse to be removed with a local refuse removal company. No refuse will be buried or incinerated on site.

## 5.5 ELECTRICAL SERVICES

The Eskom 22/132 KVA substation exists on the north eastern boundary on the Remainder of the farm Vangpan 294 LQ. The substation is being fed by Eskom lines that run from north to south along the eastern farm boundary. Negotiations with Eskom were initiated by the Developer and the Electrical Engineer in order for Eskom to supply the needed MW required for the proposed development. The developer received the budget quote from Eskom **(Refer Appendix D)**. Eskom has confirmed they can accommodate a maximum export capacity of 40MW on the remainder of the Farm Vangpan.

This can be met by implementation of the following:

- ↻ Extend 132kV busbar and construct a 132kV line bay at the Theunispan Rural substation
- ↻ Establish required tariff metering, telecontrol and communications equipment at the generator plant.

The negotiations also include the selling of the energy created by the proposed Solar PV Plant to ESKOM in terms of the Bidding Process should the developer being appointed a preferred bidder in terms of the RFP in Window 3 4 and 5 of the RFP.

Eskom is currently planning the 400 Delta-Mmamabula 1 & 2 400KV line and this 400KV line is running over the eastern boundary of the farm Steenbokpan 295 LQ which provides an alternative option for a grid

connection point for the Solar PV Plant section proposed to be erected on the Steenbokpan side of the development.

### 5.6 TRAFFIC IMPACT STUDY

Civil Concepts Consulting Engineers were commissioned to prepare a Traffic Impact Study. Herewith extracts from the report compiled by Civil Concepts Consulting Engineers (**Refer to Appendix M for a copy of the Full Report**).

**Please note that initial Traffic Impact Study was also based upon proposed land-uses on Portion 1 of the farm Steenbokpan 295 LQ as this portion was initially included as part of the EIA process comprising of the mixed use component. However since the mixed use component on Portion 1 of the farm Steenbokpan 295 LQ is no longer being applied for, the Traffic Impact Study will be revised based upon the proposed solar farm development on the Remainder of the farm Vangpan 294 LQ. The revised Traffic Impact Study will be included in the Final EIAR.**

The Traffic Impact Study was undertaken in accordance with the initial layout plan based on an assumption of the following land-use rights on the respective farm portions:

Land Use	Extent	GLA
Solar Farm	140 Ha	140 Ha
Industrial/Warehousing	200 Ha	100 000 m <sup>2</sup>
Retail	5 Ha	50 000 m <sup>2</sup>

**Table 1: Proposed land-use rights on Steenbokpan**

Land Use	Extent	GLA
Solar Farm	200 Ha	200 Ha
Industrial/Warehousing	300 Ha	150 000 m <sup>2</sup>
Retail	20 Ha	50 000 m <sup>2</sup>

**Table 2: Proposed land-use rights on Vangpan**

#### 5.6.1 TRIP GENERATION

The trip generation rates in the Department of Transport’s “South African Trip Generation Rates, 2nd Edition, June 1995” were used to calculate the development trips for the retail and industrial/warehousing components of the development. Trip reductions were applied where applicable to account for internal trips between the different land-use components, low vehicle ownership and site locality.

The proposed development consists of a land-use, a solar farm, which is not covered in the Department of Transport’s “South African Trip Generation Rates,” Manual. The solar farm will not generate many trips as the only trips to the site will be that of the maintenance crew. If peak hour trips to the development do occur, the volumes would be negligible.

The retail trips will comprise of primary and a negligible volume of pass-by trips only. It is assumed that there will not be any diverted trips because of the site location. The diverted and pass-by trips have been considered as primary trips.

Only the weekday morning (AM) peak and afternoon (PM) peak periods are considered in this study due to the remote locality of the site and low traffic volumes on the D1675 and D175.

The weekday morning and afternoon peak hour development trips with trip reductions are shown below:

	Land Use	Area (m <sup>2</sup> )	Unit (m <sup>2</sup> )	Rate	Multi-use reduction	Directional split		Peak Hour Trips		
						Weekday		IN	OUT	TOTAL
						IN	OUT			
1	Retail	100 000	100	0.00	N/A	50%	50%	0	0	0
	PRIMARY					100%		0	0	0
	DIVERTED					0%		0	0	0
	PASSER-BY					0%		0	0	0
2	Industrial/Warehousing	250 000	100	0.8	25%	70%	30%	1 050	450	1 500
<b>TOTAL</b>								<b>1 050</b>	<b>450</b>	<b>1 500</b>

**Table 3: Weekday Morning Peak Hour Trip Generation**

	Land Use	Area (m <sup>2</sup> )	Unit (m <sup>2</sup> )	Rate	Multi-use reduction	Directional split		Peak Hour Trips		
						Weekday		IN	OUT	TOTAL
						IN	OUT			
1	Retail	100 000	100	3.52	40%	50%	50%	1 057	1 057	2 114
	PRIMARY					100%		1 057	1 057	2 114
	DIVERTED					0%		0	0	0
	PASSER-BY					0%		0	0	0
2	Industrial/Warehousing	250 000	100	0.8	25%	25%	75%	375	1 125	1 500
<b>TOTAL</b>								<b>1 432</b>	<b>2 182</b>	<b>3 614</b>

**Table 4: Weekday Afternoon Peak Hour Trip Generation**

The development trips were distributed and assigned to the adjacent road network. The trip distribution was based on the access positions and the expected origins and destinations to and from the development.

### 5.6.2 EXISTING ROAD NETWORK

- **D1675 (Steenbokpan Road)** is a class 3 road and lies to the south of the Steenbokpan site and north of the Vangpan site. The road runs in an east-west direction and serves an important mobility function within the Lephalale area. Accesses to the proposed development will be gained off this road.
- **D175 (Stockpoort/Vaalwater Road)** is a class 4a road and lies to the west of the proposed development site and runs in a north-south direction. The road provides access to Stockpoort in the north and Vaalwater in the south.

### 5.6.3 PROPOSED UPGRADING OF ROAD NETWORK

The following changes and/or upgrades are required to the road network:

#### **Without Proposed Development (due to existing background traffic)**

There are no road upgrades required at the analysed intersections to accommodate the background traffic volumes. It is however recommended that the D1675 be re-surfaced. This is the responsibility of the Roads Agency Limpopo but may be funded by the developer's bulk contributions for roads and stormwater, Exxaro and Eskom.

#### **With Proposed Development**

##### ➤ **D1675/Access 1 T-Intersection**

Access must be obtained via a signalised T-intersection with the following lane configurations:

**Southern Approach (Access 1)** - An exclusive left and right turn lane must be provided.

**Eastern Approach** - A left-turn lane with a 30m storage lane capacity must be constructed in addition to the existing through lane.

**Western Approach** - An exclusive right-turn lane with a 30m storage lane capacity must be constructed in addition to the existing through lane.

Exit lanes must be constructed and road markings for all approaches must be provided accordingly.

**D1675/Access 2a/Access 2b 4-Legged Intersection**

Access to developments on Vangpan and Steenbokpan must be obtained with a signalised 4-legged intersection with the following lane configurations:

**Southern Approach (Access 2a)** - An exclusive left, right and through lane must be provided.

**Northern Approach (Access 2b)** - An exclusive left, right and through lane must be provided with one exit lane. The left-turn lane must be a continuous slip lane with a 120m acceleration (exit) lane provided.

**Eastern Approach** - In addition to the existing through lane, two right-turn lanes and a shared through and left turn lane must be constructed. The right-turn lanes must have a storage capacity of at least 50m each.

Exit lanes must be constructed accordingly.

**Western Approach** - In addition to the existing through lane a right-turn lane and a shared through and left turn lane must be constructed. The right-turn lane must have a storage capacity of at least 50m.

Exit lanes must be constructed and road markings for all approaches must be provided accordingly.

There are no further road upgrades required at the analysed intersections to accommodate the development traffic volumes in year 2024 (10 year horizon).

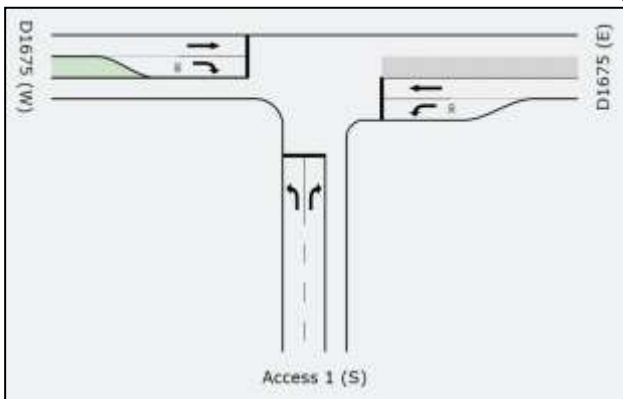
**5.6.4 ACCESS**

Initially it was anticipated that due to the size of the development, 2 access points will be provided. Access 1 and 2a off D1675 (Steenbokpan Road) will provide access to the developments on Vangpan, while Access 2b will provide access to developments on the Steenbokpan site.

***This will however have to be revised taking into consideration that the land-uses proposed on the Remainder of the Farm Vangpan will be limited to the solar component which will not generate many trips as the only trips to the site will be that of the maintenance crew. If peak hour trips to the development do occur, the volumes would be negligible.***

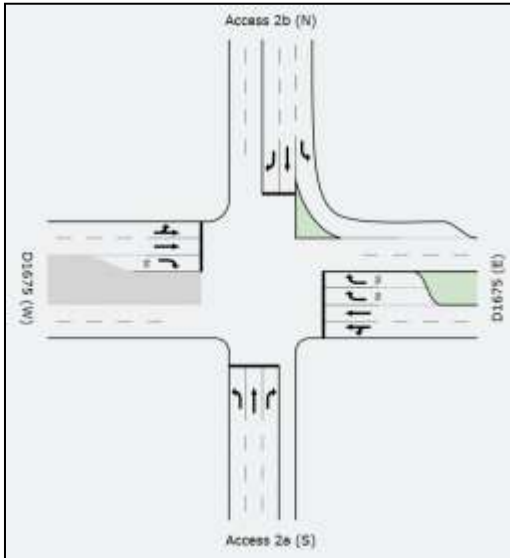
**Intersection configuration**

**Access 1** - Access 1 will be constructed as a signalised T-junction as shown below.



**Figure 15: Access 1 Configuration**

**Access 2a & 2b** - Access 2a and 2b will be constructed as a signalised 4-legged junction as shown below.



**Figure 16: Access 2a & 2b Configuration**

#### **Access Spacing**

The proposed accesses will be located off the D1675 (Steenbokpan Road). The D1675 is classified as a Class 3 minor arterial with a minimum intersection spacing of 600m (+/- 20%) according to the COTO South African Road Classification and Access Management Manual, July 2011. The proposed intersections to the developments will comply with the minimum intersection spacing requirements.

#### **Pedestrians**

There are no formal pedestrian walkways on either side on the D1675 in the vicinity of the site. There is however a pedestrian crossing point (zebra crossing) in the vicinity of the site. The pedestrian crossing has been provided for the Lerekureng Intermediate School.

It is recommended that pedestrian walkways be provided within the internal road network as well as along the site frontage along the D1675. Pedestrian crossing facilities must also be provided at the access intersections and at the D1675/D175 intersection. A formal walkway should also be provided along both sides the D1675 for the learners attending the Lerekureng Intermediate School. The walkway should be linked to the existing pedestrian crossing point.

#### **Public Transport**

It is recommended that taxi and bus lay-byes be provided within the site and along the D1675, downstream of each access intersection. It is also recommended that the developer provide a taxi rank adjacent to the retail components of the development, within the site. The promotion of the use of sustainable modes of transport will assist in reducing private vehicle trips.

#### **5.6.5 CONCLUSION**

Due to the location of the site and the low traffic volumes on the D1675 and D175, the weekday AM and PM peak periods were analysed instead of a Friday PM peak and Saturday peak. Development trips to be generated by the solar farm component of the development will generate negligible peak hour trips and have therefore not been considered in this study. Trip reductions were applied to the total development trips to account for the locality and low vehicle ownership. The proposed development with trip reductions will generate a total of 1 500 and 3 614 trips during the weekday morning and afternoon peak hours, respectively. The base year (2014), 5 year horizon (2019) and 10 year horizon (2024) were considered in the study. The existing and proposed intersections will operate satisfactorily with the proposed upgrades for the background and development traffic scenario.

### 5.6.6 RECOMMENDATIONS

It is recommended that:

- The proposed solar farm development on the Remainder of the Farm Vangpan 294 LQ (approximately 731 ha), Lephhalale, Limpopo Province be approved subject to the proposed road upgrades being implemented.
- The developer constructs accesses to the proposed development site.
- The developer constructs pedestrian and public transport facilities where required in consultation with the relevant departments of the local municipality and Roads Agency Limpopo (RAL) .
- The geometric layouts of the upgrades on roads be submitted to the relevant department of the Lephhalale Municipality and RAL for approval.

## SECTION 6: DESCRIPTION OF THE ENVIRONMENT

[Regulation 31(2)(d)]

**Please note that all specialist reports makes reference to Portion 1 of the farm Steenbokpan 295 LQ as this portion was initially included as part of the EIA process comprising of the mixed use component which is no longer being applied for. However the findings below are only focused on the property on which the solar farm is being proposed i.e Remainder of the Farm Vangpan 294 LQ.**

### 6.1 BIO-PHYSICAL ENVIRONMENT

#### 6.1.1 CLIMATE AND RAINFALL

Lephhalale normally receives about 400mm of rain per year. Summer (October to April) rainfall patterns predominate with the traditional heavy deluges in the afternoon (cumulonimbus induced thundershowers being the norm). The area receives the lowest rainfall (3mm) in July and the highest (85mm) in November. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Lephhalale range from 22.3°C in June to 31.9°C in January. The region is the coldest during July when the mercury drops to 3.7°C on average during the night.

#### 6.1.2 GEOLOGY

According to the 1:250 000 geological sheet, 2326 Ellisras rocks of the Wellington Formation, Dwyka Group occur on the Steenbokpan farm portion and comprise of mudstone, siltstone and minor grit. Further to the north sandstone, siltstone, mudrock and coal of the Swartrand Formation of Karoo Age occur. The major part of the farm Vangpan is covered by Quaternary sandy soil. This is separated from the Wellington Formation rocks by a fault indicated on the geological map. A very small bedrock zone of the Mogalakwena Formation, Waterberg Group is indicated near the north-western corner of the farm. The bedrock is coarse-grained purplish brown sandstone. Numerous faults and a lineament are indicated on and proximate to the investigated area. According to the geological maps and accompanied explanation no specific mineral deposits are present on or in the vicinity of the site. Coal is mined from the Karoo deposits to the north and mainly from the Grootegeluk Formation.

#### 6.1.3 TOPOGRAPHY

According to the Environmental Potential Atlas of South Africa (ENPAT, 2000) the project area is classified as a "Plain at a medium level". The site topography is best described as being relatively flat with little topographical features. On site the topography dips towards the northwest. Topographical elevation in the study area in the north-west is recorded at around 898 mamsl, while topography in the southwest is around 928 mamsl. The slope of the study area is classified as flatter terrain (less than 12 degree slopes) associated with the plains.



#### 6.1.4 DESKTOP GEOTECHNICAL INVESTIGATION

J Louis van Rooy Engineering Geologists were commissioned to conduct a desktop geotechnical investigation on the subject property. Below are extracts from the report (**Refer to Appendix N**)

The surface is covered by a red to orange sandy soil with scattered ferricrete and calcrete gravel and cobbles on surface. Due to the sandy nature of the surficial soils there are virtually no well-defined drainage feature in the area. Surface water runoff and groundwater flow will generally be towards the north.

The major part of the farm Vangpan is covered by Quaternary sandy soil. This is separated from the Wellington Formation rocks by a fault indicated on the geological map. A very small bedrock zone of the Mogalakwena Formation, Waterberg Group is indicated near the north-western corner of the farm.



**Figure 17: Location of Mogalakwena Formation (bedrock) highlighted in yellow**

The bedrock is coarse-grained purplish brown sandstone. Numerous faults and a lineament are indicated on and proximate to the investigated area. According to the geological maps and accompanied explanation no specific mineral deposits are present on or in the vicinity of the site. Coal is mined from the Karoo deposits to the north and mainly from the Grootegeluk Formation.

#### Soil Profile

No rock outcrops were observed. The area under investigation is covered by surficial reddish to orange brown sandy soil. The typical soil profile in the sandy soil cover, as described in trenches, foundation excavations and test pits to the west and further east is expected to be as follows:

- Average thickness of 0,3 m dry, brown, loose, intact, silty sandy topsoil with high organic content overlying between 1,0 and 2,0 m thick light orange brown loose to medium dense voided slightly clayey gravelly sand with scattered roots.
- The sand may overlie a ferruginized horizon varying from nodular to well-cemented honeycomb ferricrete or siltstone and mudrock. There is also evidence of scattered calcrete occurrences with some developed to the hardpan stage.



**Figure 18: Surficial reddish to orange brown sandy soil**

#### **Presence of Problem Soils**

According to Brink (1985) the area is covered by sandy soils which have undergone redistribution by wind, mostly belonging to the Kalahari Group. The transported sandy soils grade as mainly silty sands with very little clay and gravel. The sands are slightly plastic with low linear shrinkage, moderate grading modulus and low potential expansiveness. It will not be suitable in road construction and will be impervious when compacted. The in situ material may have a medium in-situ compressibility with a low compressibility and good to fair shear strength when compacted. The material will be reasonable stable as embankment material when compacted with good workability and good to fair compaction characteristics. A number of collapse potential tests conducted on undisturbed samples indicate potential collapse of between 2,76% and 7,07%, which relates to the “moderate trouble” to “trouble” severity class (Jennings and Knight, 1975). Numerous Dynamic Cone Penetration tests were also done in this horizon and typically indicate loose consistency with allowable bearing capacity of between 10 and 50 kPa.

From the above the site soils may exhibit the following specific characteristics:

- ↗ Collapse settlement
- ↗ Surface ponding
- ↗ Low expansiveness
- ↗ Moderate to high compressibility
- ↗ Intermediate erodability
- ↗ Low risk for unstable natural slopes

#### **Presence of Undermining**

The area is not a known undermined area although the Grootegeluk open cast coal mine occurs to the northeast.

#### **Groundwater, Perched Water Table and Seepage Area**

The transported soils are sandy, but also known for relatively low permeability. There may therefore be surface ponding, also due to the very low gradient. The bedrock is usually also impervious and this may be the cause for the development of ferricrete and/or calcrete in some instances. The occurrence of perched groundwater levels may be a possibility although this is expected to occur deeper than 1,5 m below surface. The regional groundwater table will probably occur between 20 m and 30 m below surface.

#### **Construction Materials and Excavatability**

These soils are generally not suitable for use in pavements due to their poor grading, but may have good compaction characteristics. The site is flat-lying and there is no evidence of shallow rock or rock outcrop

zones, although hardpan pedocrete horizons are known to be present at various depths below surface and may even be present as surface deposits or only covered by a thin veneer of sand. Excavation down to 1,5 m below surface is expected to be soft (SANS 1200, 1988). This site may typically be allocated a Site Class Designation of S2-C2/ 2ABDE (NHBR, 1999).

#### 6.1.4.1 CONCLUSION AND RECOMMENDATIONS

##### Conclusion

- ⌘ The farm portion under investigation is covered with a surficial sandy soil with expected thicknesses of between 1.0 and more than 2.0 m.
- ⌘ The bedrock is primarily sandstone and mudrock.
- ⌘ Pedocretes are expected with ferricrete and calcrete formation from nodular stage to hardpan.
- ⌘ The surficial soils are collapsible and larger than normal settlements are expected due to collapse and compressibility.
- ⌘ The generally voided soils will have low bearing capacity.
- ⌘ The transported soils will not be suitable for construction material due to being poorly graded.
- ⌘ Precautionary measures will be necessary to prevent damage to surface structures and services specifically pertaining to foundations and roads.
- ⌘ There are localised zones where surface calcrete and ferricrete are present on both farm portions.
- ⌘ Excavation difficulty may occur where hardpan pedocrete or shallow bedrock occurs.
- ⌘ Site drainage measures will be necessary to prevent surface ponding due to the low gradient and imperviousness of some of the sandy horizons

##### Recommendations

- ⌘ All structures are provided with a metre wide apron along all foundation walls to prevent large moisture changes in the soils beneath foundations and to limit seasonal moisture changes in the soils below the structure footprint areas.
- ⌘ All water bearing services will need to be fixed with flexible couplings to prevent water leakage due to local differential settlements.
- ⌘ Site drainage measures are essential to prevent large soil moisture changes due to ponding of surface water especially since the entire area has a low gradient and runoff will be poor.
- ⌘ Paved areas and roads may also be prone to subsoil settlements due to the voided nature of the soils and collapsible fabric.
- ⌘ Compaction of these areas prior to construction will be necessary.

#### 6.1.5 SOILS, LAND-USE, AGRICULTURAL POTENTIAL AND LAND CAPABILITY

AGES (Pty) Ltd was commissioned to conduct an agricultural study on the soils, agricultural potential and land capability for the proposed development. Below are extracts from the report (**Refer to Appendix O**).

The study was based on the Agricultural Potential and Land Capability of the soil forms of the proposed development site according to guidelines and criteria set by the Limpopo Department of Agriculture (LDA) and the National Department of Agriculture, Forestry and Fisheries (DAFF).

The Agricultural Research Institute uses specific soil characteristics to indicate the suitability of soils for arable agriculture. These characteristics for the site are as follows:

- ⌘ Structurally favourable soils: Soils with a structure that is favourable arable land use scarce or absent.
- ⌘ Soil association: Red, yellow and greyish excessively drained sandy soils (Arenosols)
- ⌘ Soil pH: 6.5-7.4
- ⌘ Prime agricultural activity for the area: Cattle.

The agriculture potential of soils in the general area are divided into two classes, namely 'Soils highly suited to arable agriculture where climate permits' and 'Soils of poor suitability for arable agriculture' (ENPAT, 2001). A Land type unit is a unique combination of soil pattern, terrain and macroclimate, the classification of which is used to determine the potential agricultural value of soils in an area. The land type unit represented within the study area include the Ah86 land type (Land Type Survey Staff, 1987) (ENPAT, 2001). Topography of the Ah86 unit is dominated by footslopes and midslopes with the Hutton and Clovelly soil formations occurring exclusively. Clay content within these regions varies between 2 and 6%. Soil depth in this land type is generally deeper than 1200 mm.

By definition, based on Part 1 of the Regulation of Conservation of Agricultural Resources Act 43 of 1983, an agricultural land in the Limpopo Province and specifically in the grid square in which the project site falls is considered high potential if the land:

- ↗ Is under permanent irrigation, or
- ↗ Can be classified into one of the following soil forms, depth and clay content:
  - Avalon;
  - Bainsvlei;
  - Bloemdal;
  - Clovelly;
  - Glencoe;
  - Hutton;
  - Oakleaf;
  - Pinedene;
  - Shortlands;
  - Tukulu; and
  - The effective soil depth is equal to or greater than 750mm;and
  - Topsoil clay content is between 10 and 35%.

High potential means prime or unique. Prime refers to the best available land, mainly from the national perspective, suited to and capable of consistently producing acceptable yields of a wide range of crops (food, feed, forage, fibre and oilseeds), with acceptable expenditure of energy and economic resources and minimal damage to the environment. Unique agricultural land means land that is or can be used for producing specific high value crops. Permanent irrigation means the availability for, and regular artificial application of, water to the soil for the benefit of growing crops. The application may be seasonal. From the databases of Department of Agriculture the site has a low agricultural potential for crop cultivation. The land capability is non-arable with a moderate potential for grazing.

## Results

Following site investigations the following was determined. The soils were classified into broad classes according to the dominant soil form and family as follows:

### **Red-yellow apedal soils of the Clovelly soil form**

**Agricultural Potential:** The Clovelly soils have a low agricultural potential due to the low water holding capacity and low rainfall conditions. These leached sandveld soils also have a low clay content and under the prevailing climatic conditions makes them unsuitable for cultivation. Under cultivation, the topsoil becomes structureless and susceptible both to capping and to erosion, like other sandveld soils. **The limited water availability, high evaporation rates and high water demands by crops would however render crop cultivation unsustainable in the study area.**

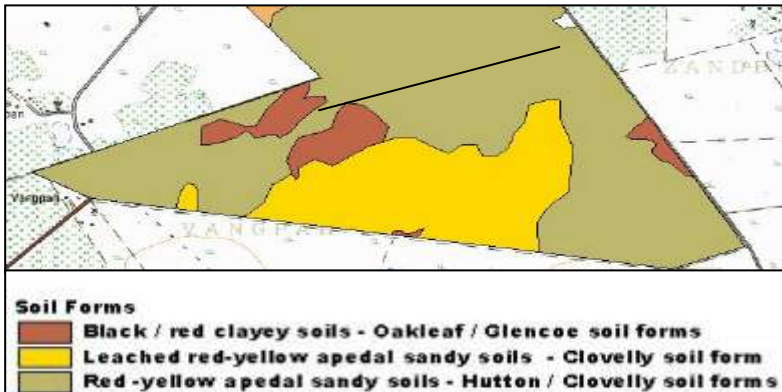
**Land capability:** The area can be utilized as low quality livestock or game grazing during the summer months, although the sandy nature of the soils and low nutrient content in the topsoil makes the grasses in these areas largely unpalatable during the winter months. The area therefore has a moderate potential for livestock or game grazing.

### **Red or black clayey soils associated with the tamboti woodland.**

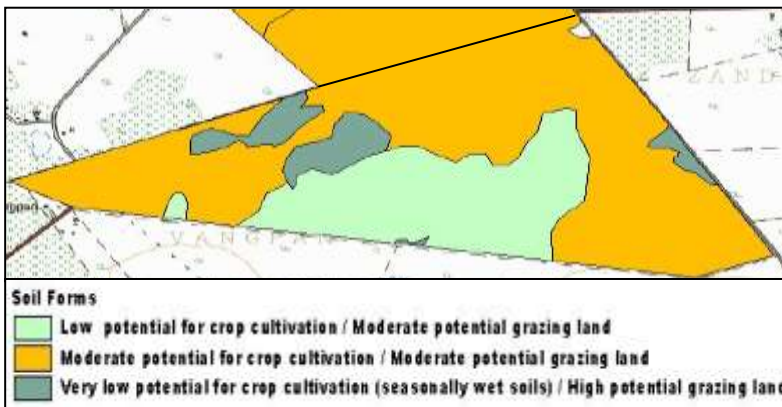
**Agricultural Potential:** Zero potential soils, **due to the soil wetness these areas are not suitable for crop cultivation under arable conditions.**

**Land capability:** The grazing potential of these areas is high due to the palatable grasses growing throughout the year on these soils. The only limiting factor may be that livestock movement is limited during the wet season when the clay expands, causing livestock to get stuck in the muddy conditions. Soils are very sensitive and prone to erosion. A specific strategy is needed to prevent damage to these soils considering that overgrazing and trampling has already caused some degradation of the floodplains.

The geological formations and vegetation patterns showed a strong correlation to the major soil units mapped in the study area. The location of the soil forms in the landscape as well as the agricultural potential and land capability are indicated below. All the above mentioned details were taken into consideration upon finalising the layout plan.



**Figure 19: Location of Soil forms**



**Figure 20: Agricultural Potential and Land Capability Map of the study area**

**Crop production**

The climatic conditions in combination with the sandy nature of the soils render the study area unfavourable for effective crop production which could result from high moisture demands by planted crops.

**Livestock production**

The current vegetation at the proposed site of development consists mainly of native woody perennial species and a mixture of palatable and unpalatable grasses (low quality grazing grass species associated with sandy plains and highly palatable grass species associated with drainage channels and floodplains). The nature of the vegetation and size of the properties make the area marginal for extensive livestock production.

**6.1.5.1 ANTICIPATED SOIL IMPACTS**

The following list of impacts is anticipated with the proposed developments on the soils and land capability in the area during the construction and operational phases:

- ⚡ Disturbance of soils (Soil compaction, erosion and crusting);
- ⚡ Sterilisation of soil (soil stripping);
- ⚡ Soil contamination due to leaching of soluble chemical pollutants;
- ⚡ Loss of current and potential agricultural land

**6.1.5.2 CONCLUSION**

The agricultural potential of soils for crop cultivation on the proposed development areas varies between very low (seasonally wet clayey soils), low (deep, coarse sandy soils) and moderate (deep sandy-loam soils with slightly higher nutrient content). The climatic conditions and agricultural potential of most of the areas on which development will occur is not suitable for crop cultivation under rain-fed arable conditions. The site

should be considered as **moderate potential grazing land with limited potential for arable agriculture considering the climatic conditions and size of land potentially available.**

## 6.2 FAUNA AND FLORA

AGES (Pty) Ltd was commissioned by Interdesign landscape Architects to conduct a EIA phase study on the ecological components (fauna and flora) for the proposed.

Herewith extracts from the report compiled by AGES (**Refer to Appendix H for a copy of the Full Report**).

