Final EIA Report **14/12/16/3/3/2/700**

PROPOSED RENEWABLE ENERGY GENERATION PROJECT ON A PART OF PORTION 1 (REMAINING EXTENT) OF THE FARM GEELHOUTSKLOOF 359 LQ, LEPHALALE LOCAL MUNICIPALITY, WATERBERG DISTRICT MUNICIPALITY, LIMPOPO PROVINCE

Short name: Delta Solar Park

June 2015

Commissioned by: Sole Energy (RF) (Pty) Ltd
Document version 2.0 – Final

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Proposed Renewable Energy Generation Project on a part of Portion 1 (Remaining Extent) of the Farm GEELHOUTSKLOOF 359 LQ, Lephalale Local Municipality, Waterberg District Municipality, Limpopo Province

Short name: Delta Solar Park

June 2015

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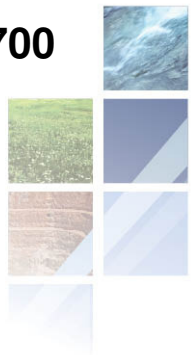

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PROJECT MAIN FEATURES IN COMPLIANCE WITH EIA GUIDELINES SUMMARY OF INFORMATION INCLUDED IN THE REPORT

GENERAL SITE INFORMATION

Site location	
Farm	**GEELHOUTSKLOOF 359 LQ**
Portion	**A part of the Remainder of Portion 1**
Surveyor-general 21 digit site	T0LQ00000000035900001
Local Municipality	Lephalale
District Municipality	Waterberg
Province	Limpopo

Property details	
Land Owner	H J L HILLS BOERDERY (PTY) LTD
Diagram deed number	T3636/952
Title deed	T52917/2007
Registration date	20070423
Current land use	Hunting lodge

Site data	
Extent	234.6884 hectares (a part of Portion 1)
Latitude	23° 45' 40" S
Longitude	27° 25' 40" E
Altitude	950 m above mean sea level
Ground slope	< 1% S

Adjacent farm portions	
Farm	**GEELHOUTSKLOOF 359 LQ**
Portion	**Portion 1 (Remaining Extent)**
Surveyor-general 21 digit site	T0LQ00000000035900001
Land Owner	H J L HILLS BOERDERY CC
Title deed	T52917/2007
Registration date	20070423
Extent	603.6244 hectares (the remaining of Ptn. 1)
Farm	**ZANDNEK 358 LQ**
Portion	**1 (Remaining Extent)**
Surveyor-general 21 digit site	T0LQ00000000035800001
Land Owner	PIQUETBERG BOERDERY PTY LTD
Title deed	T150122/2007
Registration date	20071105
Extent	834.8712 hectares
Farm	**TAAIBOSCHPAN 320 LQ**
Portion	**Remaining Extent**
Surveyor-general 21 digit site	T0LQ00000000032000000
Land Owners	TAAIBOSCHPAN LANDGOED CC
Title deed	T25415/1990
Registration date	19900424
Extent	1162.5551 hectares
Farm	**ENKELDRAAI 314 LQ**
Portion	**0**

Surveyor-general 21 digit site	T0LQ00000000031400000
Land Owner	SAUER JOHANNES JACOBUS
Title deed	T39336/1980
Registration date	19800819
Extent	1284.3312 hectares
Farm	**GEELHOUTSKLOOF 359 LQ**
Portion	**Remaining Extent**
Surveyor-general 21 digit site	T0LQ00000000035900000
Land Owner	GEELHOUTSKLOOF TRUST
Title deed	T53434/2005
Registration date	20050503
Extent	1228.7209 hectares