**Please note that all specialist reports makes reference to Portion 1 of the farm Steenbokpan 295 LQ as this portion was initially included as part of the EIA process comprising of the mixed use component which is no longer being applied for.**

### 6.2.1 VEGETATION ASSESSMENT

The development site lies within the Savanna biome which is the largest biome in Southern Africa. It is characterized by a grassy ground layer and a distinct upper layer of woody plants (trees and shrubs). The environmental factors delimiting the biome are complex and include altitude, rainfall, geology and soil types, with rainfall being the major delimiting factor. Fire and grazing also keep the grassy layer dominant. The most recent classification of the area by Mucina & Rutherford (2006) shows the site to be part of the Limpopo Sweet Bushveld. The landscape features of the Limpopo Sweet Bushveld is characterized by plains (sometimes undulating or irregular) that are traversed by several tributaries of the Limpopo River and by short open woodland. Thickets of *Acacia erubescens*, *Acacia mellifera* and *Dichrostachys cinerea* occur in disturbed areas which are almost impenetrable. The conservation status of the Limpopo Sweet Bushveld is Least Threatened with less than 1% conserved and about 5% transformed mainly by cultivation.

Two basic methods were used during the vegetation survey:

- Line transects were walked on the site surveyed to record the plant species present. Rare and threatened plant species and any botanically sensitive sites or habitats were searched for in the various vegetation units.
- The Braun-Blanquet survey technique to describe plant communities as ecological units was also used for this study. It allows for the mapping of vegetation and the comparison of the data with similar studies in the area.

The vegetation survey was conducted on site during March 2010. The vegetation was in a moderate to good condition and most species could be identified. No further surveys were necessary considering that the area received sufficient precipitation during the wet season to allow for the identification of most plants in the study area.

#### Data Processing

- **High:** Ecologically sensitive and valuable land with high species richness that should be conserved and no development allowed.
- **Medium:** Land that should be conserved but on which low impact development could be considered with the provision of mitigation measures.
- **Medium-low:** Land that has some conservation value but on which development could be considered with limited impact on the vegetation / ecosystem. It is recommended that certain sections of the vegetation be maintained.
- **Low:** Land that has little conservation value and that could be considered for developed with little to no impact on the vegetation / ecosystem.

#### Vegetation Units

The proposed development is planned on a landscape that varies from flat to slightly undulating plains. The importance to survey the area as a whole to have a better understanding of the ecosystem and the potential impact of the development on the natural environment was identified as a key factor, and subsequently the property was completely surveyed. The site is currently separated into two major sections by the Steenbokpan – Lephallale tar road. The farm is currently managed as a game farm. The vegetation

units on the site vary according to soil characteristics, topography and land-use. Most of the site is characterized by mixed broadleaf woodland that varies in density and species composition, while the areas on the old fields in a secondary state of succession represent microphyllous woodland. The natural woody layer represents Marula – Red Bushwillow – Silverclusterleaf woodland that varies in density according to soil depth. Additionally a large section of the study area was previously utilized for crop cultivation and these old fields vary in age and state of succession, while other areas on deep, sandy soils have become encroached as a result of overgrazing by livestock in the past. Vegetation units were identified and can be divided into 6 distinct vegetation units according to soil types and topography. These are as follows

1. Northern *Acacia erioloba* – *Combretum apiculatum* – *Commiphora pyracanthoides* woodland
2. *Terminalia sericea* – *Grewia flava* shrubveld
3. *Combretum apiculatum* – *Terminalia sericea* woodland
  - a) Dense *Combretum* – *Terminalia* – *Commiphora* – *Grewia* woodland
  - b) Open *Combretum* – *Grewia* woodland
  - c) Mixed *Combretum* – *Terminalia* – *Sclerocarya* woodland
  - d) Southern *Combretum* – *Terminalia* – *Eragrostis pallens* woodland
4. *Sclerocarya birrea* woodland
  - a) *Sclerocarya* – *Combretum* – *Terminalia* woodland
  - b) Dense *Sclerocarya birrea* woodland
5. Old fields
6. Tamboti woodland

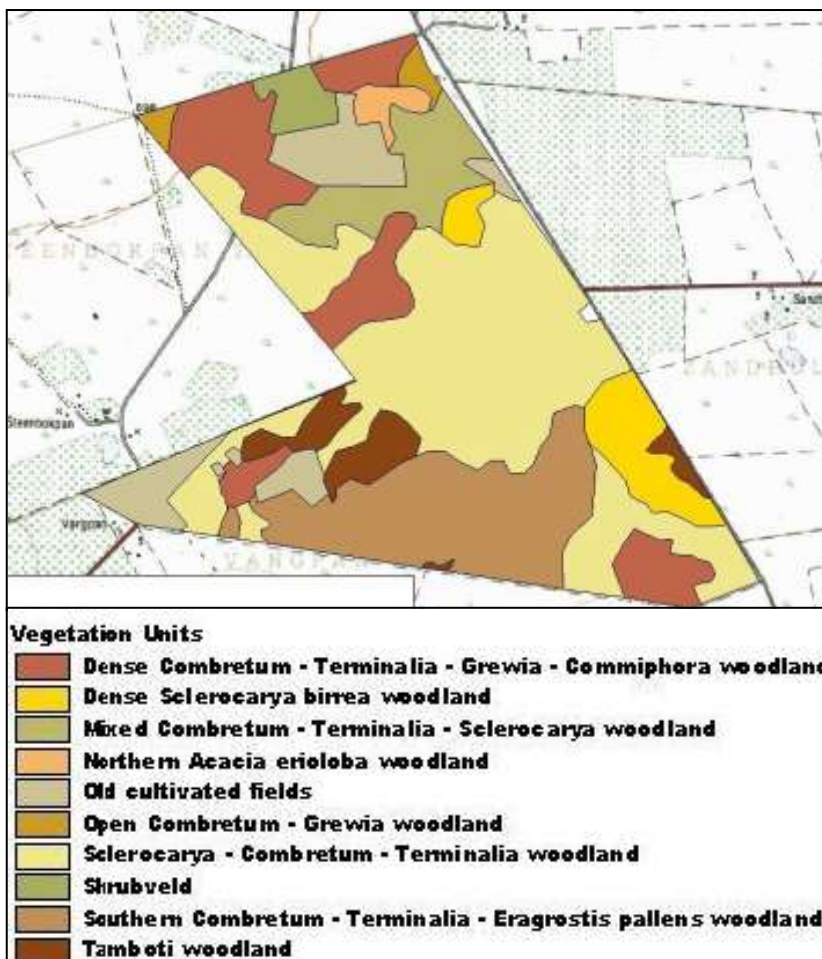


Figure 21: Vegetation Units

**1. Northern *Acacia erioloba* – *Combretum apiculatum* – *Commiphora pyracanthoides* woodland [Conservation priority MEDIUM]**

This vegetation unit occurs in a small section of the northern area of the farm Steenbokpan. The vegetation is characterized by a dense shrub layer and the presence by the sweetveld species *Acacia erioloba* and *Combretum hereroense* indicating soils with a higher clay percentage. The state of the vegetation in this vegetation unit is in an encroached state. Vegetation associated with encroached areas usually occurs in previously disturbed or overgrazed sites (Van der Meulen, 1979). Werger (1977) showed that when severe and prolonged overgrazing in the semi-arid savanna ecosystem occurs, the grass component is severely restricted in growth, or in moisture usage. More moisture remains thus available in the soil to be used by the woody plants, and the result is bush encroachment, a structural change towards more strongly woody vegetation. No red data species occurs; probably as a result of the encroached state of the habitat. The vegetation is classified as having a moderate sensitivity. Bush encroachment control and rehabilitation should be implemented before any development could be supported in the area.

The following recommendations with regards to the development in this vegetation unit can be made:

- The vegetation unit is classified as having a **moderate sensitivity** due to the indigenous component still being present in combination with the protected camel thorn trees.
- The development could be supported in this vegetation unit. The protected tree species *Sclerocarya birrea* and *Acacia erioloba* should be preserved as part of the landscaping, or alternatively a permit can be obtained from DAFF for the eradication of the species.
- Encroached areas should be cleared of shrubs like *Commiphora* and *Grewia* species as stipulated in regulation 16 of the legislation under the Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983) (CARA). Tall indigenous tree species could be preserved and incorporated as part of the gardens and landscaping of the development area.

**2. *Terminalia sericea* – *Grewia flava* Shrubveld [Conservation priority MEDIUM to LOW]**

The northern section of the proposed development site form shrubveld that varies from an open woody structure to slightly encroached areas. The woody layer of the vegetation unit is mostly dominated by broadleaf species such as *Grewia* species, *Commiphora pyracanthoides* and *Terminalia sericea*, while other broadleaf species such as *Combretum apiculatum* is also common. No red data species occurs in the area as a result of the habitat not being suitable for any of the potential red data species occurring in the area. The vegetation has a moderate to low sensitivity due to the widespread status of this vegetation unit as an entity in the Savanna Biome or Limpopo Sweet Bushveld vegetation type.

The following recommendations with regards to the development in this vegetation unit can be made:

- The vegetation unit is classified as having a moderate sensitivity due to the widespread status of this vegetation unit in the Savanna biome.

**3. *Combretum apiculatum* - *Terminalia sericea* woodland**

**(a) Dense *Combretum* – *Terminalia* – *Grewia* – *Commiphora* woodland [Conservation priority MEDIUM]**

This variation is situated on the slightly shallower soils on the northern and south western sections of portion 1 of the farm Steenbokpan and the southern sections of the farm Vangpan. The presence and dominance of red bushwillow indicate that the soils are shallower in this area compared to the northern *Acacia erioloba* woodland. The woody structure is moderately open with a well developed shrub layer. In some areas the shrub layer has become encroached as a result of overgrazing in the past as described earlier in the report. Red bushwillow and silverclusterleaf is the dominant medium tall tree species, while the shrub layer is dominated by *Grewia* species, sickle bush and *Commiphora pyracanthoides*. Only individual protected marula trees and camel thorn trees occur in the area. The presence of a moderately to high percentage of pioneer grass species indicate the poor nutrient status of the soils. No red data plant species were observed in the area or could potentially occur.

**(b) Open *Combretum* – *Grewia* woodland [Conservation priority MEDIUM to LOW]**

This vegetation unit occurs in a small section of portion 1 of the farm Steenbokpan and forms open woodland dominated by the medium tall red bushwillow tree species, and the shrub species *Grewia bicolor*.



The woody layer forms an open woody structure with a dense grass layer in between dominated by *Eragrostis pallens*. No red data plant species were observed in the area or could potentially occur.

The following recommendations with regards to the development in the two variations described above are as follows:

- The vegetation has a moderate sensitivity and represents a widespread vegetation entity. The vegetation represents important habitat for fauna and the impact of the development will be medium.
- The protected tree species *Sclerocarya birrea*, *Acacia erioloba* and *Boscia albitrunca* occur only as individuals scattered throughout the area and these specimens should be incorporated as part of the landscaping of the site. A permit should be obtained from DAFF for the eradication of these species, should it be required.
- Indigenous tree species should be used for landscaping of the sites.

**(c) Mixed Combretum – Terminalia – Sclerocarya woodlands [Conservation priority MEDIUM]**

This unit occurs on the central sections of the proposed development site to the South and East of the old fields on the farm Steenbokpan. The substrate is Hutton or Clovelly soils of medium depth derived from sandstone. The woody structure is open woodland with a well developed shrub layer and dominated mostly by broadleaf woodland species such as red bushwillow, silverclusterleaf, raisin bush and marula. Specific mitigation measures for the development of residences should be done in these areas to ensure that impact on the indigenous floristic elements is kept to a minimum. The area would be best developed as woodland incorporated with the residences.

The protected tree species *Sclerocarya birrea* occur scattered throughout the area and on the proposed development site. The following recommendations and general ecological observations can be made regarding the township development in all the variations of this vegetation unit:

- The vegetation unit as an entity occurs widespread through the area and Southern Africa and can be classified as having a moderate sensitivity due to the presence of the marula trees in medium densities. No red data plant species observed on site.
- Development within this vegetation unit would have a moderate impact in terms of the current nature and distribution of this vegetation type relating to the larger surrounding area and some of the natural elements should be preserved in the gardens and open space corridors.

**(d) Southern Combretum – Terminalia – Eragrostis pallens open woodland [Conservation priority MEDIUM to LOW]**

The landscape of this vegetation unit is typical undulating sandy plains derived from sandstone. The dominance of red bushwillow and silverclusterleaf are more apparent in this vegetation unit than any other vegetation unit on the site. Forb species typical of leached sandy soils observed in the area include *Waltheria indica*, *Indigofera daleioides* and *Dichapetalum cymosum*. The area would be best developed as woodland incorporated with the development. No red data species occurs on the proposed development site as a result of the habitat being different compared to the potential red data species occurring in the area.

The following recommendations can however be made regarding the development in this plant community:

- The vegetation unit is in a natural habitat and can be classified as having a moderate sensitivity.
- The tall woodland component of this vegetation unit should be preserved as part of the development. Large indigenous trees (especially species like tall silverclusterleaf) could be preserved on the site to enhance the aesthetic value of the area.)
- The development could be supported in this area, although care should be taken not to impact on neighbouring tamboti woodland.
- Some encroachment of silverclusterleaf and shrub species occur in the area and should be controlled as stipulated in the CARA regulations.

**4. Sclerocarya birrea woodlands**

**(a) Sclerocarya – Combretum – Terminalia woodland [Conservation priority MEDIUM]**

The Marula woodlands are characterized by a definite dominance of marula trees in the woody layer of the vegetation units. This specific vegetation unit is characterized by an equal dominance in the woody layer by the tree species marula, silverclusterleaf and red bushwillow, while the shrub layer is well developed and dominated by raisin bush species. Areas where the soils are of medium depth are dominated by red bushwillow, while deeper areas are characterized by marula and silverclusterleaf. The herbaceous layer is mostly dominated by sourveld, unpalatable grass species such as broom love grass and various *Aristida* species. No red data plant species were noted in the area. The protected marula trees provide the most unique floristic component of this vegetation unit as an entity.

The following ecological recommendations can be made regarding the township development in this plant community:

- The dominance of the protected marula trees in this indigenous woodland type of the Savanna Biome provided the basis for the classification of this vegetation unit as having a moderate sensitivity even though no red data plant species were observed on site.
- Development within this vegetation unit would not have a significant impact in terms of the current nature and distribution of this vegetation type relating to the larger surrounding area, provided that some of the area is preserved as natural corridors and as part of the landscaping in the development.
- Only indigenous plants should be planted in the gardens and the tall indigenous trees are incorporated as part of the landscaping of the site. A section of this vegetation unit could be preserved as an open space or park zones.

**(b) Dense Marula - *Grewia* Woodland [Conservation priority MEDIUM]**

This vegetation unit occurs in isolated sections of the property on deep sandy soils. The woody layer is characterized by a high density of tall marula trees and a dense shrub layer dominated by various *Grewia* species and sickle bush. The encroachment is the result of overgrazing in the past and should be controlled as stipulated earlier. The marula trees are exceptional specimens and enhance the aesthetical value of the area. Many bird species utilize the large trees for nesting sites. The red data species analysis showed that no red data species occur in the area, both after a scoping were conducted and the field surveys were performed.



**Figure 22: Section of the Marula Woodland on Remainder of the farm Vangpan**

The following recommendations should be adhered to for the development in the area:

- The vegetation unit occurs in an area with a high density of protected tree species such as *Sclerocarya birrea* (marula). The area therefore has a moderate to high sensitivity. The eradication of any marula trees would necessitate a permit from DWAF.
- The marula trees would enhance the aesthetical value of the development and should be incorporated as part of the landscaping of the proposed development and / or preserved as a park (“green belt”)

area. The location of the vegetation unit would be quite suitable for the development of the solar park provided some of the larger marula specimens are preserved in between the solar panels.

- Provided that a part of the vegetation unit is preserved as part of a park area and the remainder as a landscaped development for example an office block park, the impact of the development on this vegetation unit would be medium on a local scale.

##### 5. Old Cultivated Fields [Conservation priority LOW]

When cultivated fields are left fallow, it results in a landscape mosaic of patches of secondary vegetation varying in age and dominated by various grass species (Moll, 1965). Different stages of succession occur in the old fields, and Wildi (2002) described how dynamic these systems are over time and space. The most common old fields in the Savanna Biome and surroundings are the young old fields of 1-5 years old (Smits et al. 1999) dominated by the pioneer grass species of disturbed areas, *Cynodon dactylon* (Van Oudtshoorn, 1999). Secondary grassland communities may develop from this old field variation, dominated by the secondary grassland species directly related to man-made disturbances, *Hyparhenia hirta*. These fields are still in an early successional state, although somewhat older (older than 5 years) with several grass species like *Aristida junciformis*, *Aristida congesta s. congesta* and *Eragrostis rigidior*. The landscape and vegetation features of the primary old fields on the proposed development site include plains with almost no woody cover (< 1%) and dense (70- 80%) herbaceous layer. The dominant grass species include *Digitaria eriantha*, *Stipagrostis uniplumis* and *Aristida* species indicating previous agricultural/utilizing activities within these areas, while typical herbs/weeds include *Indigofera oxytropis*, *Tylosema fassoglense* and *Solanum incanum*. The soil in the area is sandy to loamy (Hutton) originating from Sandstone/ Mudstone. The dominant tree species in the area include *Acacia tortilis* and *Dichrostachys cinerea*, while typical herbs/forbs include *Solanum incanum* and *Indigofera oxytropis*. This vegetation unit is defined as a secondary old field variant/modified land which is evident from the higher tree cover/diversity as well as the higher shrub cover/diversity. No red data species was observed as a result of the modified state of the vegetation.

The following is recommended for the proposed development on the old fields:

- Unlimited development could be supported in this area. This area would be the most suitable area for the solar plant development on the property.
- Encroached areas should be cleared of shrubs like sickle bush and *Acacia* species on secondary old fields as stipulated in regulation 16 of the legislation under the Conservation of Agricultural Resources Act, 1983 (Act No 43 of 1983) (CARA).

##### 6. Tamboti woodland [Conservation priority HIGH]

The tamboti woodland occurs in isolated patches of the farm Vangpan and considering the sensitive soils, uniqueness of the tamboti forest and value of this area for game species, especially browsers, this area have a high conservation priority and should preferably be avoided for development. Some areas inside the tamboti woodland have already been impacted and these areas should be rehabilitated. The landscape form plains in the southern section of the proposed development site. The woody layer forms closed woodland with a poor herbaceous layer as a result of overgrazing and little or no sunlight through the dense tree canopy. This vegetation unit should be considered quite a unique entity considering the woody layer dominated almost completely by the species *Spirostachys africana*, a protected tree species according to the Limpopo Environmental Management Act (LEMA). No development can be supported in these areas, especially considering that other more suitable areas exist on other parts of the property. It is proposed that this area be kept as a public open space or park. No red data species were found in the community, although the vegetation unit as an entity should be preserved.



**Figure 23: Section of Tamboti Woodlands on Vangpan**

The following recommendations can be made regarding the development in this plant community:

- The vegetation unit is a natural habitat and can be classified as having a moderate to high sensitivity. The development should not impact on the tamboti trees whatsoever, and subsequently it is proposed that the area be kept as a public open space or park, especially considering that other parts of the site is more suitable for the development.
- Although no red data species were found in the area, the vegetation community is quite a unique entity and should be considered a conservation priority area.

**Red data Flora Species**

According to Mucina & Rutherford (2006), an important central bushveld endemic found within this region is *Piaranthus atosanguineus*, a succulent stapeliad. No individuals of this endemic plant were observed during the survey, although it was previously found in the larger area. No other red data species potentially occur in the QDS of the study area according to the SIBIS database. No other red data species was also found in the area, although the potential habitats were surveyed to the extent representative of the area. The natural woodland on the property do not represent potential habitat for red data species, while the old fields, encroached woodland and areas around the residences on the property have been totally modified through anthropogenic influences.

**Protected tree species**

Taking cognizance of the data obtained from the field surveys, five protected tree species occurs within the study area.

Species	National Conservation Status	Local impact of proposed development on specie
<i>Acacia erioloba</i>	Protected tree species	Moderate, isolated individuals should be incorporated as part of landscape and conserved in some “green belt” areas
<i>Boscia albitrunca</i>	Protected tree species	Moderate, isolated individuals should be incorporated as part of landscape and conserved in some “green belt” areas
<i>Combretum imberbe</i>	Protected tree species	Moderate, isolated individuals

Species	National Conservation Status	Local impact of proposed development on specie
		should be incorporated as part of landscape and conserved in some “green belt” areas
Sclerocarya birrea	Protected tree species	Moderate to high, should be incorporated as part of landscape and conserved in some “green belt” areas where dense stands occur
Spirostachys africana	Protected tree species	High, no development should occur in area

**Table 5: Protected trees species**

The potential impact of the proposed development on the protected tree species would be moderate considering that the species do occur in medium to high densities in certain areas of the site. The protected trees should be incorporated as part of the landscaping and gardens of the site. Permits need to be obtained for the eradication of the species as prescribed above. The tamboti woodland forms a dense stands of tamboti trees and represent a sensitive and unique entity. The recommendation would be to preserve these small, isolated areas as public open space areas.

**Refer to the full report as Appendix H for lists of medicinal plants and invasive species which occur on site.**

### General

An important aspect relating to the proposed development should be to protect and manage the biodiversity (structure and species composition) of the vegetation types which are represented on the proposed development site. Vegetation removal should be limited to the footprint areas of the proposed development. The unnecessary impact on the surrounding woodland areas outside the development footprint and solar plant development area should be avoided as far as possible.

### 6.2.2 FAUNAL ASSESSMENT

#### Overview

A survey was conducted during March 2010 to identify specific fauna habitats, and to compare these habitats with habitat preferences of the different fauna groups (birds, mammals, reptiles, amphibians, invertebrates) occurring in the quarter degree grid. During the site visits mammals, birds, reptiles, invertebrates and amphibians were identified by visual sightings through random transect walks. In addition, mammals were also recognized as present by means of spoor, droppings, burrows or roosting sites. The 500 meters of adjoining properties were scanned for important fauna habitats.

#### Mammal Habitat Assessment

Large mammals such as elephant, lion, buffalo and rhinoceros species that occurred historically at the site, are absent from the area, owing to anthropogenic impacts in recent centuries. This loss of large species means that the mammal diversity at the site is far from its original natural state not only in terms of species richness but also with regards to functional roles in the ecosystem. Two larger predators of which the existence in the larger area could not be ruled out completely are leopard (*Panthera pardus*) and brown hyena (*Hyaena brunnea*). Leopard and brown hyena tracks were found during the surveys.

#### Reptiles and Amphibians Assessment

Species such as the southern rock python, the black mamba, puff adder, boomslang, vine snake, spotted bush snake and several members of the green snakes (*Philothamnus* spp.) is expected to occur in the study

area, although the presence of these snakes is dependant on the presence of their prey species (rodents, frogs etc.). The general habitat type for reptiles consists of open to very dense bushveld, with limited available habitat for diurnally active and sit-and-wait predators, such as terrestrial skinks and other reptiles. Arboreal species are the more prominent components of the local herpetofauna. The amphibians appear to be poorly represented on site. The only near threatened amphibian which has been recorded from this area is the giant bullfrog (*Pyxicephalus adspersus*), for which the arable land provides ideal dispersal area. This species has been recorded from this quarter degree grid cell, while the African bullfrog (*P. edulis*) has not, although one might expect it also to occur here. No suitable habitat for Giant Bullfrog (*Pyxicephalus adspersus*) occurs on the site.

**Invertebrates habitat assessment**

Insects and spiders are very good indicators of the plant diversity and ecological sensitivity of an area. Butterflies can be used in the field as indicators of biodiversity. An insect and spider desktop survey was done in addition to the field observations. All of the potential invertebrate habitats are well represented by a high family richness of insects and spiders. Spiders occur throughout all the habitats, and both web builders and active hunters find their ways in trapping and actively hunt around for potential food.

**Red Data Species**

According to the existing databases and field survey the following number of fauna species included in the IUCN red data lists can potentially be found in the study area:

English Name	Conservation Status	Propability of occurring
<b>Mammals</b>		
Cheetah	Vulnerable	Low
South African Hedgehog	Near Threatened	Moderate
Brown hyena	Near Threatened	Moderate
African wild dog	Endangered	Low
Serval	Near Threatened	Low
Pangolin	Vulnerable	Moderate
Honey badger	Near Threatened	Moderate
Welwitsch’s hairy bat	Near threatened	Moderate
Rusty bat	Near threatened	Marginal
<b>Herpetofauna</b>		
South African Python	Vulnerable	Moderate
Giant bullfrog	Near Threatened	Moderate
Jalla’s sand snake	Near Threatened	Low
<b>Invertebrates</b>		
Horned baboon spider	Protected	Moderate
Burrowing Scorpion	Protected	Moderate
Monster Tiger Beetle	Protected	Moderate

**Table 6: Red Data species**

The cumulative negative impacts of the proposed development activities on the fauna of the area will be moderate even though some areas of the site are in a degraded state. Recommendations and mitigating measures need to be implemented to ensure the survival of these species other fauna habitats and feeding grounds as stipulated below:

- Some of the red data and other mammal species have a low probability of occurring in the area as a result of the following:
  - The anthropogenic influences of mining and other agricultural activities occurring in the larger area will cause some fauna to migrate from the area to more natural areas with less disturbance;
  - The degraded and modified state of the old fields and encroached thickets is not suitable habitat for red data fauna species, and will only support general fauna such as birds, small antelopes and rodent species;
  - Habitat not being suitable or marginal. Many of the red data species such as waterbirds are confined to permanent water sources such as the Mokolo River;

- Bird species such as vultures are dependant on food sources (carcasses) in the area and these species will only periodically occur as a result of their food source being present;
  - If one considers the habitat descriptions of the red data species, some of them are limited in range or threatened as a direct result of habitat loss in the southern African sub region (e.g. South African hedgehog), although many of the species in the table above are not limited by direct habitat loss due to their widespread occurrence (e.g. martial eagles have large home ranges).
- ↻ The area in general is quite heterogenous and therefore has a high potential for fauna diversity considering the surrounding vegetation types, as well as the degraded areas. The following habitats are considered fauna habitats that contribute to the fauna diversity in the area:
- Large trees provide important nesting and perching areas for threatened birds of prey like Ayres' and Tawny eagles.
  - Old field sections can contribute significantly to grazing for cattle and game, while the open woodland areas will also provide valuable habitat for a variety of bird and other fauna species.
- ↻ The protection of different habitat types in the area will be important to ensure the survival of the different animals due to each species' individual needs and requirements. Sufficient natural corridor sections should be protected around the proposed development footprints to allow fauna to move freely between the different vegetation units on the property. The importance to protect the tamboti and marula woodlands as part of the vegetation of the larger area should be a high priority as part of the development planning. In this regard the development should aim to minimally impact on these areas and promote them as "open spaces" or "parks".
- ↻ Development will not influence the natural feeding and movement patterns of the existing fauna in the area. Peripheral impacts on the larger area should be avoided.

The cumulative negative impact of the development on the fauna has the potential to be moderate. However, considering the following general mitigation and management actions taken on site, the impact on faunal populations should be low.

- ↻ Where trenches pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling of trenches during construction process.
- ↻ A speed limit should be imposed on the access roads to minimise road kills. Speed humps should be constructed at strategic places along the access road to enforce lower speeds.
- ↻ Roads should be designed without pavements to allow for the movement of small mammals.
- ↻ Hunting, trapping, poisoning and shooting of animals should be prevented. This will necessitate negotiations with the local inhabitants and informal settlers.
- ↻ Do not feed any wild animals on site.
- ↻ Poisons for the control of problem animals should rather be avoided since the wrong use thereof can have disastrous consequences for the vulture birds of prey occurring in the area. The use of poisons for the control of rats, mice or other vermin should only be used after approval from an ecologist.
- ↻ Waste bins and foodstuffs should be made scavenger proof.
- ↻ Control of vehicles in and out of the properties involved.
- ↻ Monitoring of the environmental aspects should be done over the longer term to ensure that impacts are limited to a minimum during the constructional and operational phases. Monitoring of specific species such as pythons and specific bird species such as stork species and other water birds is necessary to ensure that this species would be unaffected over the longer term by the development. Information on the rare species should be provided to workers to make them more aware of these species and their behaviour.

### 6.2.3 FAUNAL IMPACT ASSESSMENT

#### Potential Impacts

The following impacts have been identified. Site specific mitigation measures to reduce the impacts as per the recommendations provided by AGES have been included in the EMP. The Impact significance rating indicated below includes implementation of mitigation measures.

#### 6.2.3.1 Direct habitat destruction [MODERATE]

The development of the solar plant will result in significant loss of and damage to natural habitats. Rehabilitation of some areas would be possible but there is likely to be long-term damage in large areas. Most habitat destruction will be caused during the construction phase, but some may also occur during the operational phase.

**a. Destruction or loss of floral diversity or vegetation communities**

- ↻ The construction will lead to the loss of individual plants;
- ↻ Loss of threatened, “near-threatened” and endemic taxa;
- ↻ The construction activities can impact on surrounding vegetation by dust and altered surface run-off patterns;
- ↻ The disturbance of the area could lead to an increase in the growth of alien vegetation.

**b. Loss of faunal diversity through migration and decline in animal numbers**

- ↻ Habitat modification by construction activities will force animals out of the area and animal numbers will decrease
- ↻ Loss of threatened, “near-threatened” and conservation important taxa: The anticipated loss of the natural woodland will result in the local displacement of some fauna species;
- ↻ Changes in the community structure: It is expected that the faunal species composition will shift, due to an anticipated loss in habitat surface area. In addition, it is predicted that more generalist species (and a loss of functional guilds) will dominate the study area. Attempts to rehabilitate will attract taxa with unspecialised and generalist life-histories. It is predicted that such taxa will persist for many years before conditions become suitable for succession to progress

**6.2.3.2 Light pollution [MODERATE]**

Many species of flying insects (but also some non-flying insects) are attracted to artificial light, some over distances of a kilometre or more. Insects attracted to fixed external lights often circle the light until they eventually succumb to exhaustion or are killed by predators like bats, other insectivorous mammals or ants. Some insects may settle down on vegetation or other perching possibilities like walls near the light but they are often killed early the following morning by birds that quickly learn to utilize this ‘easy’ food source. Flying insects attracted to the lights of vehicles, are killed in large numbers by the moving vehicles. The impact of artificial lighting on insect populations can be very significant, resulting in the death of thousands of individuals every night and causing a substantial drain effect on the surrounding populations. Lighting pollution will probably be severe during the construction phase, especially if strong lighting is needed for construction at night. During this phase there will also probably be an increased movement of vehicles during the night. During the operational phase the impact will continue (throughout the life of the project) and its impact will depend on the number and placement of external lights and operation during the night.

**6.2.3.3 Habitat fragmentation [MODERATE]**

The construction of the solar plant, power lines and other infrastructure will inevitably result in natural movement patterns being disrupted and, to a varying degree depending on how different species react to these barriers will result in the fragmentation of natural populations.

**6.2.3.4 Increased Soil erosion and sedimentation [LOW]**

The construction activities associated with the developments may result in widespread soil disturbance and is usually associated with accelerated soil erosion. Soil, sediments and associated contaminants are transported into streams, rivers and other water bodies (pans), resulting in the loss or alteration of habitats for aquatic organisms, as well as changes in water quality. Soil erosion also promotes a variety of terrestrial ecological changes associated with disturbed areas, including the establishment of alien invasive plant species, altered plant community species composition and loss of habitat for indigenous fauna and flora.

**6.2.3.5 Soil and water pollution [LOW]**

Construction work of the magnitude contemplated for the proposed development will always carry a substantial risk of soil and water pollution, with large construction vehicles contributing substantially due to oil and fuel spillages. If not promptly dealt with, spillages or accumulation of waste matter can contaminate the soil and surface or ground water, leading to potential medium/long-term impacts on fauna and flora.



#### 6.2.3.6 Air pollution [MODERATE]

The environmental impacts of wind-borne dust, gases and particulates from the construction activities associated with the proposed development are primarily related to human health and ecosystem damage. The primary impacts on the biophysical environment are linked to noise disturbance and the emission of dusts and fumes from both the stockpiles and the transportation system. Dust pollution will impact the most severe during the construction phase.

#### 6.2.3.7 Road mortality [LOW]

Large numbers of fauna are killed daily on roads. They are either being crushed under the tyres of vehicles in the case of crawling species, or by colliding with the vehicle itself in the case of avifauna or flying invertebrates. The impact is intensified at night, especially for flying insects, as result of their attraction to the lights of vehicles.

#### 6.2.3.8 Spread and establishment of alien invasive species [MODERATE]

Along with light pollution, this is probably one of the most significant potential impacts from a terrestrial invertebrate perspective, and also may have very significant knock-on effects that could impact of virtually every aspect of the surrounding ecosystem. Vehicles often transport many seeds and some may be of invader species, which may become established along the road, especially where the area is disturbed. Invasive invertebrate species (e.g. the Argentine ant, *Linepithema humile*) are also regularly dispersed by vehicles. Continued movement of personnel and vehicles on and off the site, as well as occasional delivery of materials required for maintenance, will result in a risk of importation of alien species throughout the life of the project.

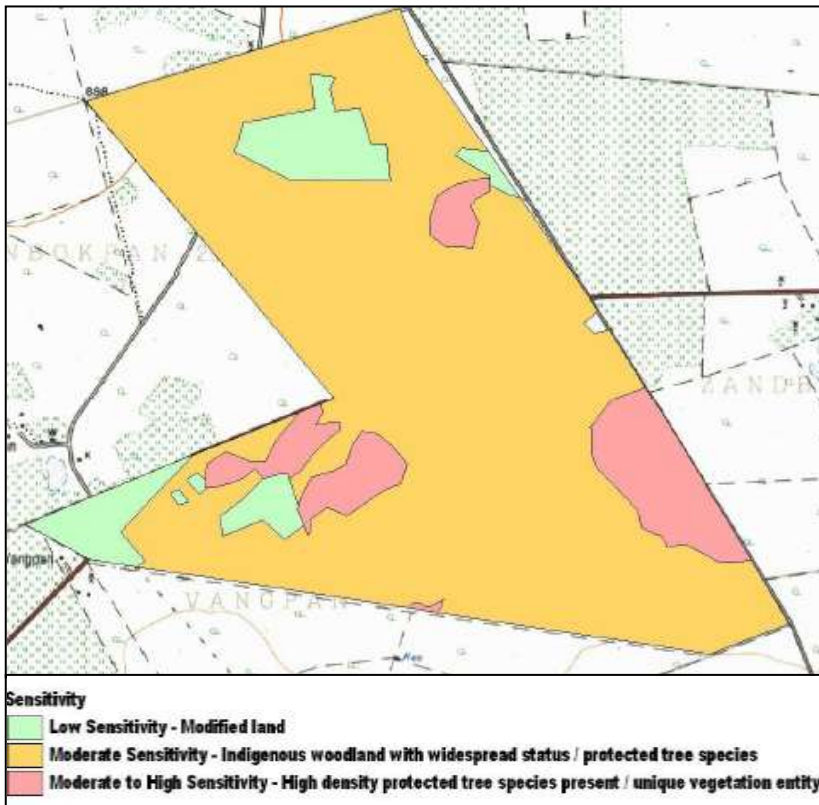
#### 6.2.3.9 Negative effect of human activities [LOW]

An increase in human activity on the site and surrounding areas is anticipated. The risk of snaring, killing and hunting of certain faunal species is increased. Certain faunal species may be captured for selling to the pet trade. If staff compounds are erected for construction workers, the risk of pollution because of litter and inadequate sanitation and the introduction of invasive fauna and flora are increased. The presence of a large number of construction workers or regular workers during the construction phase on site over a protracted period will result in a greatly increased risk of uncontrolled fires arising from cooking fires, improperly disposed cigarettes etc.

#### 6.2.4 Sensitivity Mapping

Factors which determined sensitivity classes were as follows:

- ↗ Presence, density and potential impact of development on rare, endemic and protected plant species
- ↗ Conservation status of vegetation units
- ↗ Soil types, soil depth and soil clay content
- ↗ Previous land use;
- ↗ State of vegetation



**Figure 24: Sensitivity map**

### 6.2.5 CONCLUSION

All aspects of the environment, especially living organisms, are vulnerable to disturbance of their habitat. If we can bring about a more integrated approach to living within our ecosystems, we are much more likely to save the fundamental structure of biodiversity. Positive contributions can be made even on a small scale such as within the solar plant development. All stakeholders need to be involved to avoid a loss of biodiversity in the area. The proposed development site will completely modify the natural vegetation and faunal habitats. The importance of rehabilitation and implementation of mitigation processes to prevent negative impacts on the environment during and after the development phase should be considered a high priority. Provided that the proposed layout plan is consistent with the sensitivity classification and the mitigation measures stipulated in this report are taken into consideration, the planned development can be supported.

### 6.3 AVI FAUNAL ASSESSMENT

AGES (Pty) Ltd was commissioned by Interdesign landscape Architects to conduct an avifauna study for the proposed Solar Plant.

Herewith extracts from the Report (**Refer Appendix P**).

The avifauna survey was conducted as follows:

- A site survey was done to identify potential habitats after identifying the broad vegetation types and micro-habitats. Avifauna observed on site or any specific indication of species was noted as confirmed in the species lists.
- A scoping survey was then conducted by comparing the habitat types identified with the preferred habitats of species occurring in the area.
- The data obtained from the surveys was then used to conduct an impact assessment and risk analyses for the proposed development.

#### 6.3.1 Broad bird habitats of the Savanna Biome represented in the study area

The Savanna biome in Southern Africa supports the highest diversity of bird species of all the biomes in the sub region. This includes such characteristic and colourful woodland birds as rollers, bee-eaters and waxbills, as well as large birds of prey such as vultures and eagles. The Golden-breasted Bunting is apparently unique in being found throughout the entire woodland biome.

#### **↻ Broadleaf woodland**

Woodland habitat, in its undisturbed state, is suitable for a wide range of birds – in fact the woodland species are the most species rich community. Relevant to this study is the fact that many power line sensitive raptor species utilize woodland extensively. It must be noted that large portions of the study area have been transformed, with the dominant activities being associated with cultivation, pastoralism and human settlement. As a result, a great deal of the natural vegetation within the study area has and is being transformed and subjected to severe pressure.

#### **↻ Farmland**

The agricultural habitats of Southern Africa range from pastures for grazing of livestock, through ploughed lands for the growing of crops such as maize, wheat and sugarcane, to the planting of commercial timber. These agricultural habitats sometimes cover extensive areas, and have become an artificial habitat that attracts a wide range of generalist species. Herons, storks, ibises, francolins, cranes, korhaans, plovers, pigeons and doves, larks, chats, pipits and starlings are attracted to the more open cultivated areas, while smaller species such as cuckoos, robins, sparrows, widows, finches, canaries and buntings are attracted to secondary growth around cultivation. Young crops attract gamebirds, especially guineafowl and quail, and grazing waterfowl like Spurwinged Goose and Egyptian Goose. Ploughed fields with recently sown grain crops also attract storks and cranes, which feed on the grain and thereby come into conflict with farmers.

### **6.3.2 Bird Microhabitats of the Study Area**

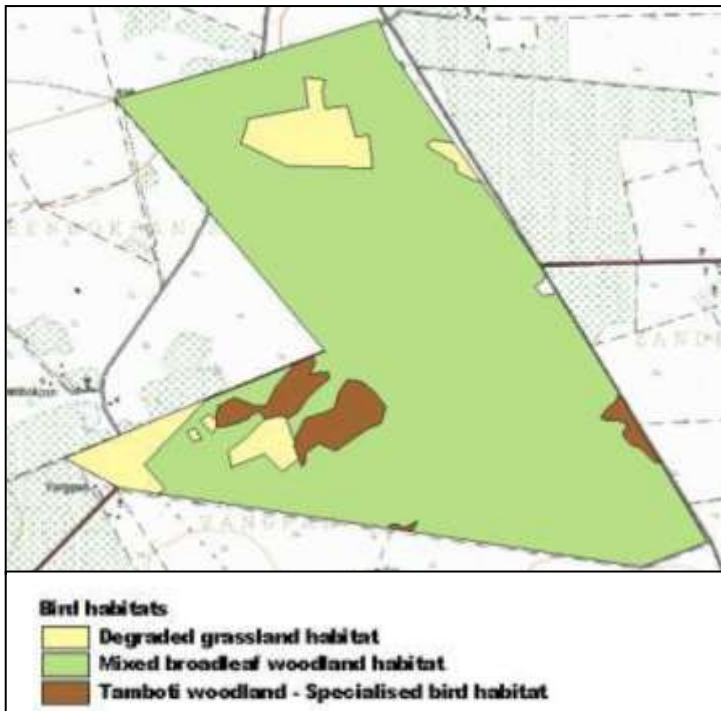
In this study area, the vegetation represented on site is mostly in a natural state, with only small transformed areas in the form of old cultivated fields, while small areas where slight encroachment of the woody layer and overgrazing where evident. A description of the micro habitats available to birds is useful to have a better understanding of the bird populations on site.

#### **↻ Mixed Broadleaf Woodland Habitat**

The mixed broadleaved woodlands represent most of the vegetation of the proposed development site and this area has quite a higher diversity of birds as a result of the diversity of plant species in this habitat type. Both microphyllous and broadleaf woodland features occur in the area, although the broadleaf woodland elements dominate the woody layer. This habitat is one of the best to look for White-bellied Korhaan and Meyer's Parrot. Other examples of typical broadleaved- woodland birds are Pallid Flycatcher and Green-capped Eremomela.

#### **↻ Degraded Grassland Habitat (old fields)**

The old fields occur on isolated areas of the site and represent short, degraded grassland as well as open secondary woodland. When cultivated fields are left fallow, it results in a landscape mosaic of patches of secondary vegetation varying in age and dominated by various grass species. Bird species such as crowned plovers, crested guinea fowls, francolin species as well as the birds of prey the smaller bird species attract utilize these areas. Although this microhabitat is in a degraded state, the area is a popular habitat for bird species, especially as foraging area, while species such as crowned plover and other smaller nonpasserine birds also breed on the ground in this area. The impact of human activities on the avifauna is limited considering it to be slightly further away from the township of Lephalale and Steenbokpan.



**Figure 25: Avifauna Habitat Map**

### 6.3.3 Relevant bird species

The area represents a diverse vegetation structure and height class. According to the existing databases and field survey the following number of birds species included in the IUCN red data lists can potentially be found in the proposed development sites

English Name	Conservation Status	Probability of occurring	Habitats on site	Probability of impact on species
Black Stork	Near threatened	Medium	Broadleaf woodland/ Old fields	Medium
Marabou Stork	Near threatened	Medium	Broadleaf woodland	High
Yellow-billed Stork	Near threatened	Very Low	None observed	High
Greater Flamingo	Near threatened	Very Low	None observed	Medium
Lesser Flamingo	Near threatened	Very Low	None observed	Medium
Secretary Bird	Near threatened	Medium	Broadleaf woodland	Medium
Cape Vulture	Vulnerable	Medium	Broadleaf woodland	High
White-backed Vulture	Vulnerable	Medium	Broadleaf woodland	High
Lappet-faced Vulture	Vulnerable	Medium	Broadleaf woodland	High
White-headed Vulture	Vulnerable	Medium	Broadleaf woodland	High
Tawny Eagle	Vulnerable	Medium	Broadleaf woodland	Medium
Martial Eagle	Vulnerable	Medium	Broadleaf woodland	Medium
Bateleur	Vulnerable	Medium	Broadleaf woodland	Medium
Kori Bustard	Vulnerable	Medium to High	Broadleaf woodland	Medium
White-crowned Lapwing	Near threatened	Medium	Broadleaf woodland/ Old fields	Low

Southern Ground-Hornbill	Vulnerable	Medium	Broadleaf woodland	Medium
Short-clawed Lark	Near threatened	Medium	Broadleaf woodland	Low
Red-billed Oxpecker	Near threatened	Medium	Broadleaf woodland	Low

**Table 7: Species potentially found on site**

**Observations and Recommendations:**

- ⚡ Examination of the data reveals that the report rates for most Red Data species according to the Bird Atlas Project of Southern Africa are relatively low to medium due to the large distribution range and limited habitat (e.g. shallow, open water habitats) of many of these species in the Savanna Biome.
- ⚡ It must be noted that many “non-Red Data” bird species also occur in the study area and will be impacted on by the proposed development.
- ⚡ The development would not have a significant impact on the above-mentioned red data avifauna since adequate natural habitat/vegetation would be available on the peripheral woodland habitats outside the study area.
- ⚡ The removal of vegetation should be confined to the footprints of the proposed developments and associated infrastructure. Development will not influence the natural feeding and movement patterns of the existing avifauna in the area to a significant extent considering that many species will still utilize recreational parks and gardens that form part of the development. Peripheral impacts on the larger area should be avoided
- ⚡ The protection of habitat types representative of the larger area will be important to ensure the survival of the different birds due to each species’ individual needs and requirements. Sufficient natural corridor sections should be protected around the proposed development footprints to allow avifauna to move freely between the different microhabitats in the study area. In this regard, the Marula woodland and Tamboti woodland on the proposed development area will be more than sufficient as corridors. The Tamboti woodland and dense Marula woodland area represent sensitive avifauna habitat.
- ⚡ The few taller (>3m) indigenous trees within this area also provide resting/perching sites for larger birds like vultures and birds of prey might occur/pass through the area and, other than the proposed footprint area for the development, should preferably be preserved. These larger trees should be protected as far as possible and be incorporated into the proposed development. A monitoring programme needs to be implemented by a specialist if any rare species are confirmed on the property.

**The cumulative negative impact of the development on the fauna has the potential to be moderate. However, considering the following general mitigation and management actions taken on site during construction, the impact on avifauna populations should be low:**

- ⚡ Where trenches pose a risk to bird safety, they should be adequately cordoned off to prevent ground-living birds falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling of trenches during construction process.
- ⚡ No birds may be poached during construction. Many birds are protected by law and poaching or other interference could result in a fine or jail term.
- ⚡ Do not feed any birds on site.
- ⚡ The occurrence of the vulture species will be influenced by the availability of carcasses and adequate roosting and nesting sites on the property.
- ⚡ Poisons for the control of problem animals should rather be avoided since the wrong use thereof can have disastrous consequences for the vulture species as well as other birds of prey occurring in the area. The use of poisons for the control of rats, mice or other vermin should only be used after approval from an ecologist
- ⚡ The habitat and feeding grounds of the water birds would be on the peripheral areas of the small pans in the area. None of these habitats occur on site and the impact on these bird species in the study area will therefore be restricted to areas where the birds perch.
- ⚡ Monitoring of the environmental aspects should be done over the longer term to ensure that impacts are limited to a minimum during the constructional and operational phases. Monitoring of specific bird species is necessary to ensure that these species would be unaffected over the longer term by the

development. Information on red data species should be provided to construction workers to make them more aware of these fauna and their behavior.

#### 6.3.4 Direct Impacts of the proposed development on Avifauna

**Direct Habitat Destruction:** The construction phase will result in loss of and damage to natural bird habitats. During the construction phase and maintenance of this infrastructure, some habitat destruction and alteration inevitably takes place. However re-growth of grass under the solar panels will take place as the mounting systems are at least 1m above ground level. At the end of the lifetime of the solar plant, structures will be removed and natural vegetation will re-establish naturally. The lower vegetation layer will have to be cleared of excess vegetation at regular intervals in order to allow access to the area for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the solar panels and power line conductors and to minimize the risk of fire which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat. Rehabilitation of some of these areas would be possible but there is likely to be long-term damage in large areas.

##### Mitigation measures:

- The removal of indigenous trees and shrubs should only occur on the footprint area of the development and not over the larger area. No trees may be trimmed or removed without the prior permission of the landowner and only protected trees can only be eradicated after permits have been obtained from Department of Forestry. The clearing and damage of plant growth in these areas should be restricted to the footprint way leave area.
- Clearly demarcate the entire development footprint prior to initial site clearance and prevent construction personnel from leaving the demarcated area.
- Monitoring should be implemented during the construction phase of the Photovoltaic Power Plant to ensure that minimal impact is caused to the fauna of the area.

**Habitat fragmentation:** The development will have a relatively large impact on the natural movement patterns and fragmentation of avifauna habitats. Such impacts would however be temporary in the solar plant site.

##### Mitigation measures:

- Use existing facilities (e.g., access roads) to the extent possible to minimize the amount of new disturbance.
- Ensure protection of important resources by establishing protective buffers to exclude unintentional disturbance. All possible efforts must be made to ensure as little disturbance as possible to sensitive bird habitats during construction.
- During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, in order to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place
- Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas.

**Electrocutions:** Electrocution of birds on overhead line connections associated with the Photovoltaic Power Plant is an emotional issue as well as an important cause of unnatural mortality of raptors and storks. However, in the context of overhead lines, electrocutions are not a major issue. Electrocution refers to the scenario where a bird is perched or attempts to perch on the electrical structure and causes an electrical short circuit by physically bridging the air gap between live components and/or live and earthed components (van Rooyen 2004). Due to the large size of the clearances on most overhead lines in the area, electrocutions are generally ruled out as even the largest birds cannot physically bridge the gap between dangerous components. In fact, transmission lines have proven to be beneficial to many birds, including species such as Martial Eagles, Tawny Eagles, African White-backed Vultures, and even occasionally Verreaux's Eagles by providing safe nesting and roosting sites in areas where suitable natural alternatives are scarce (van Rooyen 2004). Cape Vultures have also taken to roosting on power lines in certain areas in large numbers (van Rooyen 2004a), while Lappet-faced Vultures are known to use power lines as roosts, especially in areas where large trees are scarce. Electrocution on the proposed power line is improbable given the adequate clearances.

**Mitigation measures:**

- ⚡ Power line structure can present electrocution hazards to birds when less than adequate separation exist between energized conductors or between energized conductors and grounded conductors. Avian-safe facilities can be provided by one or more of the following mitigation measures:
  - Increasing separation between abovementioned conductors to achieve adequate separation for the species involved (larger birds, raptors).
  - Covering energized parts and/ or covering grounded parts with materials appropriate for providing incidental contact protection to birds.
  - Applying perch managing techniques such as conspicuous objects and support roosting sites along the power line that would allow large raptors and bustards to safely roost.

**Collisions with associated power lines and solar panel infrastructure:** Collisions are the biggest single threat posed by transmission lines to birds in southern Africa (van Rooyen 2004). Most heavily impacted upon are bustards, storks, cranes and various species of water birds. These species are mostly heavy-bodied birds with limited maneuverability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (van Rooyen 2004, Anderson 2001). Solar installations often feature large areas of reflective paneling. Any vertical, reflective surfaces may confuse approaching birds with the result that numbers are disorientated and displaced from the area, or else killed in collisions with such surfaces. Other bird species may seek to benefit from the solar installations, using the erected structures as prominent perches, sheltered roost sites or even nesting or foraging sites. Such scenarios might be associated with fouling of critical components in the solar array, bringing local bird populations into conflict with the facility operators.

**Mitigation measures:**

- ⚡ The high-risk sections of line should be marked with a suitable anti-collision marking device on the earth wire as per the Eskom guidelines.
- ⚡ Should birds collide with the solar panels, efforts should be made to restrict access by birds into the relevant, hazardous areas of the facility.
- ⚡ Specialist advice should be sought in devising effective avian deterrents to minimize associated damage.

**Disturbance of human activities and noise:** Similarly, the above mentioned construction and maintenance activities impact on birds through disturbance, particularly during breeding activities.

**Mitigation measures:**

- ⚡ Care should always be taken to disturb the receiving environment as little as possible.
- ⚡ Careful control of construction workers movements must be maintained at all times.
- ⚡ Staff that will stay on site should be accommodated in one location of the site to ensure that the impact will be minimal on the larger area.
- ⚡ Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas.
- ⚡ Construction activities must be restricted to working hours Monday to Saturday, unless otherwise approved by the appropriate competent person in consultation with the affected residents.
- ⚡ Educate workers regarding the occurrence of important resources in the area and the importance of protection.
- ⚡ Instruct employees, contractors, and site visitors to avoid harassment and disturbance of wildlife, especially during reproductive (e.g. courtship, nesting) seasons. In addition, control pets to avoid harassment and disturbance of wildlife.
- ⚡ Camp fires at construction sites must be strictly controlled to ensure that no veld fires are caused.
- ⚡ Noise levels will be kept within acceptable limits by:
  - Limiting of speed of haulage vehicles/tippers;
  - Compliance with appropriate noise legislation must take place

**6.3.5 Impact Assessment Matrix**

The table below indicates the impacts described above and specific ratings of significance the impact will potentially have on the avifauna during the power line development.

Impacts	Probability	Duration	Scale	Magnitude (WOM)	Magnitude (WM)	Scoring (WOM)	Scoring (WM)
1. Direct habitat destruction	5	5	1	6	2	66 (High)	22 (Low)
2. Habitat fragmentation	5	5	2	6	2	72 (High)	24 (Low)
3. Electrocutation	1	5	1	6	2	42 (Moderate)	14 (Negligible)
4. Collisions	4	5	1	6	2	60 (Moderate-high)	20 (Negligible-low)
5. Disturbances	5	3	2	6	2	54 (Moderate)	18 (Negligible)

**Table 8: Impact assessment Matrix**

### 6.3.6 Discussion and Conclusion

It was found from an avifauna perspective that the proposed development would be suitable due to the following aspects:

- Only small sections of natural bird habitats will be modified through the development considering the vegetation types (Limpopo Sweet Bushveld) as an entity. However, the impact should still be monitored during constructional phase to prevent any negative impacts on the surrounding natural areas.
- Furthermore, considering that the current power lines in the area as well as proposed future power lines planned by Eskom for the site, the impact on the avifauna population of the proposed development site and surrounding areas will be limited as a result of the following aspects:
  - It is either close to or will be adjacent to existing or planned power lines for most of its route in the future or at present. This means that habitat destruction, and disturbance of birds will be less significant as the area is already disturbed to some extent.
  - It will also mean that electrocution of birds is less likely on the connection lines as for the large transmission lines which it connects to is significantly taller and it is likely that birds such as vultures would choose to perch on the taller lines.
  - Building the Photovoltaic Power Plant and the connection line close to existing power lines should to a certain extent eliminate the need for new access roads and gates etc. This would reduce the level of disturbance and habitat destruction. In addition, birds in the immediate vicinity of the existing power line would already be relatively tolerant of disturbance as a result of maintenance activities on the already established lines.
  - The impact of collision of birds is partially mitigated for by placing new infrastructure close to existing lines for the following reasons:
    - The more overhead power lines and other associated infrastructure there are together, the more visible they would be to the birds in the area (Avian Power Line Interaction Committee - 1994).
    - Resident birds in an area become accustomed to a power line that crosses their flight paths, and learn to avoid it during their everyday activities. Hence adding a new small connection line and Photovoltaic Power Plant adjacent to existing lines would probably have less impact than putting it in a totally new area, where the resident birds are not yet accustomed to overhead power lines.
    - Spatially, it makes more sense to have all the threats to birds (in particular through collision) in one relatively confined area, rather than spread out across the landscape. As many bird species are territorial to some extent, keeping the development impacts confined to a smaller area could potentially impact on fewer birds.

The proposed Photovoltaic Power Plant, connecting power line and other associated infrastructure would have some impact on the avian habitats of the area, and strict mitigation should be implemented to limit the impacts to a minimum if possible. Considering the layout and design of the proposed development as well as the impact assessment; the extent of the habitat that will be affected will be reduced by mitigation and design principles. Provided that the mitigation measures and recommendations in this report are adhered to, it is unlikely that the proposed development will have a long-term, significant negative impact on the local



avifauna.

## 6.4 SOCIO ECONOMIC ENVIRONMENT

*[Regulation 31(2)(d)]*

The properties are located in the Steenbokpan area, ±42km west Ellisras/Lephallale town area along Road D1675 towards Lephallale. The Farms fall within the jurisdictional boundaries of the Lephallale Local Municipal area in the Waterberg District. According to the Lephallale Spatial Development Framework (SDF) the area between Lephallale, the Stockpoort node and the Steenbokpan node will significantly be spatially re-defined. At present Steenbokpan is known as a local service point. In terms of the Lephallale SDF the Steenbokpan node has been identified as the Potential Development Area 1 (Steenbokpan node) PDA1.

This area is very prominent for future development as this is an area where mining production is either in progress or where mineral reserves are found. The Municipality has acknowledged that this area should become a priority area and therefore they included it in the SDF as a potential development area/node. The SDF action plan together with Map 4 of the SDF furthermore indicates that the specific development area of Portion 1 of the farm Steenbokpan, 295-LQ and the Remainder of the farm Vangpan, 297-LQ lies within an industrial corridor that links Steenbokpan with the Lephallale/Ellisras town area.

### 6.4.1 SOCIAL ENVIRONMENT AND SURROUNDING LAND USES

The farm portions are situated in the Lephallale Local Municipality of the Waterberg District, along the Steenbokpan Road approximately 50km west of the town Lephallale in the Limpopo Province. The D1675 passes through the proposed development site. The direct surrounding land-uses are as follows:

- ↗ To the North - Mixed Agricultural uses;
- ↘ To the South - Department of Minerals and Energy, mining and prospecting uses;
- ↔ To the East - Mixed Agricultural uses; and
- ↖ To the West - Mixed Agricultural uses.

### 6.4.2 LOCAL PLANNING INITIATIVES

#### 6.4.2.1 WATERBERG SPATIAL DEVELOPMENT FRAMEWORK

The purpose of a Spatial Development Framework is to provide general direction to decision-making and action over a multi-year period. Spatial Planning can be defined as being “a high level planning process that is inherently integrative and strategic, that takes into account a wide range of factors and concerns and addresses the uniquely spatial aspects of those concerned”.

The Waterberg District Municipality’s Spatial Development Framework acknowledges the competition that exists between mining, residential development and the environment. It further states that the local municipalities have a responsibility to demarcate an urban edge within the boundaries of which, the municipality will endeavour to upgrade the levels of servicing. Beyond the urban edge it is envisaged that the rural communities will enjoy lower density environments. Lephallale is already a provincial growth point. Amongst the minor nodes that exist is Steenbokpan, within which area the proposed development lies.