PV POWER PLANT DESIGN SPECIFICATIONS AND CONNECTION TO THE ESKOM GRID

Project data	
Project name	**DELTA SOLAR PARK**
Technology	**Photovoltaic power plant**
Number of phases	1
Maximum generation capacity at the delivery point	up to 75 MW
Type of PV modules	Thin-film or Mono/Polycrystalline
Type of mounting system	fixed or horizontal single-axis trackers (SAT)
Average annual energy production (up to)(*)	up to 160 GWh/year with fixed mounting system up to 190 GWh/year with trackers
Load factor (*)	0.223 with fixed mounting system 0.251 with trackers
Full net equivalent hours (EOH) (*)	1950 h/year (Wh/Wp/y) with fixed mounting systems 2200 h/year (Wh/Wp/y) with trackers
(*) calculated by PVSYST, simulation professional tool	

Technical specifications	
Installed power capacity - AC side	**up to 77 MW**
Installed power capacity - DC side	**up to 86.4 MWp**
Number of PV modules	up to 608,400 thin film modules of 135 Wp each up to 288,000 mono/polycrystalline modules of 300 Wp
Number of structures (PV arrays)	up to 15,600 mounting systems (fixed or trackers)
Minimum structure height above ground level	1.0 m
Maximum structure height above ground level	3.1 m

Other technical information	
Footprint, including internal roads	Up to 160 hectares
PV power plant lifetime	25 - 30 years
Construction site (temporary)	10 hectares
Construction timeframe	Approximately 15 months

Connection to the Eskom grid	
The connection to the Eskom grid will be done according to the Eskom connection solution which may require: (i) one small on-site high-voltage loop-in loop-out substation with high-voltage power transformers, stepping up the voltage to the voltage of the Eskom's grid, a control building and a busbar with metering and protection devices (also called "switching station"); (ii) two new sections of power line, 100 m long, for the connection to the **Eskom** "**Thabazimbi Combined – Waterberg 1**" **132 kV power line**, which crosses the project site (on-site connection). The connection solution may also entail intervention on the Eskom's grid.	
Delivery point: voltage level	132 kV
New HV substation inside the property - footprint	Approximately 4,000 m^2

Water requirements	
Water consumption	See paragraph 4.2.5 - water requirements

Site maps and GIS information

Status quo information - site	***ESRI shapefiles***
Property	Portion 1 (RE) of Geelhoutskloof 359 LQ
Building and other structures	Existing buildings
Agricultural field	Not applicable
Natural and endangered vegetation areas	Vegetation and Sensitivity
Cultural historical sites and elements	Not applicable
Contours with height references	1m contours
Slope analysis	1m contours
Boreholes	Not applicable
High potential agricultural areas	Not applicable
Eskom's substation(s) / power line(s)	Eskom Thabazimbi Combined - Waterberg_1 132kV line, 132kV line to Theunispan, Eskom 3x400kV lines from Medupi; Eskom 3x400kV lines from Mateba
Cadastrals	Cadastrals
Existing roads	existing roads
Railway lines and stations	railway
Industrial areas	industrial corridor of Waterberg District SDF
Harbours and airports	Not applicable
Critical Biodiversity Areas and Ecological Support Areas	Not applicable

Development proposal maps	***ESRI shapefiles***
Project site	Part of Portion 1 (RE) of Geelhoutskloof 359 LQ
Development Area	Fenced area (footprint)
Access road and internal roads	Access road from D1675, Internal roads
Position of solar facilities	PV arrays
Permanent laydown area footprint	Fenced area (footprint)
Construction period laydown footprint	Temporary construction camp
River, stream, water crossing	Not applicable
Substation and transformers	On-site HV substation
Connection routes	Loop-in Loop-out lines
Buildings	MV stations, On-site HV substation, Control building, Warehouses
Buffers	Vegetation buffer zone

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Annexure M Rescue and Protection Plan (Annexure 3 of the Draft EMPr)