#### 6.4.2.2 LEPHALALE SPATIAL DEVELOPMENT FRAMEWORK, 2012

*(Refer Appendix Q for site in relation to SDF). Information below extracted from the Integrated Development Plan 2012 – 2013.*

A Spatial Development Framework (SDF) is regarded as an integral part of the IDP as required by Section 26 of the MSA Act of 2000 (Act 32 of 2000). In terms of the act, the SDF “must include the provision of basic guidelines for a land use management system for the Municipality”. However, a spatial development framework is not a one dimensional map or plan. It seeks to arrange development activities, land uses and the build form in such a manner that they can accommodate the ideas and desires of the people without compromising the natural environment and how services are delivered. A fine balance must be maintained at all times; too much emphasis on one element can harm the system, if development happens too quickly infrastructure provision may not keep up as we have experienced within our Municipality.

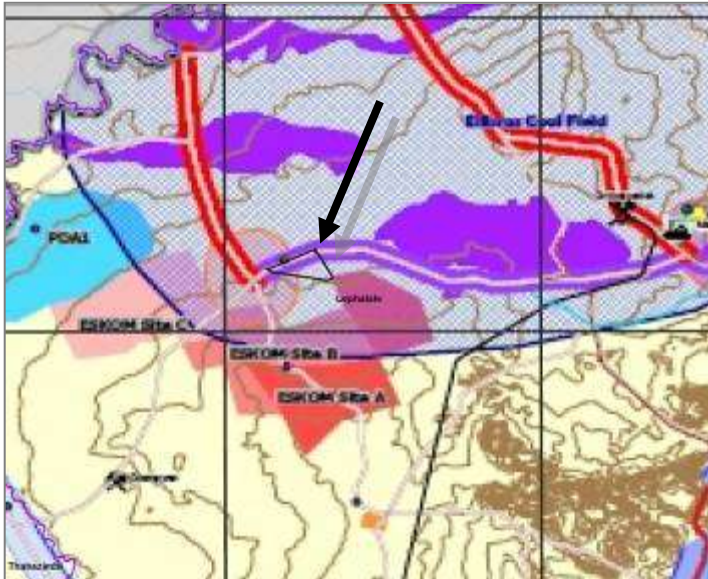
**Potential Development Area 1 (Steenbokban node).**

Steenbokpan was correctly identified as a future development node in the previous SDF. Noting national development pressures on the municipality, the area is upgraded to a level of a potential development area.

Potential Development Areas 1 and 2 are part of the area zoned mining. This zone is further categorised into mining one and mining 2. Mining one denotes areas where mining production is in progress. Mining 2 on the other hand, depicts areas with known mineral reserves whose economic viability has not been established. Energy demand in the country and international petroleum market resuscitated demand for coal based products. The coalfields west of the Lephalale town are expected to be a theatre to stage the new power station already in progress and the potential “Mafutha” project by SASOL. Anglo coal is known to be involved in exploration activities in this area. It is expected that beneficiation of coal to either gas or liquid will require certain down and upstream industries in close proximity. For this, certain special development considerations need to be conceded to support the development of these industries. These are development of national magnitude in terms of addressing the energy issues and their contribution to ASGISA in terms of job creation.

Potential Development Area 1 is designated to accommodate developments of this nature. It involves the entire coal reserve up to the border of Botswana. Steenbokpan is the epicentre of this PDA. This means that specialized developments such as industrial parks, residential developments linked to operations may be considered through special resolution of Council.

According to the SDF 2012 Map 4, the application site lies along an industrial corridor and the proposed Eskom project areas A, B and C which are located to the south. A local service point is also located to the west of the site. As the project proposal entails a solar farm it is anticipated that it will be in line with the future trends of the area.



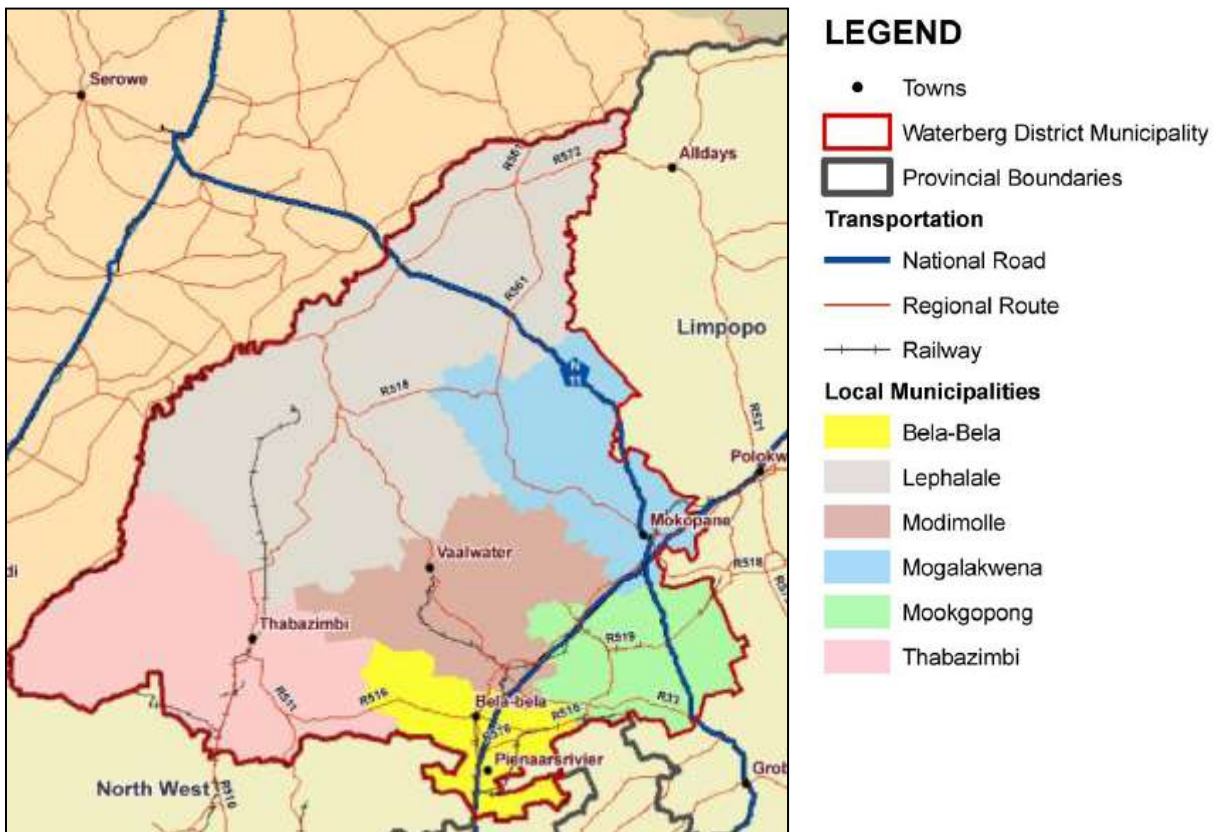
**Figure 26: SDF 2012 indicates site lies along an Industrial Corridor**

**6.4.2.3 ENVIRONMENTAL MANAGEMENT FRAMEWORK (EMF) FOR THE WATERBERG DISTRICT, 2010**

(Portions of the text below has been extracted directly from the EMF)

The Environmental Management Framework (EMF) is an initiative of the National Department of Environmental Affairs (DEA) in partnership with the Limpopo Department of Economic Development, Environment and Tourism (LDEDET), and the Waterberg District Municipality (WDM).

The EMF will support decision-making in the Waterberg District Municipality area in order to facilitate appropriate and sustainable development. The EMF integrates policies and frameworks and aligns government mandates to streamline decision-making and to improve cooperative governance. The EMF has a number of specific objectives, which include identifying the *status quo*, development pressures and trends in the area and development of a decision support system for development in the area to ensure that environmental attributes, issues and priorities are taken into account.



**Figure 27: Locality Map Waterberg District**

The requirements of the EMF have been considered and the development proposal's adherence thereto investigated. In the sections below specific requirements applicable to the affected area have been identified and the development proposals adherence thereto is highlighted.

**6.4.2.4 ENVIRONMENTAL MANAGEMENT ZONES**

A sensitivity analysis together with the structural spatial elements (towns, villages, mineral resources, economic activities, etc.) was identified and provides the basis for the development of Environmental Management Zones classified by the EMF. Based on the findings contained in the draft Desired State Report, which formed part of the compilation of the EMF it was decided to do further analysis on the following aspects in order to refine a spatial base that would be relevant and accurate for the identification of Environmental Management Zones:

- ⚡ General environmental sensitivity (ecological and landscape);
- ⚡ Conservation planning (current protected areas and potential expansion areas);
- ⚡ Water production priority areas; and
- ⚡ Agricultural intensity (footprint).

The development area falls in Zone 5 of the EMF, within a major infrastructure corridor.

**ZONE 5 - POTENTIAL LARGE INDUSTRIAL AND RELATED ACTIVITIES FOCUS AREA (MAJOR**

**INFRASTRUCTURE CORRIDOR WITHIN ZONE 5)**

This zone represents areas in close proximity to major coal fields which are being considered for the development of industrial activities to benefit the mineral product and where infrastructure like power generation facilities are being considered. The zone’s relationship to existing and likely future transportation infrastructure and necessary urban development is also important.

**PREFERRED, COMPATIBLE AND UNDESIRABLE DEVELOPMENTS:**

**Preferred activities**

- ⌘ Heavy industrial activities that operate within national standards that regulate pollution;
- ⌘ Urban support functions such as residential and commercial development that is directly related to large industries of national magnitude and in accordance with the local authority approval process;
- ⌘ Support services and light industrial activity directly related and in support of the heavy industrial activities;
- ⌘ Keeping of game and/or cattle for commercial purposes in a responsible manner that makes sustainable use of the natural vegetation cover of the area in parts where industry and related activities are not possible or where industry will only become a factor in the medium to long term;
- ⌘ Tourism facilities on disturbed land, including hunting lodges (indigenous vegetation should not be removed) in parts where industry and related activities are not possible or where industry will only become a factor in the medium to long term.

**Compatible activities**

- ⌘ Existing farming activities;
- ⌘ Roads, railways and other infrastructure that is necessary for the safe and proper transportation of industrial products and people.

**Undesirable activities**

- ⌘ Any activity that does not meet national standards in terms of pollution of the air, water or land.
- ⌘ Uncoordinated and/or fragmented urban areas, industry and infrastructure that results in lower efficiencies, higher costs, greater environmental impact and the area not reaching its full economic and social potential.
- ⌘ Proclamation of any land use including conservation that would reduce the industrial potential of the area.

**PREFERRED, COMPATIBLE AND UNDESIRABLE ACTIVITIES WITHIN THE MAJOR INFRASTRUCTURE CORRIDORS ARE AS FOLLOWS:**

**Preferred activities**

- ⌘ Linear infrastructure including major roads, railway lines, electricity distribution lines, pipelines, etc.

**Compatible activities**

- ⌘ Existing farming activities;
- ⌘ Keeping of game and/or cattle for commercial purposes in a responsible manner that makes sustainable use of the natural vegetation cover of the area; and
- ⌘ Existing linear infrastructure.

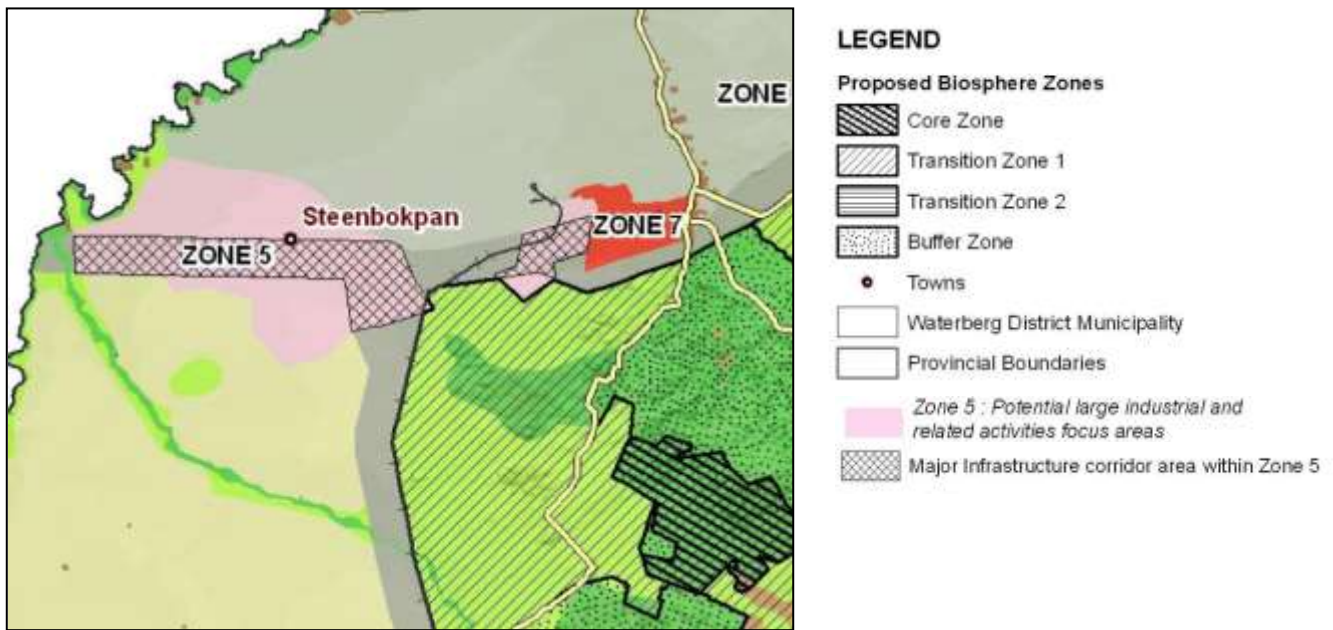
**Undesirable activities**

- ⌘ Any activity or development that will compromise the functioning of the areas as a corridor.

***The development proposal is considered in line with the objectives of the Environmental Management Zones.***

**6.4.2.5 WATERBERG BIOSPHERE RESERVE**

The Farm boundaries forming part of this application does not extend into any zone of the identified Waterberg Biosphere Reserve. Zone 5 is applicable to this application. **Refer to Figure 28.**



**Figure 28: Area (Zone 5) not affected by the Biosphere Reserve**

#### 6.4.2.6 ENVIRONMENTAL MANAGEMENT GUIDELINES

In order to give guidance on certain important environmental issues, guidelines on the following issues have been included in the EMF:

- ~ Solid waste management and recycling;
- ~ Sewage disposal;
- ~ Transformation of land;
- ~ Duty of care and remediation of environmental damage;
- ~ Compensative investment;
- ~ Stream flow management; and
- ~ Eradication of alien vegetation.

#### 6.4.2.7 TRANSFORMATION OF LAND

The transformation of land in Zone 5 will over time lead to this zone being developed to its full potential. This zone entails areas that are within close proximity to major coal fields where infrastructure like power generation facilities are being considered. The development proposal is in line with the planning initiatives that have been highlighted in the EMF for this particular zone, namely the solar plant.

- ~ Transformation of land should take the goals and targets of government as reflected in policies, legislation and other documents into account. Relevant legislation and documents include:
  - The National Environmental Management Act, 1998 (Act 107 of 1998) as amended (and its regulations);
  - The Limpopo Environmental Management Act, 2003 (Act 7 of 2003);
  - The National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004) as amended (and its regulations);
  - The National Spatial Biodiversity Assessment, 2004 (and its technical support documents) ;
  - The Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) as amended;
  - The National Forest Act, 1998 (Act 84 of 1998) as amended; and
  - The Municipal Systems Act, 2000 (Act 32 of 2000).

***The proposal entails a solar farm. The development footprint will be subject to the mitigation measures provided in the EMPr and those specified in the biodiversity assessments.***

#### 6.4.2.8 DUTY OF CARE AND REMEDIATION OF ENVIRONMENTAL DAMAGE

In performing their compliance and monitoring and enforcement duties, the relevant national and provincial officials should ensure that any activities that are inconsistent with the objectives of an Environmental Management Zone, trigger the duty of care mechanism in NEMA.

***The activities proposed are not considered to be in conflict with the specifications and requirements of Zone 5.***

#### 6.4.2.9 SUSTAINABLE DEVELOPMENT CONTEXT

There are many definitions of sustainable development which may apply to a greater or lesser extent to the district. What is however important in this particular instance is that it should be focussed on all of the following, failing which the concept itself will in all likelihood not be sustainable in the district:

- ⌘ It must ensure the adequate and appropriate protection of biodiversity in the district.
- ⌘ It must ensure that the surface water resource in the area is managed in a manner that will ensure that it continues to provide in the needs of the area and that the water that is returned to the system is of an acceptable quality.
- ⌘ It must ensure that the quantity and quality of the groundwater in the area is protected and kept at a level and quality where it can continue to sustain the activities that depend on it, especially rural communities
- ⌘ It must ensure a continued and even increased income for the district and especially its poor communities.
- ⌘ It must provide for increased levels of employment and better types of employment.
- ⌘ It must provide incentives for the establishment of a more balanced population structure especially in respect to the age, health and general prosperity of the population.

***The proposal entails a solar PV farm and is not considered to be in conflict with the specifications and requirements of Zone 5. With the construction of this component additional permanent jobs will be created during the operational phase. During the construction phase several temporary jobs will also become available.***

### 6.5 HERITAGE IMPACT ASSESSMENT

J van Schalkwyk (D Litt et Phil), Heritage Consultant was commissioned to conduct a Heritage Impact Assessment on the subject property. Below are extracts from the report. ***(Refer to Appendix J)***.

#### 6.5.1 REGIONAL OVERVIEW

##### Prehistoric period

Probably because of the somewhat inhospitable environment, being very flat, hot and dry (average rainfall of 436 mm per annum) and with few sources of surface water, people did not settle in large numbers in the area in the past. In the larger region, in areas where there are outcrops, especially close to rivers, rock art sites have been documented. The ones closest to the study area are located on the farm Grootfontein 501 - LQ, on the northern outskirts of the town of Lephalale. Other rock art sites are found further away to the south and the east. At Nelson's kop some interesting engravings of animal tracks, cupules and cut marks were identified on the southern face of the hill. Early and Later Iron Age sites are similarly found to the south and the east, as well as to the north. As these people were agro-pastoralists (and did not have the technology to extract subterranean water), they preferred to settle in areas where such resources were readily available.

##### IDENTIFIED SITES

###### Stone Age

No sites, features or objects of cultural significance dating to the Stone Age were identified in the study area.

###### Iron Age

No sites, features or objects of cultural significance dating to the Iron Age were identified in the study area

###### Historic period

The following sites, features or objects of cultural significance dating to the historic period were identified in the study area (Remainder of the Farm Vangpan 294 LQ):

- An informal burial place with 3 marked graves, although there might be more that are not properly marked located on the Remainder of the farm Vangpan 294 LQ - it is recommended that this feature is formally fenced off with a buffer zone of at least 20 metres from the centre of the middle grave. This large buffer is necessary to accommodate possible unmarked graves. **The recommended 20 meter buffer zone will be implemented by means of a fence.**



**Figure 29: The informal cemetery (Three marked graves)**

- A small memorial dedicated to a person identified as Assie, who died on this spot in an aeroplane crash in 1995 also located on the Remainder of the farm Vangpan 294 LQ - **this feature is already fenced off and does not require further fencing.**



**Figure 30: The memorial**

## 6.5.2 CONCLUSION

**From a heritage point of view it is recommend that the proposed development can continue, on condition of acceptance of the above mitigation measures. If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage consultant so that an investigation and evaluation of the finds can be made.**

## SECTION 7: PUBLIC PARTICIPATION PROCESS

### Regulation 28 (1) (h) (k) & (m)

#### 7.1 PROCESS FOLLOWED TO DATE

The public participation process is being conducted in terms of Chapter 6 of the EIA Regulations, 18 June 2010.

The initial public participation process undertaken by ILA, commenced on **17 August 2012** and included the following:

- ☞ A legal notice was placed in a local newspaper, The Mogol Pos/ Post;
- ☞ Site notices were placed at the main gate entrance to the site and at the fence along Steenbokpan Road
- ☞ Key stakeholders and/or Interested and Affected Parties (I&AP's) were notified by registered post, e-mail and fax.

##### 7.1.1 NEWSPAPER ADVERTISEMENT

An advertisement, notifying the public of the EIA process and inviting I&AP's to participate in the process by registering their comments with ILA (full contact details provided), was placed in the Mogol Pos/ Post on 17 August 2012 (Refer to **Appendix R** for copy of advertisement placed)

##### 7.1.2 SITE NOTICE

In order to notify the surrounding communities and immediate adjacent landowners of the proposed development, as well as inviting them to participate in the EIA process by registering their comments with ILA (full contact details provided), two site notices were erected on 17 August 2012 in visible locations (Refer to **Appendix S** for proof of A4 copies of site notice).



**Figure 31 & 32: Site Notice at main entrance gate to the site**





**Figure 33 & 34: Site Notice at fence along Steenbokpan Road**

### 7.1.3 DIRECT NOTIFICATION OF IDENTIFIED I&AP's

A Background Information Document (BID) with comment and registration sheet was prepared and distributed to key stakeholders (**Refer to Appendix T for a copy of the BID, Registration sheet, acknowledgment of receipt and proofs that stakeholders were notified**).

### 7.1.4 DATABASE

A database has been compiled containing details of identified stakeholders. The database will be continually updated throughout the EIA Process. Please refer to **Appendix U** for the database. The following State Organisations / Representatives / Institutions/ Stakeholders were notified by email:

- ~ Eskom;
- ~ Telkom;
- ~ WESSA;
- ~ Birdlife Africa;
- ~ EWT;
- ~ Waterberg Biosphere Reserve;
- ~ Various Divisions at the Lephalale Local Municipality;
- ~ DAFF;
- ~ DMR;
- ~ Department of Roads and Transport;
- ~ LDEDET;
- ~ DWA;
- ~ Department of Rural Development and Land Reform;
- ~ Transnet;
- ~ Steenbokpan Development Consortium;
- ~ Department of Agriculture; and
- ~ SANRAL.

The following key stakeholders were notified by post:

- ~ Eskom Holdings Ltd;
- ~ Exxaro Coal Pty Ltd;
- ~ Grenecorp CC;
- ~ Sasol Mafutha Pty Ltd;
- ~ Resgen South Africa Pty Ltd
- ~ Sunfox 33 Pty Ltd; and



~ Teozicht Trust.

The Ward Councillor Mr Frans Magwai was contacted via fax.

A register (I&AP database) has been opened and is being maintained which contains the contact details of:

- ~ All persons / institutions that have submitted comments up to date;
- ~ All persons / institutions that have requested to be included in the database'
- ~ All organs of State which have jurisdiction in respect of the activity.

(Refer to **Table 9** below for a copy of the I&AP database)

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

	Title	First Name	Last Name	Company	E-mail/ Post/ Fax/ Tel
<b>Service Provider</b>	Mr	Elias	Letsie	Telkom	letsiee@telkom.co.za
<b>Service Provider</b>	Mr	Annelien	Pretorius	Eskom	PretoAnn@eskom.co.za
<b>Service Provider</b>	Mr	Hannes	Van Rensburg	Eskom Environmental Division	Hannes.vRensburg@eskom.co.za
<b>Service Provider</b>	Ms	M	Divhani	Lepelle Northern Water	divhanim@lepelle.co.za
<b>Service Provider</b>	Ms	P	Khosa	Eskom Distribution Northern Region	khosapt@eskom.co.za
<b>Stakeholder</b>	Ms	Claire	Taylor	Endangered Wildlife Trust	clairet@ewt.org.za
<b>Stakeholder</b>	Mr	Paul	Bartels	WESSA	bartpaul@gmail.com
<b>Stakeholder</b>	Ms	Karen	Marx	WESSA	info@wessanorth.co.za
<b>Stakeholder</b>	Ms	Pam	Barret	Birdlife Africa	info@birdlife.org.za
<b>Stakeholder</b>				Waterberg Biosphere Reserve	info@waterbergbiosphere.org
<b>Stakeholder</b>	Ms	Carolyn	Ingram	Waterberg Nature Conservancy	carolyn_ingram@telkomsa.net
<b>Stakeholder</b>				Birdlife South Africa	info@birdlife.org.za
<b>Stakeholder</b>	Mr	Daniel	Marnewick	Birdlife South Africa	iba@birdlife.org.za
<b>Stakeholder</b>	Ms	Cheryl	Dehning	Tree Society South Africa	dehining@mweb.co.za
<b>Stakeholder</b>				Dendrological Society South Africa	dendrosoc@esnet.co.za
<b>Stakeholder</b>	Mr	HA	De Lange	SA Hunters & Game Conservation Association	waterberg@sahunt.co.za
<b>Stakeholder</b>	Mr	Franz	Rolinck	Limpopo Provincial Conservancy Association	franz@livinggolf.com
<b>Stakeholder</b>	Ms	Pauline	Stacey	Limpopo Conservancy Association	spauline@iafrica.com
<b>Stakeholder</b>				Limpopo Tourism and Parks	info@golimpopo.com
<b>Stakeholder</b>	Ms	Maggy	Kgwantha	Lephalale Ward Councillor Co-ordinator	maggy.kwantha@lephalale.gov.za
<b>Stakeholder</b>				Waterberg Tourism & Parks Resource Centre	waterberg@golimpopo.com
<b>Local Authority</b>	Mr	AS	Naidoo	Lephalale Local Municipality Municipal Manager	Bob.Naidoo@lephalale.gov.za
<b>Local Authority</b>		Agrey	Nailana	Lephalale Local Municipality Traffic Division	Agrey.nailana@lephalale.gov.za
<b>Local Authority</b>	Mr	Joshua	Hlapa	Lephalale Local Municipality Waste Management	Joshua.hlapa@lephalale.gov.za
<b>Local Authority</b>	Mr	Kobus	Roux	Lephalale Local Municipality Parks Division	Kobus.roux@lephalale.gov.za
<b>Local Authority</b>	Mr	April	Shiko	Lephalale Local Municipality Water Services	April.shiko@lephalale.gov.za
<b>Local Authority</b>	Mr	Andrew	Leseka	Lephalale Local Municipality Sanitation	Andrew.leseka@lephalale.gov.za

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<b>Local Authority</b>	Mr	Eddie	Jacobs	Lephalale Local Municipality Electrical Services	Eddie.Jacobs@lephalale.gov.za
<b>Local Authority</b>		Rudzani	Ngobeli	Lephalale Local Municipality Public Works	Rudzani.ngobeli@lephalale.gov.za
<b>Local Authority</b>	Mr	Leonard	Sole	Lephalale Local Municipality Development Planning & Services	Leonard.sole@lephalale.gov.za
<b>Local Authority</b>	Mr	Phathutshedzo	Siebe	Lephalale Local Municipality Development Planning	014 717 3886 (F)
<b>Ward Councillor</b>	Cllr	Bertha	Koadi	Ward 2	072 633 1183
<b>Ward Councillor</b>	Cllr	Stephanus	Snyders	Ward 4	stef.snyders@exxaro.com
<b>Ward Councillor</b>	Cllr	Frans	Magwai	Ward 3	014 763 5662 (F)
<b>Provincial Authority</b>	Mr	Enock	Makhubele	DAFF	EnockM@daff.gov.za
<b>Provincial Authority</b>	Mr	A	Matukane	DWA Chief Director Limpopo	Matukaa@dwa.gov.za
<b>Provincial Authority</b>	Ms	Portia	Ramalamula	SAHRA Limpopo	pramalamula@lt.sahra.org.za
<b>Provincial Authority</b>	Mr	Dumisani	Sibiya	SAHRA Head Office	dsibayi@sahra.org.za
<b>Provincial Authority</b>	Ms	Essy	Letsoalo	Department of Rural Development & Land Reform	EMLetsoalo@sghq.pwv.gov.za
<b>Provincial Authority</b>	Mr	Lebea	Motlatsi	Commission- Restitution of Land Rights	MELebea@ruraldevelopment.gov.za
<b>Provincial Authority</b>	Mr	S	Penn	Department of Agriculture - Waterberg District	penns@agricho.norprov.gov.za
<b>Provincial Authority</b>	Mr	Phineas	Makomene	Department of Public Works - Waterberg Shared Service Manager	makomeneM@dpw.limpopo.gov.za
<b>Provincial Authority</b>	Mr	A	Kaseke	Department of Public Works - Waterberg Infrastructure	kasekea@dpw.lompopo.gov.za
<b>Provincial Authority</b>	Mr	A K	Kharivhe	DMR Limpopo Regional Manager	Aaron.Kharivhe@dmr.gov.za
<b>Provincial Authority</b>	Ms	Mabel	Makibelo	Department of Roads & Transport Limpopo	makibelom@drt.limpopo.gov.za
<b>Provincial Authority</b>	Mr	Mike	Yorke-Hart	SANRAL	yorkehm@nra.co.za
<b>Portion 1 Vangpan 294 LQ</b>	Ms	Susanna Maria	Pelser		PO Box 342 Krugersdorp 1740
<b>Portion 2 Vangpan 294 LQ</b>				Eskom Holdings Ltd	PO Box 1091 Johannesburg 2000
<b>Portion 3 Vangpan 294 LQ</b>	Mr	Kenneth Albert	Du Plessis		ken@lantic.net
<b>Remaining Ptn of Steenbokpan 295</b>				Exxaro Coal Pty Ltd	PO Box 9229 Pretoria 0001

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<b>LQ</b>					
<b>Portion 3</b>				Genecorp CC	PO Box 5585 Onverwacht 0557
<b>Steenbokpan 295</b>					
<b>LQ</b>					
<b>Remaining Portion</b>				Sasol Mafutha Pty Ltd	PO Box 5486 Johannesburg 2000
<b>of Slangkop 296</b>					
<b>LQ</b>					
<b>Portion 1 Slangkop</b>	Mr	Kenneth Albert	Du Plessis		ken@lantic.net
<b>296 LQ</b>					
<b>Remaining Portion</b>				Resgen South Africa Pty Ltd	PO Box 5384 Rietvallis Rand 0157
<b>of Zanbult 300 LQ</b>					
<b>Remaning Portion</b>	Mr	N	Steenekamp		PO Box 12 Steenbokpan 0533
<b>of Kameelbult 298</b>					
<b>LQ</b>					
<b>Remining Ptn of</b>				Sunfox 33 Pty Ltd	PO Box 74 Steenbokpan 0533
<b>Minnaarspan 322</b>					
<b>LQ</b>					
<b>Portion 1 Toezicht</b>	Mr	JJ	Venter		PO Box 74 Steenbokpan 0533
<b>232 LQ</b>					
<b>Stakeholder</b>	Mr	S	Gama	Transnet Freight Rail	Siyabonga.Gama@transnet.net
<b>Stakeholder</b>	Mr	Richard	Vallihu	Transnet Rail Engineering	Richard.Vallihu@transnet.net
<b>Stakeholder</b>	Mr	S	Mapoma	Transnet Deputy Information Officer	Siyabulela.Mapoma@transnet.net
<b>Stakeholder</b>	Mr	Greal	Ambani	Department of Energy	greal.ambani@energy.gov.za
<b>Registered I&amp;AP</b>	Mr	Catchlife	Mutshavi	Lephalale Local Municipality Land Use Management	Catchlife.Mutshavi@lephalale.gov.za
<b>Registered I&amp;AP</b>	Ms	TP	Malungani	LDEDET Environmental Impact Management	malunganitp@ledet.gov.za
<b>Registered I&amp;AP</b>	Mr	DN	De Lange	Dept of Agriculture, Forestry & Fisheries: Director Land Use & Soil Management	thokob@daff.gov.za
<b>Registered I&amp;AP</b>	Mr	Noxolo	Galela	Eskom: Land Management	galelan@eskom.co.za
<b>Registered I&amp;AP</b>	Ms	Annelien	Pretorius	Eskom Distribution, The Land Development Manager	PretoANN@eskom.co.za
<b>Registered I&amp;AP</b>	Mr	Leonard	Sole	Townplanning of LDEDET	Leonard.sole@lephalale.gov.za
<b>Registered I&amp;AP</b>	Mr	Chris	Maritz	Steenbokpan Development Consortium	chrismaritz@gmail.com
<b>Registered I&amp;AP</b>	Mr	April	Shiko	Lephalale Local Municipality: Provision of Bulk Services	April.shiko@lephalale.gov.za
<b>Registered I&amp;AP</b>	Mr	Phillip	Hine	SAHRA: Heritage Officer	phine@sahra.org.za

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<b>Registered I&amp;AP</b>	Mr	Jacques	Du Plessis	Sasol Mining (Pty) Ltd: Senior Land & Rights Officer	jacques.duplessis@sasol.com
<b>Registered I&amp;AP</b>	Ms	Louise	Vd Berg - Nicolai	Resgen Pty Ltd (Digby Wells)	louise.nicolai@digbywells.com
<b>Registered I&amp;AP</b>	Mr	Hennie	Vd Aardweg	Resgen Pty Ltd	HAardweg@resgen.com.au
<b>Registered I&amp;AP</b>	Mr	Mike	Harrison	Harrison Attorneys	mharrison@harrisonattorneys.co.za
<b>Registered I&amp;AP</b>	Mr	Brendan		Resgen and Ledjaja Coal	boregan@resgen.com.au
<b>Registered I&amp;AP</b>	Mr	Mnisi	Thubelihle	DWA	mnisit@dwaf.gov.za
<b>Registered I&amp;AP</b>	Mr	Ben	Sengani	DWA	SenganiB@dwa.gov.za
<b>Registered I&amp;AP</b>		Philisiwe	Mbunquka	DWA	mbunqukap@dwa.gov.za
<b>Registered I&amp;AP</b>		Thoko	Bhutelezi	DAFF	thokob@daff.gov.za
<b>Registered I&amp;AP</b>		Nhlakaniipho	Dlamini	NDA	NhlakaD@nda.agric.za
<b>Deciding Authority</b>	Ms	Fatima	Rawjee	DEA	FRawjee@environment.gov.za
<b>Deciding Authority</b>	Ms	Vincentia	Phukubye	DEA	vphukubye@environment.gov.za
<b>Registered I&amp;AP</b>	Mr	MC	Marubini	DAFF Delegate of the Minister Land use & Soil Management	012 329 5938 (F)
<b>Registered I&amp;AP</b>	Mr	EC	Lennox	Eskom: Transmission Land Development	LennoxEC@eskom.co.za
<b>Registered I&amp;AP</b>	Mr	John	Geeringh	Eskom: Snr Environment Advisor	GeerinJH@eskom.co.za / john.geeringh@eskom.co.za

#### 7.1.5 DRAFT SCOPING REPORT AVAILABLE FOR PUBLIC REVIEW

The Draft Scoping Report was made available for review and comment by registered Interested and Affected Parties from 26 September to 13 November 2012. (**Refer to Appendix T for proof of Final Scoping notification**). I&AP's were notified of where the Report could be downloaded from the internet. A hard copy of the Report was also available with the Ward 3 councillor Frans Magwai. A copy of the Draft Scoping Report was submitted to LDEDET and receipt was confirmed in a letter of correspondence Annexed hereto as **Appendix V**.

#### 7.1.6 SUBMISSION OF FINAL SCOPING REPORT TO DEA

**Upon making the draft scoping report available for public review, the application was changed over from LDEDET to the DEA.**

All comments received on the Draft Scoping Report were included in the Final Scoping Report which was submitted to the DEA on 21 November 2012. The Final Scoping Report was approved by the DEA in a letter of correspondence dated 25 January 2013, and ILA was instructed to continue with preparation of the Environmental Impact Assessment Report (**Refer Appendix G approval of Scoping Report from DEA**). I&AP's were notified that the Final Scoping Report had been prepared. A copy of the Final Scoping Report was available on ILA's website for comment.

#### 7.1.7 DRAFT EIA REPORT AVAILABLE FOR PUBLIC REVIEW

The Draft EIA Report will be made available for review by registered Interested and Affected parties for a 40 day period commencing on **27 February 2013 – 29 April 2013**.

State Departments will be provided with hard copies. A Hard copy will be available for download from the ILA website at the following address [www.ilaweb.co.za](http://www.ilaweb.co.za)

The DEA will also be provided with a copy of the Draft EIA Report.

#### 7.1.8 CONCERNS RAISED BY I&AP'S

I&AP's registered by completing a registration form and forwarding comments via e-mail, fax and telephone to ILA. All comments received up to date have been captured from the initial public process as well as on the Draft and Final Scoping Report. Hard copies of all comments are included in **Appendix W**.

All comments received up to date as well as a response to same are detailed in the **Table 10** below:

**TABLE 10: COMMENTS AND RESPONSE REPORT FOLLOWING THE INITIAL PUBLIC PARTICIPATION PHASE FOR THE PROPOSED SOLAR FARM ON THE REMAINDER OF THE FARM VANGPAN 294 LQ**

ISSUES AND COMMENTS RAISED	COMMENTATOR/S	SOURCE	RESPONSE
<b>COMMENTS RECEIVED ON INTIAL PUBLIC PARTICIPATION</b>			
<b>Biophysical Issues</b>			
<p>If a project is going to affect a Natural Forest, it is required you apply for a license. A specific application form listing all the indigenous trees that are going to be directly affected by the project should be indicated. Such trees cannot be cleared without the necessary authorization therefore license if required by filling out the relevant application form.</p>	<p>Nosipho Dlamini Department of Agriculture Forestry and Fisheries</p>	<p>Post 11/09/2012</p>	<p>Noted. According to the <b>Ecological Assessment</b> compiled by <b>AGES Pty Ltd</b> the relevant permits are required prior to any impact on the protected tree species below:</p> <ul style="list-style-type: none"> <li>☞ <i>Acacia erioloba</i></li> <li>☞ <i>Boscia albitrunca</i></li> <li>☞ <i>Combretum imberbe</i></li> <li>☞ <i>Sclerocarya birrea</i></li> <li>☞ <i>Spirostachys africana</i></li> </ul> <p>The species <i>Spirostachys Africana (Tambotie)</i> was noted to occur in significant numbers. <i>Spirostachys Africana (Tambotie)</i> is not a protected <b>tree</b> species under Section 15(1) of the National Forest Act of 1998, but it is a protected <b>plant</b> species under Schedule 12 of the Limpopo Environmental Management Act, No. 7, 2003. Please note that the planning intention is to develop outside of the areas of high sensitivity where a majority of the protected trees are found. Trees found in medium and low sensitivity areas will also be retained as far as possible and only removed, pending the relevant authorisation, if necessary. It is noted that an application in terms of the National Forests Act, 1988, as amended is required prior to any of the protected tree species on site being removed or destroyed. The developer will appoint a specialist to undertake the application should he be selected as a preferred bidder during round three of the IPP Program. This was discussed with the DEA during a meeting held on 05/02/2013.</p>



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<p>The following documents were provided:</p> <p>Latest list of Protected Trees in terms of the National Forests Act (Act No. 84 of 1998) as amended.</p> <p>License Application Forms (with regards to trees in a National Forest and with regards to Projected trees.</p> <p>Policy Principles and Guidelines for Control of Development affecting Natural Forests and Guidance on Off-sets</p> <p>National Forests Act (Act No.84 of 1998) as amended.</p>	<p>Nosipho Dlamini Department of Agriculture Forestry and Fisheries</p>	<p>Post 11/09/2012</p>	<p>Noted, an application will be submitted where required to the Department of Agriculture Forestry and Fisheries. Please note that the development layout has aimed to retain as many trees as possible. The developer will appoint a specialist to undertake the application should he be selected as a preferred bidder during round three of the IPP Program. This was discussed with the DEA during a meeting held on 05/02/2013.</p>
<p><b>Socio – Economic Issues</b></p>			
<p>Requested to be provided with all documents pertaining to the project in order to evaluate them</p> <p>Enquired when a public meeting would be scheduled</p>	<p>Chris Maritz on behalf of the Steenbokpan Development Consortium</p>	<p>Email and Fax 19/09/2012</p>	<p>Mr Maritz has been added onto the database of registered interested and affected parties and will be kept up to date during the EIA process. He will also be provided the opportunity to comment on all reports during the EIA process. He will be informed should a public meeting be scheduled.</p>

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<p>In terms of the National Heritage Resources Act (NHRA), no 25 of 1999, heritage resources, including archaeological or palaeontological sites over 100 years old, graves older than 60 years, structures older than 60 years are protected. They may not be disturbed without a permit from the relevant heritage resources authority. This means that before such sites are disturbed by development it is incumbent on the developer (or mine) to ensure that a Heritage Impact Assessment is done. This must include the archaeological component (Phase 1) and any other applicable heritage components. Appropriate (Phase 2) mitigation, which involves recording, sampling and dating sites that are to be destroyed, must be done as required.</p>	<p>Phillip Hine Heritage Officer Archaeology, Palaeontology &amp; Meteorites Unit South African Heritage Resources Agency</p>	<p>Email 18/09/2012</p>	<p>A heritage specialist was appointed to conduct a Heritage Impact Assessment (<b>Refer Appendix J</b>). The finding of the assessment will be included the following: Two sites were identified as follows:</p> <ul style="list-style-type: none"> <li>➤ An informal burial place with 3 marked graves, although there might be more that are not properly marked located on the Remainder of the farm Vangpan 294 LQ - it is recommended that this feature is formally fenced off with a buffer zone of at least 20 metres from the centre of the middle grave. This large buffer is necessary to accommodate possible unmarked graves. The layout has taken this into consideration by provision of the recommended 20 meter buffer zone.</li> <li>➤ A small memorial dedicated to a person identified as Assie, who died on this spot in an aeroplane crash in 1995 also located on the Remainder of the farm Vangpan 294 LQ - this feature is already fenced off and does not require further fencing.</li> </ul> <p>None of these features will be impacted upon by the proposed solar farm and remains within the open spaces as per the layout plan.</p>
<p>Where bedrock is to be affected, or in potentially fossiliferous superficial deposits, a Palaeontological study must be undertaken to assess whether or not the development will impact upon palaeontological resources - or at least a letter from a Palaeontologist motivating for an exemption is needed to indicate that this is unnecessary. If the area is deemed sensitive, a full Phase 1 Palaeontological Impact Assessment will be required and if necessary a Phase 2 rescue operation might be necessary (see <a href="http://www.palaeontologicalsociety.co.za">www.palaeontologicalsociety.co.za</a>).</p>	<p>Phillip Hine Heritage Officer Archaeology, Palaeontology &amp; Meteorites Unit South African Heritage Resources Agency</p>	<p>Email 18/09/2012</p>	<p>A very small bedrock zone of the Mogalakwena Formation, Waterberg Group is located near the north-western corner of the farm. The footprint of the solar farm lies outside of this area and will not impact upon bedrock. <b>Refer to Section titled Desktop Geotechnical Study</b> for location of bedrock zone.</p>

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<p>Any other heritage resources that may be impacted such as built structures over 60 years old, sites of cultural significance associated with oral histories, burial grounds and graves, graves of victims of conflict, and cultural landscapes or viewsapes must also be assessed</p>			<p>A heritage specialist was appointed to conduct a full Heritage Impact Assessment. Refer to <b>Appendix J</b> for findings.</p>
<p>Confirmed that the application has been captured in the electronic AgriLand tracking and management system. Ref 2012_08_0116</p>	<p>B N de Lange Department of Agriculture Forestry and Fisheries</p>	<p>Post 16/08/2012</p>	<p>Noted.</p>
<p><b>Infrastructure and Services Issues</b></p>			
<p>The Municipality is a WSA. Currently there is no sufficient bulk water supply in the area earmarked for the development. It should be noted whilst in the planning processes. The plant to provide bulk water requirements for the proposed development should be investigated thoroughly. The Department of Water Affairs must be engaged as the study for MCWAP project is in process of investigating ways to meet future water needs for the Lephalale area.</p>	<p>April Shiko Lephalale Local Municipality</p>	<p>Email 20/08/2012</p>	<p>An investigation into the availability of services was carried by the civil engineer and the conclusion thereof was the definite lack of availability of water and sewage services in the area. The applicant entered into negotiations with DWA in order to be registered as a forum member of the MCWAP project, however following these negotiations it was confirmed that water would only become available in 2018 once Phase 2 of the MCWAP project was operational. This together with other factors in turn required the applicant to reconsider the scope of his application which resulted in the project being scaled down from a mixed use and solar farm development that would have been carried out on Portion 1 of the farm Steenbokpan 295 LQ as well as the Remainder of the farm Vangpan 294 LQ to only a solar farm development on the Remainder of the farm Vangpan 294 LQ.</p>
<p>Eskom Transmission's (Tx's) Delta-Mmamabula 1&amp;2 400kV future powerlines are affected by the proposed development. Map was provided showing exact position of the two future powerlines. Eskom Tx will raise no objection to the proposed project provided that Eskom Tx's rights and services are</p>	<p>N Galela Eskom Land Management</p>	<p>Post 29/08/2012</p>	<p>Noted. Eskom's transmission lines runs along the southern and western boundary of Portion 1 of the farm Steenbokpan 295 LQ, due to the application being scaled down to only a solar farm development on the Remainder of the farm Vangpan 294 LQ, Eskom's Delta Mmamabula lines over Portion 1 of the farm Steenbokpan 295 LQ will not be affected.</p>

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acknowledged and respected at all times.			
Must ensure the area earmarked for development is in line with the long term planning attributes of the Local Municipality	Leonard Sole Lephalale Municipality Development Planning & Services Townplanning of LED Matters as a Legislative Authority	Fax 21/08/2012	According to the Integrated Development Framework 2012 – 2013, Steenbokpan was correctly identified as a future development node in the previous SDF. Noting national development pressures on the municipality, the area is upgraded to a level of a potential development area. The development area falls in Zone 5 of the EMF, within a major infrastructure corridor. This zone represents areas in close proximity to major coal fields which are being considered for the development of industrial activities to beneficiate the mineral product and where infrastructure like power generation facilities are being considered. The land use proposal is also considered in line with the objectives of the Environmental Management Zones of the Waterberg EMF as there is a strong parallel between the site and the activities that surround it.
<b>Requested to be registered no comments issued</b>			
Requested to be registered as an interested and affected party on behalf of Sasol Mining.	Jacques du Plessis Senior Land & Rights Officer Sasol Mining (Pty) Ltd	Email 05/09/2012	Registered
<b>COMMENTS RECEIVED ON DRAFT SCOPING REPORT</b>			
<b>Biophysical Issues</b>			
Some protected plant species, in particular Tambotie tress, were identified during a site visit conducted by officials from LDEDET, therefore, proof that an application to acquire a permit regarding the management of these trees must be submitted to the LDEDET prior to the issuance	Limpopo Department of Economic Development, Environment and Tourism Manager Environmental Impact Management	Fax 13/11/2012	It is noted that an application in terms of the National Forests Act, 1988, as amended is required prior to any of the protected tress species on site being removed or destroyed. The developer will appoint a specialist to undertake the application should he be selected as a preferred bidder during round three of the IPP Program. This was discussed with the DEA during a meeting held on 05/02/2013.  According to the proposed layout plan the development footprint remains outside of the areas as indentified in

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			the Ecological Assessment ( <b>Refer Appendix H</b> ) to be the Tambotie Woodland.
<b>Socio – Economic Issues</b>			
All comments and objections raised by the registered interested and affected parties during the scoping phase of this project must be included in the final scoping report, as also indicted in the draft scoping report.	Limpopo Department of Economic Development, Environment and Tourism Manager Environmental Impact Management	Fax 13/11/2012	Please refer to <b>Appendix W</b> .
Proof that adjacent landowners were notified must be included in the final scoping report	Limpopo Department of Economic Development, Environment and Tourism Manager Environmental Impact Management	Fax 13/11/2012	Please refer to <b>Appendix T</b> .
The draft scoping report makes reference to Activity 3 in terms of the Environmental Impact Assessment (EIA) Regulation GNR 544 of 2010, while the aforementioned activity is not included in the amended application form submitted to the Department on 10 August 2012. Therefore, an amended application form must be submitted to this Department with the final scoping	Limpopo Department of Economic Development, Environment and Tourism Manager Environmental Impact Management	Fax 13/11/2012	The Draft Scoping Report made reference to Activity 3 in terms of the Environmental Impact Assessment (EIA) Regulation GNR 545 of 2010 and not Activity 3 of GNR 544. However, this activity has been omitted from the application that was sent to DEA.
Section 9.2.1, bullet eight (8) refers to GDARD as the evaluator and/or competent authority for this application	Limpopo Department of Economic Development, Environment and Tourism Manager Environmental Impact Management	Fax 13/11/2012	The reference has been amended to reflect the DEA
Noted that ILA requested a reply to the initial public participation phase by 17 September 2012. Resgen and Ledjadja however only received the notice on 14 September 2012 and needed to convene a meeting to discuss their reply. As such, the notification came after the nominated deadline.	Harrisons Attorneys Mr Mike Harrison Represents Resgen South Africa (Pty) Ltd and Ledjadja Coal (Pty) Ltd	Email 27/09/2012	Mr Harrison was provided with the details to view the draft scoping report on 28/09/2012 and has been registered as an interested and affected party.

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Resgen South Africa (Pty) Ltd is the incumbent owner of RE Vangpan. Party to a contract involving Vangpan, owner of nearby properties. and involved as operator of Boikarabelo Coal Mine	Mr Brendan OBO Resgen South Africa (Pty) Ltd and Ledjadja Coal (Pty) Ltd	Email 27/09/2012	Noted. The applicant is aware that the Remainder of the farm Vangpan 294 LQ will be bought by Resgen South Africa (Pty) Ltd in the future. However following negotiations with Resgen South Africa (Pty) Ltd, it was decided that should this be the case the applicant will then lease the land required for operation of the solar farm from Resgen South Africa (Pty) Ltd.
Requested to be provided with 2 CD copies of the draft scoping report	Chris Maritz on behalf of the Steenbokpan Development Consortium	Email 26/09/2012	ILA prepared the CD copies of the report which was collected by Mr Maritz on 26/09/2012
Informed ILA that he is unable to access the links provided to view the draft scoping report as his access is denied. Requested electronic version of the report	Leonard Sole Lephalale Municipality Development Planning & Services Townplanning of LED Matters as a Legislative Authority	Email 26/09/2012	ILA couriered a CD containing the draft scoping report to Mr Sole.
Requested Appendix D and J to be emailed	Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental	Email 04/11/2012	ILA emailed the requested Appendices to Ms van den Berg – Nicolai
Requested a 1 day extension to submit comments on behalf of Ledjadja Coal	Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental	Email 13/11/2012	ILA contacted Ms van den Berg – Nicolai and it was agreed that she would provide her comments by the end of the day – 14/11/2012.
Digby Wells Environmental (Digby Wells), in their capacity as independent environmental consultants, has been requested by Ledjadja Coal (Pty) Ltd (Ledjadja Coal) to review the Draft Scoping Report for the proposed Mixed	Louise van den Berg – Nicolai Environmental Management Services	Email 14/11/2012	Noted.

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<p>Use Development (including a Solar Farm) on Portion 1 of the Farm Steenbokpan 295 LQ and the Remainder of the Farm Vangpan 294 LQ.</p>	<p>Digby Wells Environmental</p>		
<p>Locality: The locality map (Figure 1, Interdesign 2012) neither provide clear designation of the farm portions nor where they are located in relation to the town of Steenbokpan and surrounding roads which may be impacted on.</p>	<p>Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental</p>	<p>Email 14/11/2012</p>	<p>Please refer to <b>Appendix X</b> for location of town. The results of the impacts on surroundings roads have been investigated by the traffic engineer as part of the Traffic Impact Assessment (<b>Refer Appendix M</b>).</p>
<p>Public Participation: In the list of identified stakeholders that were consulted, provided by Interdesign, there is no mention of the Department of Roads and Transport, in the event that an intersection is required along the road to Steenbokpan (D1675), they would need to be consulted. The Department of Rural Development and Land Reform has also not been consulted in terms of potential land claims on the property. Furthermore, as Ledjadja Coal has an approved railway line which will cross Vangpan 294 LQ, Transnet should also be consulted as part of the consultation process.</p>	<p>Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental</p>	<p>Email 14/11/2012</p>	<p>A traffic engineer was appointed to address issues regarding site access, this includes negotiations with Road Agency Limpopo and the Department of Roads and Transport. The Department of Rural Development and Land Reform were notified of the proposed development (<b>Refer Appendix T and U</b>). Transnet were notified that the Draft Scoping Report was availability for review and comments (<b>Refer Appendix T</b>).</p>
<p>EIA Requirements: Activity 9 of GNR 544 was included for bulk services for the proposed development. There is no indication given if the local municipality is looking to expand bulk services into this area or, in the event that they do not, how this will be catered for. As Ledjadja Coal will have a railway line, power line and pipeline running in this area, an indication of where this bulk service line will run is required. An indication of if, and where the bulk service line will transect properties will also need to be indicated.</p>	<p>Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental</p>	<p>Email 14/11/2012</p>	<p>Please refer to the Civil Services Report attached as <b>Appendix I</b> for detailed information pertaining to the provision of services.</p>

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<p>As part of Activity 15 of GNR 545, it is stated that between 300 and 400 ha will be required for the solar farm. It is normally estimated that 4ha is required per MW, which would result in a requirement of 600 ha for 150MW. The question is then raised as to whether a maximum area of 400 ha would suffice.</p>	<p>Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental</p>	<p>Email 14/11/2012</p>	<p>Following specialised investigations, the development footprint will be limited to 120 ha in order to cater for the required output of 40MW.</p>
<p>Lephalale spatial development framework, 2009: It must be noted that the Lephalale spatial development framework (SDF) has been revised and Steenbokpan is no longer a focus area for initial future development</p>	<p>Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental</p>	<p>Email 14/11/2012</p>	<p>According to the Integrated Development Framework 2012 – 2013, Steenbokpan was correctly identified as a future development node in the previous SDF. Noting national development pressures on the municipality, the area is upgraded to a level of a potential development area.</p>
<p>Proposed Development: In the preliminary layout plan, it is unclear whether the railway line indicated on the plan is the Boikarabelo Railway line. This railway line has a dedicated servitude in which other infrastructure, together with the railway line, will be placed. This servitude will conflict with the potential commercial block of development on Vangpan. Authorisations are in place for both the railway line and pipeline. The environmental processes for a 132KV power line from the substation on Vangpan to the Boikarabelo Coal Mine have also been initiated. Very little detail is given on the industrial, commercial and retail development. What are the key services envisaged from this development? What market is the development focussing on? Has a needs analysis or any form of market research been completed for this development? If there is no need for a development of this kind, its merits must be weighed against the clearing of vegetation and loss of biodiversity. There is no detailed description of what a solar farm of photovoltaic</p>	<p>Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental</p>	<p>Email 14/11/2012</p>	<p>The applicant has been made aware of the Boikarabelo Railway line that will pass over the Remainder of the farm Vangpan, which is also indicated on the layout plan (<b>Refer Appendix E</b>). Ms van den Berg-Nicolai was requested to provide the applicant with plans indicating the exact position of the railway line, pipeline and powerline that she made reference to and these have also been indicated on the layout plan. The project proposal no longer entails the mixed use component and is limited to the solar farm component on the Remainder of the farm Vangpan 294 LQ. The layout was amended taking cognisance of these future structures as well as the results of the specialist studies. The proposed development concept was taken into consideration since 2009 in accordance with the Spatial Development Framework 2009 which identified Steenbokpan as Potential Development Area 1 (Steenbokpan node). <b>Refer to Section 6.4</b> of the Report. Detailed description of the solar farm and photovoltaic panels as well as their operation and maintenance have been included in <b>Section 4.2 and Appendix Y</b>. Following receipt of information during the draft and final scoping phase and consultation with the deciding</p>



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<p>panels involves, supporting infrastructure or how it works. How will these panels be cleaned? If wet cleaning is undertaken, how much water is required and where will the water come from? It is also not clear from the project description why the solar farm is situated on either side of the road, this has also not been covered in the alternatives. In the event that the proposed commercial development does not take place on Vangpan, it should be considered placing all solar farm infrastructure on Vangpan with the potential development area focused on Steenbokpan, this could be seen as an alternative. No socio-economic benefits have been outlined for the project and key issues such as job creation and housing (particularly in terms of a construction camp) must be addressed. Furthermore, the project timeframes have not been provided and should be addressed, particularly in terms of whether it would be a phased project and the lead time for construction.</p>			<p>authority the alternatives have been adjusted. Please refer to <b>Section 8</b> of the Report. The project proposal has been scaled down from a mixed use and solar farm development that would have been carried out on Portion 1 of the farm Steenbokpan 295 LQ as well as the Remainder of the farm Vangpan 294 LQ to only a solar farm development on the Remainder of the farm Vangpan 294 LQ. Socio-economic benefits such as job creation have been identified under <b>Section 8</b> of this report. The development of renewable energy is currently regarded as national priority. The IPP Procurement Programme, which is being run by the Department of Energy, has been designed to procure the target of 3725 megawatts and to contribute towards socio-economic and environmentally sustainable growth, and to start and stimulate the Renewable Energy industry in South Africa. The proposed development is considered to be in line with the objectives of the Department of Energy in terms of job creation, local content, ownership, black management, preferential procurement, enterprise development and socio-economic development. Refer to the relevant appendices with regards to the IPP. The project will not be phased.</p>
<p>Locality Alternative: As many substations are scattered across the country, why has it been deemed preferable to build the solar farm in the Lepalale area and why were other areas such as the Northern Cape not considered? Key aspects such as daylight length and solar intensity within the project area must be considered amongst a myriad of other environmental factors. Also, were any other alternative localities considered for the commercial development?</p>	<p>Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental</p>	<p>Email 14/11/2012</p>	<p>The project proposal has been scaled down from a mixed use and solar farm development that would have been carried out on Portion 1 of the farm Steenbokpan 295 LQ as well as the Remainder of the farm Vangpan 294 LQ to only a solar farm development on the Remainder of the farm Vangpan 294 LQ. As confirmed by the applicant the Northern Cape was not considered because the first 28 Preferred Bidders in terms of the RFP is allocated in that province. ESKOM also prefers a substation on the development site to facilitate the Grid connection, which Vangpan currently holds. Furthermore please note that the applicant has indicated that two projects/ sites were previously selected in the first round of the RFP as preferred</p>

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			Bidders, none were selected for the second round and the applicant has selected the proposed Vangpan farm portion in the third round of bidding. Following investigations by the applicant with regards to sun hours, the Lephalale area was considered a viable location for a solar farm ( <b>Refer Appendix Y</b> )
Land-Use Alternatives: This section has not considered alternative land uses apart from the proposed project, such as agriculture.	Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental	Email 14/11/2012	The project proposal entails a solar farm and therefore no other land-use alternatives have been considered. The soil and land capability assessment concluded that: <i>“the agricultural potential of soils for crop cultivation on the proposed development areas varies between very low (seasonally wet clayey soils), low (deep, coarse sandy soils) and moderate (deep sandy-loam soils with slightly higher nutrient content). The climatic conditions and agricultural potential of most of the areas on which development will occur is not suitable for crop cultivation under rain-fed arable conditions. The site should be considered as moderate potential grazing land with limited potential for arable agriculture considering the climatic conditions and size of land potentially available”</i> <b>Refer Appendix O.</b>
The main area of concern regarding the Draft Scoping report is that the preliminary layout does not take into account the Boikarabelo Railway line servitude which will have implication on the layout design of the proposed project.	Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental	Email 14/11/2012	Noted. Ms van den Berg – Nicolai was requested to provide the applicant with plans indicating the exact position of the railway line, pipeline and powerline that she makes reference to. The layout was amended taking cognisance of these future structures ( <b>Refer Appendix E</b> ).
<b>Infrastructure and Services Issues</b>			
Resgen South Africa (Pty) Ltd is involved as operator of Boikarabelo Coal Mine which will rely on Remainder of Vangpan for rail, water and power infrastructure	Mr Brendan OBO Resgen South Africa (Pty) Ltd and Ledjadja Coal (Pty) Ltd	Email 27/09/2012	Noted and the applicant is aware thereof.
Ledjadja Coal (Pty) Ltd is the title holder and	Mr Brendan	Email	Noted and the applicant is aware thereof.