Annexure N Consents received

ABBREVIATIONS AND ACRONYMS

AGES	Africa Geo-Environmental and Engineering Consultants (Pty) Ltd
BID	Background Information Document
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CSP	Concentrating Solar Power
DAFF	Department of Agriculture, Fisheries and Forestry
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DoE	Department of Energy
DWA	Department of Water Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environment Impact Assessment Report
EMP	Environmental Management Plan
ESS	Environmental Scoping Study
FIT	Feed in Tariffs
GHG	Green House Gases
GIS	Geographic Information Systems
GN	Government Notice
GWh	Giga Watt hour
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IEM	Integrated Environmental Management
IPP	Independent Power Producer
kV	kilovolt
LEDET	Limpopo Department of Economic Development, Environment and Tourism
LEMA	Limpopo Environmental Management Act, 2003
MW	Mega Watt
MWp	Mega Watt peak
NEMA	National Environmental Management Act - Act no. 107 of 1998
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act - Act no. 25 of 1999
NWA	National Water Act - Act no. 36 of 1998
PoS	Plan of Study
Property	Portion 1 (Remaining Extent) of the Farm Geelhoutskloof 359 LQ
Project site	a part of the Remainder of Portion 1 of the Farm Geelhoutskloof 359 LQ
PV	Photovoltaic
RD	Registration Division
REFIT	Renewable Energy Feed-in Tariffs
REIPPPP	Renewable Energy IPP Procurement Programme
RFP	Request for Qualification and Proposals for New Generation Capacity under the REIPP Procurement Programme
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SANS	South African National Standard
Sole Energy	Sole Energy (RF) (Pty) Ltd (applicant)
UPS	Uninterruptible Power Supply

1. INTRODUCTION

Sole Energy (RF) (Pty) Ltd (Reg. No. 2011/008465/07) is proposing the development of a renewable solar energy facility in a key strategic location in terms of the connection to the Eskom grid and in terms of the favourable solar irradiation.
The proposed site is **a part (±234 ha) of Portion 1 (Remaining Extent) of the Farm Geelhoutskloof 359 LQ**, measuring 838.31 ha and located within the Lephalale Local Municipality, Waterberg District Municipality, Limpopo Province.

Site location: Part of Portion 1 (Remaining Extent) of the Farm Geelhoutskloof 359 LQ
Surveyor-general 21 digit site code:

T	**0**	**L**	**Q**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**5**	**9**	**0**	**0**	**0**	**1**

The name of the project is **DELTA SOLAR PARK** and it envisages a **photovoltaic (PV) power plant having a maximum generation capacity of 75 MW**. The **footprint (fenced area)** of the proposed development is up to **160 ha,** to be located on the northern side of the Remainder of Portion 1 of the Farm Geelhoutskloof 359 LQ, North of the railway and of the Eskom 132 kV and 400 kV power lines crossing the property, **in an area included in the "*industrial corridor*" earmarked by the Lephalale Local Municipality.**
At present the property has an overall size of ***838.31 ha.*** Only the northern side of the farm is suitable for the proposed development, as the southern part is not flat enough and it is not included in the "*industrial corridor*".

The proposed solar park will help the Eskom grid to meet the high energy demand related to the coal mining activities conducted in the area. Furthermore, being a renewable energy plant which doesn't generate greenhouse emissions - it will help to compensate for the greenhouse gases' emissions arising from mining activities.

The project site will be reached from the **District Road D1675** between the towns of Steenbokpan and Lephalale, through **a new access road** - **8.0 km long** - running parallel to the western boundary of **the Farms PONTES ESTATES 712 LQ** and **ENKELDRAAI 314 LQ**, North of the project site.

New access road: Farm Pontes Estates 712 LQ and Farm Enkeldraai 314 LQ
Surveyor-general 21 digit site codes:

T	**0**	**L**	**Q**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**4**	**0**	**0**	**0**	**0**	**0**
T	**0**	**L**	**Q**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**7**	**1**	**2**	**0**	**0**	**0**	**0**	**0**

The Delta Solar Park will participate to the REIPP Procurement Programme issued on 3 August 2011 by the DoE (Department of Energy).