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<p>owner of Boikarabelo Coal Mine and relies on Remainder of Vangpan for rail, water and power infrastructure</p>	<p>OBO Resgen South Africa (Pty) Ltd and Ledjadja Coal (Pty) Ltd</p>	<p>27/09/2012</p>	
<p>The topic automatically indicated that solar energy is part of the bigger picture where its water uses will fall under water supply (MCWAP) of the whole project Page 7 indicates that the project engineer is to complete the designs for the project The Department of Water Affairs (DWA) does not have any clue yet of what capacity water is required and from which source While DWA does not have any objections about the project, it would be better for DWA to be furnished with all information about water quantity and source thereof Since solar energy is included in the proposed project, you are required to clarify to DWA how and where water will be obtained from</p>	<p>Chief Director Limpopo Department of Water Affairs</p>	<p>Fax 14/11/2012</p>	<p>According to the Civil Services Report compiled by Siza Tech Consulting Engineers (<b>Refer Appendix I</b>) the contractor that is appointed for the construction of the solar facility will be responsible for provision of water to the site by means of transporting the water to site during the construction phase. Concrete will be required for the basements of: medium-voltage stations, medium voltage receiving station, high-voltage substation (if required) and control building, warehouse. The overall amount of concrete to be produced will be approx. 5,000 m<sup>3</sup>, this will however be procured as ready-mix from Lephalale and no water will be required. Should the applicant be selected as a preferred bidder in terms of the IPP Program then the applicant will apply for a Water-Use Licence Application for provision of water during the operational phase of the project. This was discussed with the DEA during a meeting held on 05/02/2013. The DWA will be provided with a copy of this Draft EIA Report for comment.</p>
<p>National Environmental Management: Waste Act, Act 59 of 2008: In this section, sewage is only referred to in the sense that, in the event that the development cannot connect to an existing sewage network, a waste license may be required. As the proposed development includes industrial uses, any potential generation of hazardous waste must be discussed in conjunction with the management thereof. Any form of development will generate domestic waste, and, as there is no formal collection in this area, the strategy for managing such waste must be iterated.</p>	<p>Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental</p>	<p>Email 14/11/2012</p>	<p>The project proposal has been scaled down from a mixed use and solar farm development that would have been carried out on Portion 1 of the farm Steenbokpan 295 LQ as well as the Remainder of the farm Vangpan 294 LQ to only a solar farm development on the Remainder of the farm Vangpan 294 LQ.</p> <p>According to the Civil Services Report compiled by Siza Tech Consulting Engineers (<b>Refer Appendix I</b>) the sewage effluent to be generated during the operational phase is estimated at 1168 m<sup>3</sup>/year. Therefore a waste management licence application will not be required as estimated annual throughput is below the threshold of 2000m<sup>3</sup>.</p>

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<p>Existing and proposed infrastructure: In terms of water, different water sources in the greater area are discussed but it is not clearly indicated where water, if required for the project, will be sourced from. With regards to sewage, it has been implied that the development will link into other developments in the area such as Sasol Mafutha. Has this been discussed with Sasol and an agreement put in place? If the Sasol Mafutha project does not go ahead or the Sasol project timing is not in-line with this project, alternative strategies must be discussed. It is also stated that it can be safely assumed that the municipality will provide necessary services for solid waste removal and is based on the SDF (2009). In the event that the municipality does not provide solid waste removal services, what are the alternatives?</p>	<p>Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental</p>	<p>Email 14/11/2012</p>	<p>Please refer to the Civil Services Report compiled by Siza Tech Consulting Engineers (<b>Refer Appendix I</b>) for full details regarding provision of water and sewage services.</p>
<p><b>Requested to be registered / Acknowledgements/ General</b></p>			
<p>The Department acknowledges receipts of the draft scoping report which is under review. The Department will communicate its findings in due course.</p>	<p>Limpopo Department of Economic Development, Environment and Tourism Manager Environmental Impact Management</p>	<p>Fax 03/10/2012</p>	<p>Noted.</p>
<p>Kindly bring to the attention of the applicant the fact that this development must not commence prior to an environmental authorisation issued by the Department</p>	<p>Limpopo Department of Economic Development, Environment and Tourism Manager Environmental Impact Management</p>	<p>Fax 03/10/2012</p>	<p>Noted.</p>
<p>Kindly bring to the attention of the applicant the fact that this development must not commence prior to an environmental authorisation issued by the Department</p>	<p>Limpopo Department of Economic Development, Environment and Tourism Manager</p>	<p>Fax 13/11/2012</p>	<p>Noted.</p>

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	Environmental Impact Management		
Requested for Resgen South Africa (Pty) Ltd and Ledjadja Coal (Pty) Ltd to be registered as interested and affected parties.	Harrisons Attorneys Mr Mike Harrison Represents Resgen South Africa (Pty) Ltd and Ledjadja Coal (Pty) Ltd	Email 27/09/2012	Registered
Requested acknowledge receipt of letter and the registration form.	Harrisons Attorneys Mr Mike Harrison Represents Resgen South Africa (Pty) Ltd and Ledjadja Coal (Pty) Ltd	Email 27/09/2012	ILA acknowledged receipt on 28/09/2012 per email.
Requested on behalf of Resgen South Africa (Pty) Ltd and Ledjadja Coal (Pty) Ltd to be registered as interested and affected parties and to receive all relevant information, attend meetings to be apprised on developments and reserve the right to comment on the application once more familiar with its likely impacts	Mr Brendan OBO Resgen South Africa (Pty) Ltd and Ledjadja Coal (Pty) Ltd	Email 27/09/2012	Registered.
Please ensure that Ledjadja Coal is informed of the availability of the Final Scoping Report, Draft EIAR and any planned public meetings.	Louise van den Berg – Nicolai Environmental Management Services Digby Wells Environmental	Email 14/11/2012	Registered and noted.
<b>COMMENTS RECEIVED ON FINAL SCOPING REPORT</b>			
<b>Biophysical Issues</b>			
All possible impacts and effects of the development on the surrounding area are required by the Department of Environmental Affairs.	Department of Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and	Letter: 25-01-2013	Noted. Addressed as part of this Draft EIA Report.

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	Fatima Rawjee (Director: Integrated Environmental Authorisations)		
<b>Socio – Economic Issues</b>			
The Department of Agriculture, Forestry and Fisheries does not support the development. Based on information provided the proposed development will change the character of the area and will lead to a serious loss of agricultural land that can be utilised for sustainable food security in the country.	MC Marubini – Department of Agriculture, Forestry & Fisheries Delegate of the Minister: Land Use and Soil Management	Letter: 29-01-2013	Noted. However according to the Soil and Land Capability Assessment conducted by AGES (Pty) Ltd ( <b>Refer Appendix O</b> ) The soil and land capability assessment concluded that: <i>“the agricultural potential of soils for crop cultivation on the proposed development areas varies between very low (seasonally wet clayey soils), low (deep, coarse sandy soils) and moderate (deep sandy-loam soils with slightly higher nutrient content). <u>The climatic conditions and agricultural potential of most of the areas on which development will occur is not suitable for crop cultivation under rain-fed arable conditions.</u> The site should be considered as moderate potential grazing land with limited potential for arable agriculture considering the climatic conditions and size of land potentially available.</i>
The Final Impact Report (FIR) should include information on the economic viability of the facility to the surrounding area and how the local community will benefit.	Department of Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and Fatima Rawjee (Director: Integrated Environmental Authorisations)	Letter: 25-01-2013	Refer to <b>Section 6.4</b> for Socio Economic Environment and <b>Appendix Y</b> for report from developer.
<b>Infrastructure and Services Issues</b>			
The Department of Environmental Affairs required the total footprint of the proposed development to be indicated in the Final Environmental Impact Report (EIR). Exact locations of the commercial blocks, Solar Facility and associated infrastructure should be mapped on appropriate scale.	Department of Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and Fatima Rawjee (Director:	Letter: 25-01-2013	The project proposal has been scaled down from a mixed use and solar farm development that would have been carried out on Portion 1 of the farm Steenbokpan 295 LQ as well as the Remainder of the farm Vangpan 294 LQ to only a solar farm development on the Remainder of the farm Vangpan 294 LQ. Refer to <b>Appendix E</b> for copy of proposed solar farm layout as well as detailed drawing for both construction

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	Integrated Environmental Authorisations)		phase and permanent layout of solar farm.
Should a Water Use License be required, proof of application for a water use license needs to be submitted.	Department of Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and Fatima Rawjee (Director: Integrated Environmental Authorisations)	Letter: 25-01-2013	According to the Civil Services Report compiled by Siza Tech Consulting Engineers ( <b>Refer Appendix I</b> ) the contractor that is appointed for the construction of the solar facility will be responsible for provision of water to the site by means of transporting the water to site during the construction phase. Concrete will be required for the basements of: medium-voltage stations, medium voltage receiving station, high-voltage substation (if required) and control building, warehouse. The overall amount of concrete to be produced will be approx. 5,000 m <sup>3</sup> , this will however be procured as ready-mix from Lephalale and no water will be required. Should the applicant be selected as a preferred bidder in terms of the IPP Program then the applicant will apply for a Water-Use Licence Application for provision of water during the operational phase of the project. This was discussed with the DEA during a meeting held on 05/02/2013.
The FIR should include information on services required on the site, e.g. sewage, refuse removal, water and electricity; Who will supply these services and has an agreement and confirmation of capacity been obtained?	Department of Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and Fatima Rawjee (Director: Integrated Environmental Authorisations)	Letter: 25-01-2013	Please refer to <b>Section 5</b> for further details pertaining to civil services.
The FIR should include a construction and operational phase EMP to include mitigation and monitoring measures and should blasting be required, appropriate mitigation measures should be provided.	Department of Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and Fatima Rawjee (Director: Integrated Environmental Authorisations)	Letter: 25-01-2013	Please refer to the EMPr that includes mitigation measures as requested.
Eskom Transmission (Tx) Division's future	EC Lennox - Eskom	E-mail:	Noted. Eskom's transmission lines runs along the

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<p>Delta-Mamabula 2 x 400kV power lines will be affected. A map indicated the Eskom Tx's TxSi-System with the proposed power lines indicated with red dotted lines was provided.</p>		<p>29-11-2012</p>	<p>southern and western boundary of Portion 1 of the farm Steenbokpan 295 LQ, due to the application being scaled down to only a solar farm development on the Remainder of the farm Vangpan 294 LQ, Eskom's Delta Mmamabula lines over Portion 1 of the farm Steenbokpan 295 LQ will not be affected</p>
<p><b>Requested to be registered / Acknowledgements/ General</b></p>			
<p>The Final EIR should include at least one A3 regional map of the area and the locality maps included in the final EIR illustrate the different proposed alignments and above ground storage of fuel. The maps must be of acceptable quality and as a minimum, have the following attributes:</p> <ul style="list-style-type: none"> <li>• Maps are relatable to one another;</li> <li>• Cardinal, points;</li> <li>• Co-ordinates;</li> <li>• Legible legends;</li> <li>• Indicate alternatives;</li> <li>• Latest land cover;</li> <li>• Vegetation types of the study area; and</li> <li>• A3 size locality map.</li> </ul>	<p>Department of Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and Fatima Rawjee (Director: Integrated Environmental Authorisations)</p>	<p>Letter: 25-01-2013</p>	<p>Noted. No fuel tanks will be stored on site and therefore alignments are not applicable. Please refer to <b>Appendix C, E and F</b> for maps.</p>
<p>Should an application for Environmental Authorisation be subject to the provisions of Chapter II, Section 38 of the National Heritage Resources Act, Act 25 of 1999, this Department will not be able to make nor issue a decision in terms of your application for Environmental Authorisation pending a letter from the pertinent heritage authority categorically stating that the application fulfils the requirements of the relevant heritage resources authority as described in Chapter II, Section 38(8) of the National Heritage Resources Act, Act 25 of 1999.</p>	<p>Department of Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and Fatima Rawjee (Director: Integrated Environmental Authorisations)</p>	<p>Letter: 25-01-2013</p>	<p>The SAHRA will be afforded an opportunity to provide comments of this Draft EIA Report which includes a full Heritage Impact Assessment.</p>
<p>Submit five (5) copies of the Environmental</p>	<p>Department of</p>	<p>Letter:</p>	<p>Noted.</p>



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Impact Report (EIR) to the Department as per regulation 34(1)(b) of the EIA Regulations, 2010. Please submit at least one electronic copy (CD/DVD) of the complete final report with the hard copy documents.	Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and Fatima Rawjee (Director: Integrated Environmental Authorisations)	25-01-2013	
No activity may commence prior to an environmental authorisation being granted by the Department as per Section 24F of the National Environmental Management Act, Act No 107 of 1998,	Department of Environmental Affairs Mr Mark Gordon (Chief Director: Integrated Environmental Authorisations) and Fatima Rawjee (Director: Integrated Environmental Authorisations)	Letter: 25-01-2013	Noted.
Requested 2 CD's for perusal to be posted to PO Box 14058 Sinoville 0129	Chris Maritz (I& AP)	E-mail: 16-11-2012	The CD's were posted to Mr Maritz on 20/11/2012.
Eskom Transmission (Tx) Division's requested to be registered as an I&AP. The contact person in this regard is Mr. David Tunnicliff who can be contacted at 0118005145.	EC Lennox - Eskom	E-mail: 29-11-2012	Noted and details were added to the database.
Mr Geeringh note that the application for the solar farm is lodged with LDEDET and it is his understanding that all applications for renewables have to be lodged at the National; DEA. He requested clarification on the matter	John Geeringh - Eskom Snr Env Advisor GC Land Development Megawatt Park	E-mail: 13-12-2012	The application was initially registered with LDEDET as it consisted of the solar farm as well as mixed use development. However, after extensive consultation between LDEDET and DEA the application has been changed over to DEA (as per their request), and has been allocated the following DEA Ref: 14/12/16/3/3/2/444 and NEAS Ref: DEA/EIA/0001604/2012.
NT Dlamini informed ILA that he is unable to access the links provided.	Nosipho T. Dlamini Forestry Regulations and Support: Forester (Waterberg District)	E-mail: 16-11-2012	ILA emailed the relevant section of the report to Nosipho for review.
T Buthelezi confirmed receipt of the application that was sent via email and he forwarded the application to their registry division for	Thoko Buthelezi Agriland Support Group	E-mail: 26-11-2012	Noted.

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<p>capturing. A formal acknowledgement letter of receipt with an agriland reference number will be sent within 3 to 4 working days.</p>			
<p>Ms Collett notified that she is no longer involved in applications pertaining to renewable energy related projects. Any application, documentation, notification etc. should be forwarded to the following officials: Ms Mashudu Marubini Delegate of the Minister (Act 70 of 1970): and Ms Thoko Buthelezi AgriLand Liaison Officer</p>	<p>Department of Agriculture, Forestry &amp; Fisheries Anneliza Collett Directorate: Land Use &amp; Soil Management</p>	<p>E-mail: 07-01-2013</p>	<p>ILA requested commentary on the Final Scoping Report from M Marubini &amp; T Buthelezi. ILA also noted that T Buthelezi has confirmed receipt of the application and requested T Buthelezi to provide ILA with comments thereto.</p>
<p>The application is currently on step 6 of 8, which means the official working with this application is busy typing a letter, with regards to the decision that was taken by committee</p>	<p>Nhlakanipho Dlamini Department of Agriculture, Forestry &amp; Fisheries</p>	<p>E-mail: 07-01-2013</p>	<p>Noted.</p>

## SECTION 8: IMPACT ASSESSMENT

### Regulation 28 (1) (g)

#### 8.1 DESCRIPTION OF POTENTIAL ENVIRONMENTAL IMPACTS AND ISSUES

This section of the report is aimed at providing a description and brief evaluation of issues and impacts associated with the proposed development.

Before impacts can be identified, it is important to give account of the on-site activities anticipated during the construction and operational phases of the project.

The activities envisaged are based on normal construction and operational programs associated with activities of this nature. They are referred to as environmental aspects as they represent the actions during the construction and operational phases that will influence environmental conditions to a large or lesser degree.

#### ANTICIPATED ENVIRONMENTAL AND SOCIAL ASPECTS

##### PRE-CONSTRUCTION AND CONSTRUCTION PHASES

- ↻ Surveying, fencing, search-and-rescue, clearing and grubbing, topsoil stripping and access road construction;
- ↻ Transport of material to site;
- ↻ Construction of the temporary site camp which involves clearing of the vegetation, fencing of the camp and related structures including store-rooms and vehicle parking areas;
- ↻ Earthworks include clearing of vegetation;
- ↻ Road and infrastructure construction includes clearing of vegetation;
- ↻ Site clearance including removal of all building material, temporary structures and any other waste material generated during construction. All such material to be removed from site and disposed of appropriately once construction is complete.

##### OPERATIONAL PHASE

- ↻ Maintenance of solar plant infrastructure

#### 8.1.1 ANTICIPATED IMPACTS

##### CONSTRUCTION PHASE

###### Beneficial Impacts

- ↻ Skills development and creation of job opportunities

###### Adverse Impacts

- ↻ De-vegetation of specific areas of construction will result in loss of habitat for fauna, invertebrates and flora (habitat destruction and fragmentation)
- ↻ Damage to and removal of protected tree species
- ↻ Invasion by weeds and invasive alien plants as a result of surface disturbance
- ↻ Potential impact on soil due to possible hydrocarbon spills by construction vehicles
- ↻ Loss of agricultural potential and land capability due to construction of solar farm
- ↻ Loss of grazing and roosting land for existing faunal and avian species
- ↻ Increased risk of erosion due to site clearance, removal of vegetation, soil disturbance and compaction
- ↻ Increased rate of stormwater run-off from solar panels
- ↻ Dust generation on site
- ↻ Sanitation (toilet facilities) could impact on soil and ground water.
- ↻ Waste management could impact on soil and groundwater
- ↻ Unsupervised and misuse of fire on site could impact negatively on the environment.
- ↻ Poaching of game by construction team
- ↻ Impact of heavy vehicles (damage to the D1675) as well as dust and noise

- ↗ Possible damage to existing powerlines/ infrastructure
- ↗ Possible damage/loss of subterranean artefacts
- ↗ Traffic obstruction and traffic safety due to construction vehicles
- ↗ Crime may increase as a result of construction workers

#### OPERATIONAL PHASE

##### Beneficial Impacts

- ↗ Promotion of clean renewable energy
- ↗ Skills development and creation of job opportunities [solar farm maintenance]
- ↗ Contribution to infrastructure upgrades
- ↗ Contribute to improving grid strength by putting back 40mw of electricity into the system

##### Adverse Impacts

- ↗ Increase of hard surface area i.e. increased stormwater run off, resulting from solar panels
- ↗ Possible electrocution of avian species due to presence of powerlines
- ↗ Collision with associated power lines and solar panel infrastructure

#### 8.1.2 ANITICPATED CUMULATIVE IMPACTS

The majority of impacts associated with the activity both adverse and beneficial and for both the construction and operational phases have been identified as resulting in cumulative impacts due to the number of development activities that will be undertaken in the area. The Remainder of the Farm Vangpan and its surrounds will be under pressure until such time as developments are operational and are operating responsibly. The mining company Resgen South Africa (Pty) Limited have already obtained various Environmental Authorizations from the LDEDET (Limpopo Department of Economic Development, Environment & Tourism) to use a 150 meter wide strip of the farm Vangpan for the construction of a railway line as well as for the construction of a portable water line to suit their development needs. The EA reference numbers issued by LDEDET is 12/1/9/2-W08 dated 2012/03/20 and 12/1/9/1-W51 dated 25/10/2012. Resgen South Africa (Pty) Ltd has also applied for a Basic Assessment to obtain permission for the construction of a 132KV Power line for the Boikarabelo Coal Mine which will run over the farm Vangpan. Cumulative impacts can be minimised if development proposals take cognisance of surrounding development proposals and if designs are supportive of each other.

#### 8.1.3 SIGNIFICANCE OF IMPACTS

*[Regulation 31 (2) (h)]*

An assessment of the significance of each of the impacts identified during the Scoping Process has been performed by means of a qualitative methodology. The above-mentioned methodology and results of the assessment are reflected in this section of the report.

##### 8.1.3.1 SIGNIFICANCE ASSESSMENT METHODOLOGY

An assessment of the significance of each of the impacts identified during the Scoping Process will be performed by means of a qualitative methodology. The above-mentioned methodology and results of the assessment are reflected in this section of the report.

In terms of the Significance Assessment Methodology, developed in accordance with the above guidelines, the significance of an impact is the product of a probability rating and a severity rating. A detailed description of the mentioned methodology follows below:

#### SIGNIFICANCE

Significance is the product of probability and severity.

#### PROBABILITY

Probability describes the likelihood of the impact actually occurring, and is rated as follows:

- ↗ Improbable - Low possibility of impact to occur due to design or history. Rating: 2
- ↗ Probable - Distinct possibility that impact will occur. Rating: 3
- ↗ Highly probable - Most likely that impact will occur. Rating: 4

➤ Definite - Impact will occur regardless of any prevention measures. Rating: 5

### SEVERITY RATING (SR)

The severity rating is calculated from the factors allocated to intensity and duration. Intensity and duration factors are awarded to each impact, as described below.

### INTENSITY FACTOR (IF)

The intensity factor is awarded to each impact according to the following method:

- Low intensity - nature and/or man made functions not affected (minor process damage or human/wildlife injury could occur). Factor 1
- Medium intensity - environment affected but natural and/or manmade functions and processes continue (Some process damage or human/ wildlife injury may have occurred). Factor 2
- High intensity-environment affected to the extent that natural and/or human-made functions are altered to the extent that it will temporarily or permanently cease (Major process damage or human/wildlife injury could occur). Factor 4

### DURATION (D)

Duration is assessed and a factor awarded in accordance with the following:

- Short term - <1 to 5 years. Factor 2
- Medium term - 5 to 15 years. Factor 3
- Long term - impact will only cease after the operational life of the activity has ended, either because of natural process or by human intervention. Factor 4
- Permanent - mitigation, either by natural process or by human intervention, will not occur in such a way or in such a time span that the impact can be considered transient. Factor 4

### SEVERITY FACTOR (SF)

The severity rating is obtained from calculating a severity factor, and comparing the severity factor to the rating in the table below. For example:

$$\begin{aligned} \text{The Severity factor} &= \text{Intensity factor} \times \text{Duration factor} \\ &= 2 \times 3 \\ &= 6 \end{aligned}$$

A severity factor of six (6) equals a severity rating of medium severity (Rating 3) as per table below:

**TABLE 11: SEVERITY RATING**

RATING	FACTOR
Low Severity (Rating 2)	Calculated values 2 to 4
Medium Severity (Rating 3)	Calculated values 5 to 8
High Severity (Rating 4)	Calculated values 9 to 12
Very High severity (Rating 5)	Calculated values 13 to 16

Severity factors below 3 indicate no impact

### SIGNIFICANCE RATING (SR)

A Significance Rating is calculated by multiplying the severity rating with the probability rating. The significance rating should influence the development project as described below:

**Low significance** (calculated Significance Rating 4 to 6)

- Positive impact and negative impacts of low significance should have no influence on the proposed development project.

**Medium significance** (calculated Significance Rating 7 to 14)

- Positive impact: Should weigh towards a decision to continue
- Negative impact: Should be mitigated to a level where the impact would be of low significance before project can be approved.

**High significance** (calculated Significance Rating 15 and more)

- ↻ Positive impact: Should weigh towards a decision to continue, should be enhanced in final design.
- ↻ Negative impact: Should weigh towards a decision to terminate proposal, or mitigation should be performed to reduce significance to a low significance rating.

### 8.1.3.2 SIGNIFICANCE ASSESSMENT RESULTS

Impacts highlighted in Section 8 were each assessed according to the above methodology. **Table 13** contains the results of the significance assessment before and after implementation of mitigation measures.

KEY	
Probability Rating	PR
Intensity	I
Duration	D
Severity Factor	SF
Severity Rating	SR
Significance Impact Rating	SiR

**Table 12:** Key to Ratings

**TABLE 13 : RESULT OF THE SIGNIFICANCE ASSESSMENT [BEFORE AND AFTER MITIGATION] OF THE IMPACTS IDENTIFIED AND ASSOCIATED WITH THE PROPOSED ESTABLISHMENT OF THE SOLAR FARM.**

IMPACT	SIGNIFICANCE BEFORE MITIGATION						SIGNIFICANCE AFTER MITIGATION					
	P R	I	D	S F	S R	SiR	P R	I	D	S F	S R	SiR
<b>PROPOSAL</b>												
<b>CONSTRUCTION PHASE (BIO-PHYSICAL ENVIRONMENT)</b>												
<b>ADVERSE IMPACTS</b>												
i	5	2	4	8	3	<b>15 High</b>	4	2	4	8	3	<b>12 Medium</b>
ii	5	2	4	8	3	<b>15 High</b>	4	2	4	8	3	<b>12 Medium</b>
iii	4	2	2	4	2	<b>8 Medium</b>	3	2	2	4	2	<b>6 Low</b>
iv	4	4	2	8	3	<b>12 Medium</b>	3	4	2	8	3	<b>9 Medium</b>
v	4	2	4	8	3	<b>12 Medium</b>	2	2	4	8	3	<b>6 Low</b>
vi	4	2	4	8	3	<b>12 Medium</b>	3	2	4	8	3	<b>9 Medium</b>
vii	4	2	2	4	2	<b>8 Medium</b>	3	2	2	4	2	<b>6 Low</b>
viii	4	2	2	4	2	<b>8 Medium</b>	3	2	2	4	2	<b>6 Low</b>

		SIGNIFICANCE BEFORE MITIGATION					SIGNIFICANCE AFTER MITIGATION						
IMPACT		P	I	D	S	S	SiR	P	I	D	S	S	SiR
		R			F	R		R			F	R	
ix	Dust generation on site	5	2	4	8	3	<b>15 High</b>	3	2	2	4	2	<b>9 Medium</b>
x	Sanitation (toilet facilities) could impact on soil and ground water.	4	2	2	4	2	<b>8 Medium</b>	3	2	2	4	2	<b>6 Low</b>
xi	Waste management could impact on soil and groundwater	4	2	2	4	2	<b>8 Medium</b>	2	2	2	4	2	<b>4 Low</b>
xii	Unsupervised and misuse of fire on site could impact negatively on the environment.	4	2	2	4	2	<b>8 Medium</b>	2	2	2	4	2	<b>4 Low</b>
xiii	Poaching of game by construction team	3	4	2	8	3	<b>9 Medium</b>	2	2	2	4	2	<b>4 Low</b>
xiv	Impact of heavy vehicles (damage to the D1675) as well as dust and noise	5	2	2	4	2	<b>10 Medium</b>	3	2	2	4	2	<b>6 Low</b>
<b>CONSTRUCTION PHASE (SOCIO-ECONOMIC ENVIRONMENT)</b>													
<b>BENEFICIAL IMPACTS</b>													
xv	Skills development and creation of job opportunities	4	2	2	4	2	<b>8 Medium</b>	5	4	2	8	3	<b>15 High</b>
<b>ADVERSE IMPACTS</b>													
xvi	Possible damage to existing powerlines/ infrastructure	3	2	2	4	2	<b>6 Low</b>	2	2	2	4	2	<b>4 Low</b>
xvii	Possible damage/loss of subterranean artefacts	3	2	4	8	3	<b>9 Medium</b>	3	2	2	4	2	<b>6 Low</b>
xviii	Traffic obstruction and traffic safety due to construction vehicles	4	2	2	4	2	<b>8 Medium</b>	3	2	2	4	2	<b>6 Low</b>
xix	Crime may increase as a result of construction workers	3	2	2	4	2	<b>6 Low</b>	2	2	2	4	2	<b>4 Low</b>
<b>OPERATIONAL PHASE (BIO-PHYSICAL ENVIRONMENT)</b>													
<b>BENEFICIAL IMPACTS</b>													
xx	Promotion of clean renewable energy	2	2	2	4	2	<b>4 Low</b>	5	4	4	16	5	<b>25 Very High</b>
<b>ADVERSE IMPACTS</b>													
xxi	Increase of hard surface area i.e. increased stormwater run off, resulting from solar panels	5	2	4	8	3	<b>15 High</b>	3	2	4	8	3	<b>9 Medium</b>
xxii	Possible electrocution of avian species due to presence of powerlines	4	2	4	8	3	<b>12 Medium</b>	3	2	4	8	3	<b>6 Low</b>
xxiii	Collision with associated power lines and solar panel infrastructure	4	2	4	8	3	<b>12 Medium</b>	3	2	4	8	3	<b>6 Low</b>
xxiv	Prevention of veld fires	4	2	4	8	3	<b>12 Medium</b>	3	2	4	8	3	<b>6 Low</b>
<b>OPERATIONAL PHASE (SOCIO-ECONOMIC ENVIRONMENT)</b>													
<b>BENEFICIAL IMPACTS</b>													
xxv	Skills development and creation of job opportunities [solar farm maintenance]	5	2	4	8	3	<b>15 High</b>	5	2	4	16	5	<b>15 High</b>
xxvi	Contribution to infrastructure upgrades	5	2	4	8	3	<b>15 High</b>	5	2	4	8	3	<b>15 High</b>

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IMPACT	SIGNIFICANCE BEFORE MITIGATION						SIGNIFICANCE AFTER MITIGATION					
	P R	I	D	S F	S R	SiR	P R	I	D	S F	S R	SiR
xxvii Contribute to improving grid strength by putting back 40mw of electricity into the system	5	2	4	8	3	<b>15 High</b>	5	2	4	8	3	<b>15 High</b>
<b>ADVERSE IMPACTS</b>												
xxviii Possible visual impact of solar panels	5	2	4	8	3	<b>15 High</b>	4	2	4	8	3	<b>12 Medium</b>

**NOTES:**

Beneficial impacts with a high significance rating should weigh towards a decision to continue with the project. Medium impacts of an adverse nature should be mitigated to a level where the impact would be of low significance before a decision is made to continue with the project. Impacts (adverse) with a high significance should influence the planning, layout and design of the proposed development to prevent the impact from occurring.



**SECTION 9: ENVIRONMENTAL MANAGEMENT PROGRAMME**

*[Regulation 33]*

This section of the report provides implementation and management activities to assist the planning and design, pre-construction, construction and operational phases of the development. The Environmental Management Programme (EMPr) will especially concentrate on matters related to impact on the Physical, Biological and Social environments to ensure an environmentally sustainable project.

Sensitivities were highlighted by the specialists whom also provided specific mitigation measures.

Measures indicated in **Table 15 (EMPr)** must be implemented during the construction and operational phases of the proposed development in order to ensure responsible management of the aspects and associated impacts of the proposed development on the receiving environment.

Mitigation measures were formulated with the assistance of input received from the professionals indicated in **Table 14** forming part of the project team:

Specialist field	Specialist	Qualifications
Interdesign Landscape Architects	Mrs Karen Botes	BL (UP) MTech (Hort.) cum laude PrLArch.
Cultural Heritage Resources	Dr. Johnny van Schalkwyk	BA: UP BA (Hons) Archaeology UP Post Graduate Diploma in Museum Science UP BA (Hons) Anthropology UP MA Anthropology UP D.Litt et Phil (Anthropology UNISA)
Ecological Assessment	Dr BJ Henning	Ph D Plant Ecology MSc Soil Science Pr Nat Sci
Avifaunal Assessment	Dr BJ Henning	Ph D Plant Ecology MSc Soil Science Pr Nat Sci
Soil and Land Capability Assessment	Dr BJ Henning	Ph D Plant Ecology MSc Soil Science Pr Nat Sci
Hydrogeological Assessment	Professor JL van Rooy Mathyss A Dippenaar	Pr.Sci.Nat PhD (Pret) FSAIEG MGSSA M.Sc.Pr.Sci.Nat.
Geotechnical Investigation	Professor JL van Rooy	Pr.Sci.Nat PhD (Pret) FSAIEG MGSSA
Civil Engineering Services	SD Holtzhausen	Pr Eng
Traffic Impact Assessment	JJ Potgieter	BSc Eng (Hons) Transportation

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Table 15: EMPr

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
<b>PRE CONSTRUCTION PHASE</b>					
Review , familiarise and approval of EMPr	To ensure sound environmental management on site	<ul style="list-style-type: none"> <li>■ The final EMPr must include considerations as deemed necessary and relevant by the deciding authority</li> </ul>	Deciding Authority, Developer, Environmental Control Officer , Environmental Assessment Practitioner (ILA)	Review of Environmental Authorisation Conditions subject to environmental audits	Pre-construction phase
Duties of the Developer	The developer remains ultimately responsible for ensuring that the development proceeds according to the requirements of the EMPr	<ul style="list-style-type: none"> <li>■ Ensure that sufficient resources are available to all role players to perform their tasks in terms of the EMPr</li> <li>■ Include the EMPr in the tender documentation so that the appointed contractor is bound to the conditions of the EMPr.</li> <li>■ Take responsibility and the necessary actions required for restoring the environment in the event of negligence leading to damage of the environment.</li> <li>■ Appoint of an independent Environmental Control Officer (ECO) during the pre-construction phase to oversee all the environmental aspects relating to the development.</li> <li>■ Provide the ECO with all reasonable assistance to facilitate effective monitoring</li> </ul>	Developer	Preparation of environmental audits to be submitted to the Dept. of Environmental Affairs (DEA) during the construction phase. A 30 day written notice to be provided to DEA prior to commencement of construction	Pre-construction and construction phases
Appointment and duties of Environmental Control Officer	To ensure monitoring and implementation of the	<ul style="list-style-type: none"> <li>■ The Developer must appoint an independent Environmental</li> </ul>	Developer, ECO, Contractor	Permit to be issued for	Pre-construction

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
(ECO)	EMPr, by an independent third party. To report on the developer's compliance with the EMPr	<p>Control Officer (ECO) who must monitor the developer and contractor's compliance with the EMPr on a continuous basis, with particular reference to:</p> <ul style="list-style-type: none"> <li>■ Removal of protected trees on site – permit to be obtained from DAFF prior to commencement of construction</li> <li>■ Limiting construction activity within the demarcated construction areas of 120 ha</li> <li>■ Unnecessary damage to vegetation</li> <li>■ Implementation of stormwater management measures</li> <li>■ Compliance with all relevant requirements of environmental law</li> <li>■ The ECO shall report on the findings of monitoring to the Dept. of Environmental Affairs (DEA) on a monthly basis during the construction phase</li> <li>■ The developer must provide all contractors and sub-contractors with a copy of the EMPr.</li> <li>■ The ECO must attend all relevant project meetings on a continuous basis.</li> <li>■ Prior to the commencing of activities on site, the contractors must ensure that</li> </ul>		relocation of protected species; Removal of protected tree species to take place in conjunction with DAFF; Submission of monthly environmental audits to DEA.; DEA to be provided with contact details of ECO	and construction phases

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		the construction crew attend an environmental briefing and training session with respect to guidelines outlined in this EMPr.			
Appointment and duties of the Environmental Liaison Officer (ELO)	To ensure day to day monitoring of construction activities on site, compliance and co-operation of all personnel	<ul style="list-style-type: none"> <li>■ The contractor must appoint and Environmental Liaison Officer (ELO)</li> <li>■ The ELO must preferably be fluent in the languages of the work crew</li> <li>■ The person appointed as the ELO must have an environmental background in order to ensure that the ELO is competent to execute this duties efficiently</li> </ul>	Contractor Contractor Contractor	DEA to be provided with contact details of ELO	Pre-construction phase
Review of the Contractor's Health and Safety Plan	<p>To ensure compliance with the regulations of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993)</p> <p>To ensure a construction site that is safe not only to workers, but also to the surrounding properties and the owners/residents</p>	<ul style="list-style-type: none"> <li>■ The contractor must at all times comply with the requirements of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993) and the regulations under this Act.</li> <li>■ The contractor must prepare and submit a Health and Safety Plan that addresses all aspects related to maintaining a safe and healthy environment, as per the requirements of the Occupational Health and Safety Act, 1993 (Act 85 of 1993), including the Construction Regulations (GNR 1010, Government Gazette 25207 of 18 July 2003).</li> <li>■ The safety plan must include a method statement, stipulating</li> </ul>	Contractor Contractor Contractor	Safety plan to be included in first construction phase audit report for submission to DEA;	Pre-construction and construction phases

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>requirements in terms of fire control and procedures to be followed in the event of fire, including fire fighting and fire training.</p> <ul style="list-style-type: none"> <li>■ Emergency procedures must be produced and communicated to all employees on site. This will ensure that accidents are responded to appropriately and the impacts thereof are minimised. This will also ensure that potential liabilities and damage to the environment and lives are avoided.</li> <li>■ The nearest emergency service provider must be identified as well as its capacity and the magnitude of accidents it will be able to handle.</li> <li>■ The contact details of this emergency centre, as well as the police and ambulance service must be available at a prominent location at the construction site and the construction crew camp.</li> <li>■ The contractor must have a basic spill control kit available at the construction camp and around the construction site. These kits must include absorbent material that can handle all forms of hydrocarbon. The contractor shall ensure that at least the site foreman and the ELO have received formal training in the use</li> </ul>	<p>Contractor, ELO</p> <p>Contractor, ELO</p> <p>Contractor, ELO</p>	<p>Training records</p>	

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		of the spill control kit.			
The EMPr	To ensure effective environmental management on site during construction and operation	<ul style="list-style-type: none"> <li>■ This EMPr must be made binding to the main contractor as well as individual contractors and must be included in tender documentation for the construction contract.</li> <li>■ Contract with contractor to include penalties in the event of non-compliance with this EMPr. A penalty system will be devised prior to commencement of construction, during the planning phase.</li> </ul>	Developer, ECO	Minutes of handover should reflect that EMP has been made available to main contractor; Records to be kept i.e. environmental incident log and complaint record sheet	Pre-construction and construction phase & construction phase
Awareness of the workforce	To ensure effective environmental management on site during construction and operation	<ul style="list-style-type: none"> <li>■ It is the contractor's responsibility to ensure that the workforce is aware of and conforms to the environmental guidelines that are applicable in this EMPr</li> <li>■ Environmental briefing session to be undertaken with every individual working on site</li> </ul>	Contractor	No reports of environmental incidents	Continuous
Record of environmental incidents	<p>To ensure that incidents are recorded and remedial action is taken that would restore the environment to acceptable conditions</p> <p>To ensure quick and appropriate response to environmental incidents</p> <p>To ensure adequate</p>	<ul style="list-style-type: none"> <li>■ The contractor shall take corrective action to mitigate an incident appropriate to the nature and scale of the incident, immediately after the occurrence of the incident</li> <li>■ Residual environmental damage that remains after having taken corrective action shall be rehabilitated</li> <li>■ Change operating procedures where necessary to prevent</li> </ul>	Contractor, ELO and Project Engineer	Environmental incident log / Report	Pre-construction and construction phases

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
	<p>recordings of environmental incidents</p> <p>To prevent recurrence of similar incidents</p>	<p>recurrence of similar accident</p> <ul style="list-style-type: none"> <li>■ Record all incidents on an Environmental Incident Report, within 24 hours of the incident occurring. Additional documents, including photos shall be appended to the incident report to provide a comprehensive record of the incident and the corrective and preventative action taken. Failure to do so shall result in a penalty.</li> <li>■ All incidents will be investigated in collaboration with the ECO. The focus of these investigations shall not be to apportion blame to specific employees, but to ascertain the root cause of the incident and to prevent a recurrence of similar incidents</li> </ul>			
<p>Planning and Design</p>	<p>To mitigate the potential visual impact</p> <p>To ensure minimal negative impact to the natural environment, fauna and invertebrates</p>	<ul style="list-style-type: none"> <li>■ The Detail Design Plan and all other construction drawings shall be verified on site by the ECO prior to the onset of any construction work.</li> <li>■ Prior to the commencement of construction activities the entire construction servitude, including lay down areas and stock pile areas must be fenced off and clearly demarcated restricted to an area on 120 ha. All construction activity to be contained within this servitude;</li> <li>■ Any discrepancies must be brought to the attention of the</li> </ul>	<p>Developer, Architect, Engineer, Landscape Architect, wetland specialist</p>	<p>Final Site Development Plan, Stormwater Management measures, permit from DAFF</p>	<p>Pre-construction, design and planning phases</p>

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>Relevant Authority.</p> <ul style="list-style-type: none"> <li>■ The Contractor shall submit to the site agent for his approval, plans of the exact location, extent and construction details of construction camps, offices, workshops and testing facilities on the site and the impact mitigation measures the Contractor proposes to put in place.</li> <li>■ The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas. If the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located close to water courses, streams and rivers, contamination should be avoided.</li> <li>■ All mitigation measures highlighted in the Desktop Geotechnical Report by J Louis van Rooy Engineering Geologist must be adhered to.</li> <li>■ All mitigation measures highlighted in the Ecological, Avifaunal and Soil and Land Capability Assessments by AGES (Pty) Ltd must be adhered to</li> <li>■ All mitigation measures highlighted in the Heritage Impact Assessment by J van Schalkwyk (D Litt et Phil), Heritage Consultant must be</li> </ul>			



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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>adhered to</p> <ul style="list-style-type: none"> <li>■ Use of only specifically designed lighting equipment</li> <li>■ Prior to removal of protected trees on site – permit to be obtained from DAFF prior to commencement of construction</li> </ul>			
Storm Water Control Measures	To restrict impacts of erosion and sedimentation	<ul style="list-style-type: none"> <li>■ Stormwater Control Measures must be implemented as advised by the civil engineer.</li> <li>■ The Stormwater control measures should include the provision of bio swales and grassed channels along the internal roads and in-between the strings of solar panels.</li> </ul>	Developer, Engineer, landscape architect	DWA & DEA approved Stormwater Control Measures	Pre-construction phase
Rehabilitation plan	Rehabilitation of disturbed areas	<ul style="list-style-type: none"> <li>■ A rehabilitation plan must be compiled by a landscape architect for areas affected by construction of the solar farm. Areas affected by erosion should be rehabilitated</li> <li>■ The rehabilitation plan must be developed taking into consideration the storm water control measures to be implemented</li> </ul>	Developer, landscape architect	Rehabilitation plan to be compiled by a landscape architect	Pre-construction phase

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
<b>CONSTRUCTION PHASE</b>					
<b>ADVERSE IMPACTS</b>					
<b>Socio-economic</b>					
Nuisance to surrounding farms i.e. noise and dust generation	Limit noise emanating from construction.	<ul style="list-style-type: none"> <li>■ Construction shall only take place between 08:00 and 17:00 on weekdays and between 08:00 and 13:00 on Saturdays, in order to minimise the disturbance caused by noise emanating from the construction site;</li> <li>■ Blowing of waste material by the wind to neighbouring properties should be prevented. Loose material should be dampened or covered;</li> <li>■ The area on which the proposed construction activities will take place should be demarcated/fenced off in order to limit the extent of the impacts associated with these activities to a confined area. Where possible, it is proposed that the boundary wall/palisade fence be erected prior to commencement of construction works.</li> <li>■ Construction vehicles to travel at a speed between 10 – 20 km/h when operating on site to avoid dust and excessive noise</li> </ul>	Contractor, Project Manager, and Project Engineer	No reports of non compliance	Construction phase
Heavy vehicle traffic increase on the D1675 (Steenbokpan Road),	Minimize impact on traffic flow and all major access	<ul style="list-style-type: none"> <li>■ A road safety programme will be implemented in order to inform all</li> </ul>	Contractor, Project Manager, and	No reports of non	Construction phase

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
<p>which could impact negatively on safety of existing road users. Traffic obstruction during the construction period.</p>	<p>routes.</p>	<p>relevant parties of the possible risks of the construction site including red flags should be used to warn the public and construction vehicle operators at least 100m before crossing points or access route into the construction area and ensuring adequate and correct road signage in the construction affected area.</p> <ul style="list-style-type: none"> <li>■ Limit construction activities strictly to daylight hours.</li> <li>■ Dust controlling measures such as spraying of the construction site and tyres of vehicles before leaving the site should be implemented to reduce the impact of dust generated during construction.</li> <li>■ Sand stockpile heaps should be dampened regularly</li> <li>■ Designated routes are to be determined for construction vehicles</li> <li>■ The proposed solar farm development on the Remainder of the Farm Vangpan 294 LQ (approximately 731 ha), Lephalale, Limpopo Province be approved subject to the proposed road upgrades being implemented.</li> <li>■ The developer constructs accesses to the proposed development site.</li> </ul>	<p>Project Engineer</p>	<p>compliance</p>	

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ The developer constructs pedestrian and public transport facilities where required in consultation with the relevant departments of the local municipality and Roads Agency Limpopo (RAL)</li> <li>■ The geometric layouts of the upgrades on roads be submitted to the relevant department of the Lephalale Municipality and RAL for approval.</li> </ul>			
Possible damage to heritage resources, subterranean artefacts	Preservation of heritage resources/ archaeological artefacts and graves.	<ul style="list-style-type: none"> <li>■ An informal burial place with 3 marked graves, are located on the Remainder of the farm Vangpan 294 LQ - it is recommended that this feature is formally fenced off with a buffer zone of at least 20 metres from the centre of the middle grave. This large buffer is necessary to accommodate possible unmarked graves.</li> <li>■ The fence must be erected by use of natural materials (wooden pegs around the 20m diameter to make people aware of its existence and to allow for movement of animals)</li> <li>■ No archaeological structures/ artefacts may be removed, destroyed or interfered with prior to issuing of permit by SAHRA.</li> <li>■ The Contractor must immediately cease construction activities and inform an archaeological specialist and SAHRA within 24 hours,</li> </ul>	Contractor	No destruction of archaeological finds / removal of artefacts No destruction of the two graves located on the site	Construction phase

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>should they come across any archaeological artefacts/ sites.</p> <ul style="list-style-type: none"> <li>■ The relevant heritage resources authority and the archaeologist must be informed as a matter of urgency should any human remains be exposed on the terrain</li> <li>■ All recommendations made in the Heritage Impact Assessment by J van Schalkwyk (D Litt et Phil), Heritage Consultant dated October 2012 must be adhered to.</li> <li>■ No destruction of the two graves located on the site as this area fall outside of the 120 ha development footprint</li> </ul>			
Crime may increase as a result of contract workers in the area	Prevent loss of assets of surrounding landowners	<ul style="list-style-type: none"> <li>■ No building activities to be allowed after hours during weekdays, or over weekends</li> <li>■ Building contractor to make use of labour from local communities of Steenbokpan Village and Lephalale which will imply no contract workers residing on the premises.</li> <li>■ Workers should be provided with transport to and from their residences by the contractor</li> <li>■ Only a limited number of two night watchmen to be allowed to overnight on property to ensure safety of equipment stored on site.</li> </ul>	Contractor	No reports of non compliance, spills or other environmental incidents	Construction phase

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
<p>Stockpile areas for construction materials, generation and disposal of building waste and liquids and vehicle maintenance could impact on groundwater. Stockpile areas often host hazardous substances such as cement, petrol, diesel, oil, etc.</p>	<p>Risk of ground and air pollution due to construction waste should be prevented.</p>	<ul style="list-style-type: none"> <li>■ Domestic waste generated on site during construction to be collected in waste skips. Waste skips to be fitted with lids to prevent littering; this must also be implemented during transportation of skips.</li> <li>■ This skip must be placed at a centralised collection point and frequently removed by a licensed waste contractor and disposed of at a municipal waste site.</li> <li>■ No material may be dumped in the surrounding region. Written proof of disposal at a registered waste disposal site must be given to the site manager on every load of construction waste removed from the site. It is the responsibility of the site manager to keep records of certificates</li> <li>■ Adequate on-site chemical sanitation systems (one toilet for every 8 workers) must be provided within walking distance to all construction workers. Strict penalties in re-numeration must be applied for workers that use other surrounding open areas for this purpose.</li> <li>■ No waste material may be burnt on-site.</li> <li>■ Waste to be disposed at recognised and certified landfill sites.</li> </ul>	<p>Building Contractor</p>	<p>No reports of non compliance</p>	<p>Construction phase</p>

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ Hazardous waste to be disposed of at licensed H:H site</li> <li>■ Solid construction waste not posing a pollution hazard should be used on site as a filling material. Should no filling material be required this waste should be disposed off.</li> <li>■ To prevent spillages, no diesel or oil should be stored on site, other than what is required for work undertaken during the course of one day. Spills should be cleaned up with approved absorbent material such as 'Drizit' or 'Spillsorb'. These should be kept in sufficient quantities on site to deal with small spills.</li> <li>■ Liquid waste to be stored in bunded area. Bunded area to have complete seal and a volume equal to 110% of the total volume of liquid stored in the area.</li> <li>■ Liquid waste to be disposed of at a class HH site only.</li> <li>■ The following guidelines apply for the use of cement on site:               <ul style="list-style-type: none"> <li>▪ Careful control of all on site operations that involve the use of cement and concrete;</li> <li>▪ Limit cement and concrete mixing to single sites where possible;</li> <li>▪ Use plastic trays and liners when mixing cement and concrete. No cement or concrete may be mixed on open soil;</li> </ul> </li> </ul> <p>Dispose of all visible remains of excess cement and concrete after</p>			

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
Construction works could impact negatively on the fauna [Habitat destruction and fragmentation]	Minimise impact on fauna and flora in sensitive vegetation areas.	<ul style="list-style-type: none"> <li>▪ Disturbed areas must be rehabilitated as per the specifications of the rehabilitation plan as soon as possible</li> <li>▪ The contractor must ensure that no fauna species are disturbed, trapped, hunted or killed during the construction phase.</li> </ul>	Contractor, Engineer and ECO, Landscape Architect	No reports of non compliance. Implementation of approved rehabilitation plan	Planning and construction phase
Damage to and removal of protected trees	Flora endemic of area and biome to be preserved.	<ul style="list-style-type: none"> <li>■ Disturbed areas must be rehabilitated as soon as possible;</li> <li>■ Prior to construction activities commencing Prior to removal of protected trees on site – permit to be obtained from DAFF prior to commencement of construction</li> <li>■ All lay down areas, material stockpiles, temporary construction camps and support infrastructure and heavy machinery parking areas must be located within the designated area of 7.4 ha</li> <li>■ Such areas should be clearly demarcated and all associated activities restricted to the demarcated areas</li> </ul>	Contractor, Project Engineer, Flora Specialist, ELO and ECO	Permits to be issued by DAFF for relocation/ removal of protected tree species	Planning and construction phase
Mammalian, reptile, and avian species will move to adjacent properties during the construction phase	Minimise disturbance of mammalian habitats, conserve existing fauna.	<ul style="list-style-type: none"> <li>■ All activities on site must comply with the regulations of the Animal Protection Act, 1962 (Act No.71 of 1962).</li> <li>■ No fauna are to be trapped, hunted or killed on the application site or adjacent properties</li> <li>■ If any bird, mammal, amphibian or</li> </ul>	Developer, Contractor, ELO, ECO		Planning and construction phase



Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>reptile is found during construction, these animals must be relocated to undisturbed areas or to conservation areas close by.</p> <ul style="list-style-type: none"> <li>■ The Contractor shall advise his workers of the penalties associated with the needless destruction of wildlife, as set out in the Animals Protection Act, 1962 (Act 71 of 1962) sec. 2 (fine R2,000.00 and/or 12 months imprisonment).</li> <li>■ All the larger indigenous trees (&gt;3m) on the site should be conserved wherever possible and incorporated into the design of the individual stands.</li> <li>■ Perimeter walling and fence structures should be of the palisade fence type, and should be at least 150 mm apart. The palisade fence should be without any ground-level impediments;</li> <li>■ Allowance should be made during construction for the free movement of all natural biota through unnatural barriers, such as fences, walls and stormwater management features</li> </ul>			
De-vegetation of areas of construction and loss of topsoil due to construction of internal roads, units and installation of services as well as environmental disturbance caused by trenching	Prevention of associated soil loss which could result in dust generation and would impact negatively on the natural environment	<ul style="list-style-type: none"> <li>■ Construction schedules to indicate which areas can be cleared for construction work</li> <li>■ Construction sites should be watered/ wetted on a regular, monitored basis to prevent dust</li> </ul>	Contractor, ELO, ECO, and Project Engineer	No incidents of erosion reported, implementation of approved rehabilitation	Construction phase

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
<p>which could result in wind and water erosion as well as dust generation</p>		<p>formation.</p> <ul style="list-style-type: none"> <li>■ Regular inspections by the ECO to ensure compliance with these regulations.</li> <li>■ Where rehabilitation of cleared areas is planned topsoil should be preserved for this purpose</li> <li>■ Areas to be rehabilitated as soon as possible after disturbance to satisfaction of the ECO</li> <li>■ The temporary storage of topsoil, inert spoil, fill, etc. must be away from stormwater systems</li> <li>■ Wind erosion could be limited by dampening of soil. This could also assist in reducing dust associated with construction activities;</li> <li>■ The construction process should be phased so as to limit the extent of exposed areas at any one time, and so that for any specific area, the time between initial disturbance and completion of construction is as short as possible;</li> <li>■ Construction activities should take place within the dry season, specifically construction of the wetland crossings;</li> <li>■ Disturbed areas should be rehabilitated on an ongoing basis to prevent long-term impacts and severe erosion.</li> </ul>		<p>and stormwater management plan</p>	

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
Stripping of topsoil	To decrease the loss of topsoil	<ul style="list-style-type: none"> <li>■ The top layer of all areas to be excavated for the purposes of construction shall be stripped and stockpiled in areas where this material will not be damaged, removed or compacted.</li> <li>■ This stockpiled material shall be used for the rehabilitation of the site and for landscaping purposes.</li> <li>■ When the stripping of topsoil takes place, the grass component shall be included in the stripped topsoil. The soil will contain a natural grass seed mixture that may assist in the re-growth of grass once the soil is used for rehabilitation.</li> <li>■ Strip topsoil at start of works and store in stockpiles no more than 2m high and 4m2 footprint in the designated materials storage area.</li> </ul>	Contractor, ELO, ECO		Construction Phase
Waste Management	To ensure the responsible disposal of waste generated by the contractor and to prevent the accumulation of litter and waste on site and in the surrounding area	<ul style="list-style-type: none"> <li>■ The contractor must adhere to all the relevant laws and regulations applicable to the disposal of construction waste and rubble.</li> <li>■ The contractor shall provide sufficient closed containers on site, as well as waste skips, which must be placed in the crew camp, to handle the amount of litter, wastes, and builder's wastes generated on site.</li> <li>■ Containers shall be emptied once weekly by a licensed waste contractor and disposed of at a municipal waste site. No solid</li> </ul>	Contractor, ELO, and ECO	No reports of non compliance	Construction phase

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>waste or any materials used may be disposed of on site</p> <ul style="list-style-type: none"> <li>■ No rubble or discarded building material may remain on site for more than one week.</li> <li>■ Burning of waste on site is not permitted</li> <li>■ Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site</li> <li>■ No material may be dumped in the surrounding region. Written proof of disposal at a registered waste disposal site must be given to the ELO on every load of construction waste removed from the site</li> <li>■ Liquid waste consists mainly of used oil, contaminated fuel, and lubricants, as well as waste paint etc. Liquid wastes to be collected in original containers. Liquid waste to be stored in bunded area. Bunded area to have complete seal and a volume equal to 110% of the total volume of liquid stored in the area. Liquid waste to be disposed of at a class HH site only.</li> <li>■ Waste bins with lids shall be provided on site for all waste pertaining to food and drinks. These shall be supplied in close proximity to the area where the workers eat.</li> </ul>			