Sole Energy previously received Environmental Authorisation for the Delta Solar Park, that was issued by the DEA on 20 October 2011 with **DEA Reference No. 12/12/20/2152**, amended on 29 January 2013 and further amended on 2 July 2013**.** The EA, as amended, authorised the construction and operation of a **46 MW** Photovoltaic (PV) Power Plant within a **90 ha footprint**.

In order to increase the footprint from 90 ha to 160 ha and the generation capacity from 46 MW to 75 MW, Sole Energy has to conduct a new environmental process.

Due to the increased footprint, which will allow the increase the planned capacity from 46 MW to 75 MW, the project will be more competitive in terms of amount of electricity generated by the PV modules.

In order to develop the facility, Sole Energy must undertake an Environmental Impact Assessment (EIA) process and acquire environmental authorization from the National Department of Environmental Affairs (DEA), in consultation with the *Limpopo Department of Economic Development, Environment and Tourism (LEDET)*, in terms of the EIA Regulations (2010) published in terms of Section 24(2) and 24D of the National Environmental Management Act (NEMA, Act No. 107 of 1998).
This project has been registered with the **DEA application reference number 14/12/16/3/3/2/700.**

The Delta Solar Park will be connected to the Eskom "**Thabazimbi Combined - Waterberg 1**" **132 kV power line**, which crosses the project site (**on-site connection**). This connection solution has been confirmed by Eskom in the Cost Estimate Letter issued on 5 August 2014 (Eskom Ref. IPP 44922446, attached as Annexure N).
Eskom is the entity which should assess the connection solutions described in this EIA Report. Eskom also coordinates the necessary liaising between Sole Energy, Eskom Transmission, Eskom Distribution and Eskom Land & Rights Department.
All or part of the infrastructure required for the connection may be owned and/or operated by Eskom Distribution and this will depend on the Eskom grid code in relation to the IPP's (Independent Power Producers) and on the Connection Agreement to be finalized prior to or simultaneously with the conclusion of the PPA (Power Purchase Agreement) in respect of the options of retaining ownership of the connection works once completed.

The independent Environmental Assessment Practitioners (EAP's) which have been appointed for the undertaking of the detailed environmental studies in compliance with the 2010 EIA Regulations are **AGES Limpopo.**

With the aim of identifying and assessing all potential environmental impacts related to the development as well as suggesting possible mitigation measures and alternatives, AGES has appointed specialist sub-consultants to compile detailed reports and to study the activities necessary for the assessment of the specific impacts related to their field of expertise. During the first EIA process this was all done. In the current application process the specialists were requested to review their reports in light of the fact that the footprint has increased. The revised reports are enclosed as annexures of this EIA Report.

AGES and the other specialist consultants are in a position of independency from Sole Energy; therefore they are not subsidiaries or affiliated to the latter. AGES and the specialist consultants have no secondary interest connected with the development of this project or of other projects which may originate from the authorization of the project.
The characteristics, the technology and the new extent of the Delta Solar Park, as a result of the change in the site lay out plan, is defined and evaluated in this EIA Report and its annexures.

2. MOTIVATION AND RATIONALE OF THE DELTA SOLAR PARK IN LIGHT OF THE REIPP PROCURMENT PROGRAMME REQUIREMENTS

2.1. THE CHOICE OF THE LIMPOPO PROVINCE AND OF THE SITE LOCATION

The Delta Solar Park will be located in the Limpopo Province. The Limpopo Province has been identified by Sole Energy as an ideal macro area for establishing a solar PV plant on the basis of several important considerations:

- solar resource is exceptionally high: the *global horizontal irradiation* of the site is 2,106 kWh/m^2/year;
- there are few green projects currently under development in Limpopo and it is clear that the "green energy quota" can be achieved mainly by means of solar projects, considering the high solar resources and the availability of undeveloped lands with low ecological and agricultural value;
- The Limpopo Province, Local Municipalities and Communities are eager to continue establishing an eco-green image in consideration of the burden of greenhouse emissions they have to bear.