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ The waste bins shall be cleared by a waste truck on a weekly basis</li> </ul>			
<p>Fuel Storage use of spill kits and decontamination procedure</p>	<p>To prevent possible soil, stormwater and groundwater contamination and provide measures for dealing with a spill</p>	<ul style="list-style-type: none"> <li>■ To prevent spillages, no diesel or oil should be stored on site, other than what is required for work undertaken during the course of one day. Spills should be cleaned up with approved absorbent material such as 'Drizit' or 'Spillsorb'. These should be kept in sufficient quantities on site to deal with small spills.</li> <li>■ Liquid waste and hydrocarbons to be stored in bunded areas. Bunded area to have complete seal and a volume equal to 110% of the total volume of liquid stored in the area.</li> <li>■ Liquid waste to be disposed of at a class HH site only.</li> <li>■ Spill kits must be available in all vehicles that transport hydrocarbons for dispensing to other vehicles on the site. The dispensing devices (pump heads) must be compatible with the vehicles to which they are dispensing. In addition the dispensing devices must be fitted with the necessary valves/apparatus that will ensure that the nozzles do not drip fuel after pumping has stopped.</li> </ul>	<p>Contractor, ECO, Health and Safety Representative</p>	<p>No incidents reported</p>	<p>Construction Phase Continuous</p>

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ In the event of spills from vehicles, the area should be cleaned immediately using a bioremediation product, such as Petro-Clean TM. The absorbent and soil must be placed in a bin and removed from the site by a certified company and disposed of as a hazardous waste at a licensed commercial facility.</li> <li>■ Firebreaks to be implemented with adequate water available on site for fire fighting purposes.</li> </ul>			
Vehicle Maintenance	To prevent possible contamination of soil and groundwater as well as stormwater	<ul style="list-style-type: none"> <li>■ The maintenance of vehicles and equipment used for any purpose during the development will take place only in the maintenance yard.</li> <li>■ Drip trays to be placed under vehicles whilst repairs are undertaken.</li> <li>■ Equipment used in the development process must be adequately maintained so that during operations it does not spill oil, diesel, fuel, or hydraulic fluid.</li> <li>■ Machinery or equipment used on the site must not constitute a pollution hazard in respect of the above substances. The main contractor or ECO shall order such equipment to be repaired or withdrawn from use if he or she considers the equipment or machinery to be polluting and irreparable.</li> </ul>	Engineer, ECO, Contractor	No incidents reported	Construction Phase continuous

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
Sanitation (toilet facilities)	<p>To maintain the construction area in a hygienic condition and prevent the spread of disease</p> <p>To prevent pollution of surface or groundwater</p>	<ul style="list-style-type: none"> <li>■ Adequate on-site chemical sanitation systems, at least one toilet for every 8 workers, must be provided</li> <li>■ Toilets must be located within the construction camp</li> <li>■ Toilets shall be serviced once a week to prevent spillages</li> <li>■ Under no circumstances may ablutions occur outside of the provided facilities</li> </ul>	Contractor, ELO and ECO	No incidents of non compliance reported	Construction phase
Unsupervised and misuse of fire on site could impact negatively on the environment	To reduce risk of fire on site	<ul style="list-style-type: none"> <li>■ Fires will only be allowed in a facility especially constructed for the purpose of keeping warm and for on site cooking, within the site camp.</li> <li>■ The ECO is to be informed as to the type of cooking facilities that will be used prior to construction.</li> <li>■ Wood for the fire must be supplied by the contractor and NOT taken from the surrounding area.</li> <li>■ Heavy smoke may not be released into the air.</li> <li>■ Any fire that is ignited outside of the construction camp must be extinguished immediately.</li> <li>■ Fire extinguishers must be provided at the site camp, where it is easily accessible.</li> <li>■ Fire extinguishers must be serviced, full and in good working order.</li> <li>■ The contractor's Health and Safety Plan must include particulars in</li> </ul>	Contractor, ELO, Health and Safety Representative and ECO	No incidents of fire on site	Construction phase

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		terms of fire fighting and training. ■ Firebreaks to be implemented with adequate water available on site for fire fighting purposes			
Impact on avifaunal Population (Avifaunal Assessment Recommendations)	To reduce risk of avifaunal collisions and electrocutions	■ The removal of vegetation should be confined to the footprints of the proposed developments and associated infrastructure ■ Peripheral impacts on the larger area should be avoided. ■ All large trees to be preserved as far as possible ■ A monitoring programme needs to be implemented by a specialist if any rare species are confirmed on the property. ■ Where trenches pose a risk to bird safety, they should be adequately cordoned off to prevent ground-living birds falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling of trenches during construction process. ■ No birds may be poached during the construction of the solar plant, which includes power lines. ■ Many birds are protected by law and poaching or other interference could result in a fine or jail term. ■ Feeding of any birds on site is prohibited. ■ The use of poisons for the control of rats, mice or other vermin	Developer Contractor, ELO	No incidents of deaths reported	Construction phase



Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>should only be used after approval from an ecologist.</p> <ul style="list-style-type: none"> <li>■ Monitoring of the environmental aspects should be done over the longer term to ensure that impacts are limited to a minimum during the constructional and operational phases. Monitoring of specific bird species is necessary to ensure that these species would be unaffected over the longer term by the development. Information on red data species should be provided to construction workers to make them more aware of these fauna and their behaviour.</li> <li>■ The removal of indigenous trees and shrubs should only occur on the footprint area of the development and not over the larger area. No trees may be trimmed or removed without the prior permission of the landowner and only protected trees can only be eradicated after permits have been obtained from Department of Forestry. The clearing and damage of plant growth in these areas should be restricted to the footprint way leave area.</li> <li>■ Clearly demarcate the entire development footprint prior to initial site clearance and prevent construction personnel from leaving the demarcated area.</li> </ul>			

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ Monitoring should be implemented during the construction phase of the Photovoltaic Power Plant to ensure that minimal impact is caused to the fauna of the area.</li> <li>■ Use existing facilities (e.g., access roads) to the extent possible to minimize the amount of new disturbance.</li> <li>■ Ensure protection of important resources by establishing protective buffers to exclude unintentional disturbance. All possible efforts must be made to ensure as little disturbance as possible to sensitive bird habitats during construction.</li> <li>■ During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, in order to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place.</li> <li>■ Construction activities must remain within defined construction areas and the road servitudes. No construction / disturbance will occur outside these areas.</li> <li>■ Power line structure can present electrocution hazards to birds when less than adequate</li> </ul>			

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>separation exist between energized conductors or between energized conductors and grounded conductors. Avian-safe facilities can be provided by one or more of the following mitigation measures:</p> <ul style="list-style-type: none"> <li>▪ Increasing separation between abovementioned conductors to achieve adequate separation for the species involved (larger birds, raptors).</li> <li>▪ Covering energized parts and / or covering grounded parts with materials appropriate for providing incidental contact protection to birds.</li> <li>▪ Applying perch managing techniques such as conspicuous objects and support roosting sites along the power line that would allow large raptors and bustards to safely roost.</li> </ul> <ul style="list-style-type: none"> <li>■ The high risk sections of line should be marked with a suitable anti-collision marking device on the earth wire as per the Eskom guidelines.</li> <li>■ Should birds collide with the solar panels, efforts should be made to restrict access by birds into the relevant, hazardous areas of the facility.</li> </ul>			

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ Specialist advice should be sought in devising effective avian deterrents to minimize associated damage.</li> </ul>			
Prevention of unauthorised access to the site	Prevent theft and crime on site	<ul style="list-style-type: none"> <li>■ Access to site to be controlled</li> <li>■ Only security personnel should be allowed to overnight on the site.</li> <li>■ Access control (I.D. cards) should be enforced at the entrance gate to ensure that no unauthorised persons enter the site.</li> </ul>	Contractor, ELO	No complaints of crime and theft	Construction phase
Loss of agricultural potential and land capability due to construction of solar farm Protection of Soil: Avoidance of soil compaction, erosion and pollution.	Avoid unreasonable loss of agricultural land	<ul style="list-style-type: none"> <li>■ Soil should be handled when dry during removal and placement to reduce the risk of compaction;</li> <li>■ Vegetation (grass and small shrubs) should not be cleared from the site prior to clearing (except if vegetation requires relocation as determined through an ecology assessment). This material is to be stripped together with topsoil as it will supplement the organic and possibly seed content of the topsoil stockpile depending on the time of soil stripping (whether plants are in seed or not)</li> <li>■ Soil should be sampled and analysed prior to replacement during rehabilitation. If necessary, and under advisement from a suitably qualified restoration ecologist, supplemental fertilisation may be necessary.</li> <li>■ During construction, sensitive soils</li> </ul>	Contractor , ELO	No unnecessary disturbance to soil	Construction phase

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>with high risk of compaction (e.g. clayey soils) must be avoided by construction vehicles and equipment, wherever possible, in order to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place.</p> <ul style="list-style-type: none"> <li>■ Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices. Control dust on construction sites and access roads using water-sprayers.</li> <li>■ Institute a storm water management plan including strategies such as: <ul style="list-style-type: none"> <li>▪ Minimising impervious area</li> <li>▪ Increasing infiltration to soil by use of recharge areas</li> <li>▪ Use of natural vegetated swales instead of pipes or</li> <li>▪ Installing detention or retention facilities with graduated outlet control structures.</li> </ul> </li> <li>■ Conservation of topsoil should be prioritized on site and done as follows: <ul style="list-style-type: none"> <li>▪ Topsoil should be handled twice only - once to strip and stockpile, and secondly to</li> </ul> </li> </ul>			

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>replace, level, shape and scarify.</p> <ul style="list-style-type: none"> <li>▪ Stockpile topsoil separately from subsoil.</li> <li>▪ Stockpile in an area that is protected from stormwater runoff and wind.</li> <li>▪ Topsoil stockpiles should not exceed 2.0 m in height and should be protected by a mulch cover where possible.</li> <li>▪ Maintain topsoil stockpiles in a weed free condition.</li> <li>▪ Topsoil should not be compacted in any way, nor should any object be placed or stockpiled upon it.</li> <li>▪ Stockpile topsoil for the minimum time period possible i.e. strip just before the relevant activity commences and replace as soon as it is completed.</li> </ul> <ul style="list-style-type: none"> <li>■ Dry chemicals to be stored on an impervious surface protected from rainfall and stormwater run-off;</li> <li>■ Ensure that refuelling stations on site are constructed so as to prevent spillage of fuel or oil onto the soil, and put in place measures to ensure that any accidental spillages can be contained and cleaned up promptly.</li> <li>■ Spill kits should be on-hand to deal with spills immediately;</li> </ul>			

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ Spillages or leakages must be treated according to an applicable procedure as determined by a plan of action for the specific type of disturbance;</li> <li>■ All construction vehicles should be inspected for oil and fuel leaks regularly and frequently. Vehicle maintenance will not be done on site except in emergency situations in which case mobile drip trays will be used to capture any spills. Drip trays should be emptied into a holding tank and returned to the supplier.</li> </ul>			
Loss of grazing and roosting land for existing faunal and avian species	Protection of faunal and avian habitat	<ul style="list-style-type: none"> <li>■ No clearing of vegetation to occur outside footprint area</li> <li>■ No vehicles to travel outside footprint area</li> <li>■ Disturbed areas must be rehabilitated as per the specifications of the rehabilitation plan as soon as possible</li> <li>■ The contractor must ensure that no fauna species are disturbed, trapped, hunted or killed during the construction phase.</li> </ul>	Contractor , ELO	No unnecessary disturbance to wildlife habitat	Construction phase
Increased risk of erosion due to site clearance, removal of vegetation, soil disturbance and compaction	Reduce risk of erosion	<ul style="list-style-type: none"> <li>■ Have both temporary (during construction) and permanent erosion control plans.</li> <li>■ Temporary control plans should include: <ul style="list-style-type: none"> <li>▪ Short term seeding or mulching of exposed soil areas (particularly on slopes)</li> </ul> </li> </ul>	Contractor , ELO	No evidence of soil erosion	Construction phase

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>▪ Limitations on access for heavy machinery and the storage of materials to avoid soil compaction.</li> <li>■ Permanent erosion control plans should focus on the establishment of stable native vegetation communities.</li> <li>■ Other mitigation measures needed to prevent soil erosion include:               <ul style="list-style-type: none"> <li>▪ Ensure the amount of bare soil exposed is minimized by staging earthworks in phases and leaving as much ground cover intact as possible during construction.</li> <li>▪ Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas.</li> </ul> </li> </ul>			
Increased rate of stormwater run-off from solar panels	To reduce the rate of run-off	<ul style="list-style-type: none"> <li>■ Cleared areas to be restored by re-planting of indigenous species as soon as possible</li> <li>■ Slopes that occur by removal of soil must be kept to a minimum to reduce the chances of erosion damage to the area.</li> <li>■ Implementation of bioswales and grass lined channels</li> </ul>	Contractor , ELO	No evidence of soil erosion and sedimentation	Construction phase
Poaching of game by construction team	Avoid game fatalities	<ul style="list-style-type: none"> <li>■ No animal may be hunted, trapped or killed</li> <li>■ All activities on site must comply</li> </ul>	Contractor , ELO	No complaints of game fatalities	Construction phase



Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>with the regulations of the Animal Protection Act, 1962 (Act No.71 of 1962).</p> <ul style="list-style-type: none"> <li>■ No fauna are to be trapped, hunted or killed on the application site or adjacent properties</li> <li>■ If any bird, mammal, amphibian or reptile is found during construction, these animals must be relocated to undisturbed areas or to conservation areas close by.</li> <li>■ No pets to be allowed on site that may threaten other animals</li> </ul>			
Possible damage to existing powerlines/ infrastructure	No incidences of damage	<ul style="list-style-type: none"> <li>■ Contractor to ensure that no existing infrastructure is damaged during construction</li> <li>■ Where applicable the way leave applications must be submitted to stakeholders informing them of position of proposed infrastructure</li> <li>■ Written notice to be sent to adjacent landowners and stakeholders prior to commencement of construction</li> </ul>	Contractor , ELO	No complaints by Eskom, Resgen and other stakeholders that have infrastructure installed in the area	Construction phase
Geotechnical Recommendations	Ensure site stability	<ul style="list-style-type: none"> <li>■ All structures be provided with a metre wide apron along all foundation walls to prevent large moisture changes in the soils beneath foundations and to limit seasonal moisture changes in the soils below the structure footprint areas.</li> <li>■ All water bearing services (if applicable) will need to be fixed with flexible couplings to prevent</li> </ul>	Contractor , Developer, Engineer	No incidents related to stability	Construction phase

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>water leakage due to local differential settlements.</p> <ul style="list-style-type: none"> <li>■ Site drainage measures are essential to prevent large soil moisture changes due to ponding of surface water especially since the entire area has a low gradient and runoff will be poor.</li> <li>■ Paved areas and roads may also be prone to subsoil settlements due to the voided nature of the soils and collapsible fabric.</li> <li>■ Compaction of these areas prior to construction will be necessary</li> <li>■ Precautionary measures will be necessary to prevent damage to surface structures and services specifically pertaining to foundations and roads.</li> <li>■ Site drainage measures will be necessary to prevent surface ponding due to the low gradient and imperviousness of some of the sandy horizons</li> </ul>			
<p>Ecological Assessment Recommendations (Flora and Fauna)</p>	<p>To protect flora and fauna</p>	<ul style="list-style-type: none"> <li>■ The tamboti woodland must be preserved</li> <li>■ Vegetation removal should be limited to the footprint areas of the proposed development.</li> <li>■ The unnecessary impact on the surrounding woodland areas outside the development footprint area should be avoided as far as possible.</li> <li>■ Large trees must be retained as far</li> </ul>	<p>Contractor, ELO</p>	<p>No complaints regarding destruction of flora and fauna</p>	<p>Construction Phase</p>

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>as possible as they provide important nesting and perching areas for threatened birds of prey like Ayres' and Tawny eagles</p> <ul style="list-style-type: none"> <li>■ The protection of different habitat types in the area will be important to ensure the survival of the different animals due to each species' individual needs and requirements.</li> </ul>			
Poaching of animals	To protect animals on site	<ul style="list-style-type: none"> <li>■ Where trenches pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling of trenches during construction process.</li> <li>■ A speed limit should be imposed on the access roads to minimise road kills. Speed humps should be constructed at strategic places along the access road to enforce lower speeds.</li> <li>■ Roads should be designed without pavements to allow for the movement of small mammals.</li> <li>■ Hunting, trapping, poisoning and shooting of animals should be prevented. This will necessitate negotiations with the local inhabitants and informal settlers.</li> <li>■ Do not feed any wild animals on site.</li> </ul>	Contractor, ELO	No complaints regarding death of animals	Construction Phase

Proposed Solar Farm on the Remainder of the Farm Vangpan 294 LQ, Lephalale Municipality, Limpopo Province

TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ Poisons for the control of problem animals should rather be avoided since the wrong use thereof can have disastrous consequences for the vulture birds of prey occurring in the area. The use of poisons for the control of rats, mice or other vermin should only be used after approval from an ecologist.</li> <li>■ Waste bins and foodstuffs should be made scavenger proof.</li> <li>■ Control of vehicles in and out of the properties involved.</li> <li>■ Monitoring of the environmental aspects should be done over the longer term to ensure that impacts are limited to a minimum during the constructional and operational phases. Monitoring of specific species such as pythons and specific bird species such as stork species and other water birds is necessary to ensure that this species would be unaffected over the longer term by the development. Information on the rare species should be provided to workers to make them more aware of these species and their behaviour.</li> </ul>			
Blasting (if applicable)	To minimise risks related to blasting	<ul style="list-style-type: none"> <li>■ Wherever blasting activity is required on the site (including quarries and/or borrow pits) the contractor shall rigorously adhere to the relevant statutes and</li> </ul>	Contractor, ELO	No incidents to ne reported	Construction Phase

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>regulations that control the use of explosives.</p> <ul style="list-style-type: none"> <li>■ The contractor shall, prior to any drilling of holes in preparation for blasting, supply the site agent with a locality plan of the blast site on which shall be shown the zones of influence of the ground and air shock-waves and expected limits of fly-rock.</li> <li>■ The plan shall show each dwelling, structure and service within the zones of influence and record all details of the dwellings/structures/services including existing positions, lengths and widths of cracks, as well as the condition of doors, windows, roofing, wells, boreholes etc.</li> <li>■ The contractor, alone, shall be responsible for any costs that can be attributed to blasting activities, including the collection of fly-rock from adjacent lands and fields. The submission of such a plan shall not in any way absolve the contractor from his responsibilities in this regard.</li> <li>■ The contractor shall indicate to the site agent the manner in which he intends to advertise to the adjacent communities and/or road users the time and delays to be expected for each individual blast</li> </ul>			

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ Neighbours are to be notified prior to such activity being undertaken</li> </ul>			
Visual Impact Assessment Recommendations	To prevent visual impacts	<ul style="list-style-type: none"> <li>■ Surface disturbance must be limited during construction;</li> <li>■ Existing vegetation must be retained much as possible;</li> <li>■ Disturbed areas must be rehabilitated immediately after construction;</li> <li>■ Attractive views from public viewing areas e.g. at the entrance to the solar farm must be created;</li> <li>■ Finishes and forms must, as far as reasonably possible, be representative of the rural and natural surrounding area with a low level of reflectivity;</li> <li>■ Structures must be limited to a maximum height of 3.5m above ground level; and</li> <li>■ A lighting engineer must be appointed in order to provide to ensure that potential obtrusive lighting impacts are prevented.</li> </ul>	Contractor, ELO, Developer	No reports of fast visual impacts	Construction Phase
<b>OPERATIONAL PHASE</b>					
Removal of exotic plant species and establishment of indigenous veldgrass, trees, shrubs in degraded areas, which will increase biodiversity and visual quality of these areas.	Enhancement of biodiversity and visual quality of degraded areas.	<ul style="list-style-type: none"> <li>■ During the operational phase of the solar farm the following maintenance measures relating to the removal of weeds will be applicable</li> <li>■ All Classified Invader Species in terms of the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) must be identified,</li> </ul>	Developer	Regular monitoring by local authority and the developer	Operation phases

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<p>eradicated and controlled (i.e. Black Wattle, Blue Gum, Poplar, etc.).</p> <ul style="list-style-type: none"> <li>■ Eradication of weeds and exotic invader plant species must take place manually to avoid water quality deterioration from the use of chemicals.</li> <li>■ Dead weeds/ exotic invader plant species must be discarded and disposed of at landfill sites.</li> </ul>			
Increase of hard surface area i.e. increased stormwater run off, resulting from solar panels	To limit run off	<ul style="list-style-type: none"> <li>■ Maintenance of the roads must be kept up to standard to prevent and reduce the incidence of erosion alongside roads.</li> <li>■ Surface drainage system should be monitored after storms and storm water damage should be repaired (if applicable).</li> </ul>	Developer	No evidence of degradation caused by run off	Operational Phase
Possible electrocution of avian species due to presence of powelines as well as collisions	Avoid electrocution of avifauna	<ul style="list-style-type: none"> <li>■ Power line structure can present electrocution hazards to birds when less than adequate separation exist between energized conductors or between energized conductors and grounded conductors. Avian-safe facilities can be provided by one or more of the following mitigation measures: <ul style="list-style-type: none"> <li>■ Increasing separation between abovementioned conductors to achieve adequate separation for the species involved (larger birds, raptors).</li> </ul> </li> </ul>	Developer	No evidence of fatalities	Operational Phase

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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		<ul style="list-style-type: none"> <li>■ Covering energized parts and / or covering grounded parts with materials appropriate for providing incidental contact protection to</li> <li>■ birds.</li> <li>■ Applying perch managing techniques such as conspicuous objects and support roosting sites along the power line that would allow large raptors and bustards to safely roost.</li> </ul>			
Collision with associated power lines and solar panel infrastructure	Avoid collisions of avifauna	<ul style="list-style-type: none"> <li>■ The high risk sections of line should be marked with a suitable anticollision marking device on the earth wire as per the Eskom guidelines.</li> <li>■ Should birds collide with the solar panels, efforts should be made to restrict access by birds into the relevant, hazardous areas of the facility.</li> <li>■ Specialist advice should be sought in devising effective avian deterrents to minimize associated damage.</li> </ul>	Developer	No evidence of fatalities	Operational Phase
Prevention of veld fires	Prevent loss of biodiversity and damage to property	<ul style="list-style-type: none"> <li>■ Firebreaks to be maintained throughout the operation of the facility and should comply with the National Veldt and Forest Fire Act, 1998 (Chapter 4: Duty to Prepare and maintain firebreaks).</li> <li>■ It is further proposed that 90,000 l of water will be stored in storage</li> </ul>	Developer	No evidence of fatalities	Operational Phase



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TASK/ ENVIRONMENTAL IMPACT	OBJECTIVE	ACTION REQUIRED	RESPONSIBILITY	TARGETS & MONITORING	FREQUENCY
		tanks also for fire fighting purposes			

## SECTION 10: ENVIRONMENTAL IMPACT STATEMENT

### 10. ENVIRONMENTAL IMPACT STATEMENT

*[Regulation 31 (2) (f) &(o)]*

#### 10.1 SUMMARY OF EIA PROCESS FOLLOWED UP TO DATE

Since registration of the project with the LDEDET and then DEA the appropriate environmental process as specified in terms of Section 24 and 24D of the National Environmental Management Act, 1998 (Act 107 of 1998) as amended, and the Environmental Impact Assessment (EIA) Regulations promulgated 18 June 2010 as read with Government Notices R 543 (Regulations 26-35), R544, R545 and R546 as amended for the construction of the proposed dual carriageway has been followed.

Up to date the following actions have formed part of the EIA process:

- ~ Issues raised during the scoping phase have been addressed;
- ~ Alternatives for the proposed development were considered and investigated;
- ~ Environmental issues identified during the environmental scoping exercise were ranked through application of a methodology for the determination of significance, based on the Guidelines compiled by the Department of Environmental Affairs and Tourism;
- ~ Relevant biophysical environmental components of the site were assessed to an appropriate level of detail. This includes the physical, biological, and socio-economic components; and
- ~ A draft Environmental Management Programme has been compiled describing specific measures to be implemented to address significant impacts associated with the proposed solar farm.

#### 10.2 SUMMARY OF KEY FINDINGS

During the scoping and EIA phase up to date it was confirmed by specialist investigations that the biophysical environment affected but the development can be supported provided that all mitigation measures and recommendations from the relevant specialist fields are taken into consideration and implemented diligently.

Alternatives were considered and the proposal was reached taking into account various factors such as the availability of land, existing infrastructure to which the solar farm easily connect with, and the future planning for the area.

#### The site is desirable for the following reasons:

- ~ Availability of land
- ~ The solar farm will be able connected to the Eskom Theunispan substation situated on the same property through a 132 KV line bay as foreseen in the Eskom cost estimation letter (**Appendix D**).
- ~ The 132 kV line bay will be made available by Eskom as per the Eskom cost estimation letter (**Appendix D**).
- ~ The connection will not affect other properties in terms of servitudes etc.
- ~ The mining group Resgen Pty Ltd and Eskom has various EA's issued in their favour which means that the farm Vangpan and all the other surrounding farm portions will be under construction very soon. This is to build a railway line as well as the portable water line.
- ~ Eskom has indicated that the proposed project does not interfere with Eskom's present and future developments, nor affect them negatively.

Taking the above into consideration, the applicant identified the proposed site for the development of the solar facility, which from a technical perspective is highly preferred.

The climate in the area is conducive to solar farms as the area experiences lots of sunny days. In terms of

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the solar farm Eskom Theunispan Substation substation exists along the north eastern boundary on the Remainder of the farm Vangpan 294 LQ as well as Eskom lines that run from north to south along the eastern farm boundary. The site is also affected by a future railway line that traverses the area. The site is therefore extremely desirable in terms of its size and location considering the infrastructure that exists in its vicinity. In terms of the Lephalale SDF the Steenbokpan node has been identified as the Potential Development Area 1 (Steenbokpan node) PDA1. The development area falls in Zone 5 of the EMF, within a major infrastructure corridor. This zone represents areas in close proximity to major coal fields which are being considered for the development of industrial activities to benefit the mineral product and where infrastructure like power generation facilities are being considered. The zone's relationship to existing and likely future transportation infrastructure and necessary urban development is also important. The land use proposal is also considered in line with the objectives of the Environmental Management Zones of the Waterberg EMF as there is a strong parallel between the site and the activities that surround it.

The following protected tree species occur on site:

- ~ *Acacia erioloba*
- ~ *Boscia albitrunca*
- ~ *Combretum imberbe*
- ~ *Sclerocarya birrea (Marula)*
- ~ *Spirostachys Africana (Tamboti)*

The potential impact of the proposed development on the protected tree species would be moderate considering that the species do occur in medium to high densities in certain areas of the site. The protected trees should be incorporated as part of the landscaping and gardens of the site. Permits need to be obtained for the eradication of the species as prescribed above. The tamboti woodland forms a dense stands of tamboti trees and represent a sensitive and unique entity. The recommendation would be to preserve these small, isolated areas as public open space areas.

Application in terms of the National Forests Act, 1988, as amended is required prior to any of the protected tree species on site being removed or destroyed. The area of the Tamboti woodland will be retained as an Open Space and no development will take place in this area as per the proposed layout.

The no go alternative is not considered practical as the environmental and socio-economic benefits related to the proposal will not be realised.

In the case of the development proposal, the following benefits would apply:

- ~ Contribution of up to 40 MW from the project towards the Government target for renewable energy will not be realised;
- ~ The current electricity crisis in South Africa shows the important role that renewable energy can play in terms of supply power. The opportunity for strengthening grid supply while reducing expensive transmission and distribution losses will not be achieved;
- ~ As an already water stressed nation, the conventional coal fired plants require major amounts of water during their requisite cooling processes whereas with the solar farm this is not the case;
- ~ Presently solar radiation, wind power etc. remains largely unexploited in our country, the use of these energy flows will assist in strengthening energy security through the development of a diverse energy portfolio;
- ~ Renewable energy offers various benefits to society which includes reduced pollution concerns, ecosystem health, climate friendly development and improved human health;
- ~ Surrounding and existing infrastructure will not be upgraded;
- ~ Additional employment opportunities will not be available;
- ~ No monitored clearing of vegetation will take place; and
- ~ Contribution to meeting the targets set for the Steenbokpan node in the SDF and EMF will not be realised.

The main objective of the solar component is aimed to add new generation capacity from renewable energy to the national electricity grid and to aid in accomplishing the goal of a 42% share of all new installed generating capacity from renewable energy forms as per the target set by the Department of

Energy.

### **10.3 RECOMMENDATION**

It is recommended that the solar farm be approved with inclusion of the following specific conditions:

- ↺ A permit from DAFF be obtained prior to any protected tree species being destroyed/ removed
- ↺ Should the applicant be selected as a preferred bidder in terms of the IPP Program a Water Use Licence Application must be lodged with the DWA for the use of borehole water
- ↺ The SMP should consider the provision of bio swales along the alignment of internal roads. Bio swales will contribute to improving water quality prior to discharge. Bio swales improve water quality by infiltrating the first flush of stormwater run off and filtering the large storm flows they convey. The majority of annual precipitation comes from frequent, small rain events. Much of the value of bio swales comes from infiltrating and filtering nearly all of this water.
- ↺ With regards to the solar panels should birds collide with the solar panels, efforts should be made to restrict access by birds into the relevant, hazardous areas of the facility.
- ↺ Specialist advice should be sought in devising effective avian deterrents to minimize associated damage.