The province of Limpopo can achieve the target of clean energy production mainly through solar energy, considering the absence of wind. The presence of renewable energy plants like the proposed one is, more than in other provinces, a priority in consideration of the massive production of CO_2 that occur in province due to heavy industrial activity.

In addition to these favourable conditions in terms of desirability of a renewable solar energy projects in the Limpopo province, the site of the Delta Solar Park has been chosen on the basis of several elements which indicates the energetic vocation of the site and the fact that the natural profile of the site has been already subject to changes to infrastructure:

- the site is ideal since it is located inside the area earmarked for industrial uses within the "***industrial corridor - major infrastructure corridor areas***" **of the** ***Spatial Development Framework of the Waterberg District Municipality***. The industrial corridor runs from the town or Lephalale to the town of Steenbokpan;
- six Eskom 400 kV power lines, coming from the Eskom Medupi and Mateba coal power plants, are crossing the property along the east-west direction, in the corridor between the railway and the existing **Eskom** "**Thabazimbi Combined – Waterberg 1" 132kV power line**;
- the proposed Eskom transmission substation, named "Delta" or "Masa", will be located on the Remainder of the farm Zandnek 358 LQ, adjacent to the selected project site;
- further high-voltage power lines, already planned by Eskom, will be linked to the new Delta / Massa substation.

In terms of the land use rights, **the Council of the Lephalale Local Municipality has approved a "*Special Consent*" application on 19 April 2011**. The approved land use rights will apply to the northern portion only and reads as follows: ***Agriculture IV (iv): Industrial purposes: Agro-industry*** for a Renewable Energy Generation project (Photovoltaic Solar Power Plant) and ancillary land uses, subject to specific conditions.
The Lephalale Municipality has a **Spatial Development Framework** for the entire jurisdiction of Lephalale. In terms of the SDF Plan of Lephalale, the property is situated in the area alongside an **Industrial corridor** along Road D1675, which is the road between Lephalale and Steenbokpan. This corridor is seen as a major spine of the mining and petro-chemical cluster.

Lephalale has attained the status of a growth node of national importance. Not only is it identified as a Provincial Growth Point in the Limpopo Spatial Rationale, it is experiencing enormous growth in mining and the energy industries. The triangle between Lephalale, the Stockpoort node and the Steenbokpan node will significantly be spatially re-defined in the coming years.

The property is located within this prominent area close to Steenbokpan and more specifically adjacent to the Eskom site for the **new Delta (Masa) transmission substation** on the adjacent farm Zandnek 358 LQ.

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 and the potential Mafutha project by SASOL.

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. The development of renewable energy generation facilities, such as the proposed solar park, falls directly into this category.

Potential Development Area 1 is designated to accommodate developments of this nature. In involves the entire coal reserve up to the border of Botswana. Steenbokpan node is the epicentre of this PDA. Steenbokpan is identified as a Local Service Point. The SDF emphasise that strategic urban-rural interface (that is between Ellisras town and Steenbokpan) will require more development. Developments such as the proposed Solar Park are an ideal means to strengthen the urban-rural linking between Steenbokpan and Ellisras/Lephalale.

The proposed development will complement the Energy Generation industry, but will definitely be a more environmentally friendly alternative. The facility will contribute towards the strengthening of the energy sector in the wider Lephalale area which will ultimately benefit the surrounding area and the Country as a whole. This will contribute towards the economic development of the area and the optimal utilisation of the natural (solar) resources.

The proposed use of the property as a Solar Park will be in line with the land uses planned in the vicinity, i.e. industrial, mining, power generation, etc. Regarding the agricultural potential of the land, the property is already seriously affected by existing infrastructure (linear services) such as the railway line and extensive power lines and future electrical line servitudes. The agricultural potential of the northern portion of the property is therefore already jeopardized by these lines traversing the property. The proposed development of the solar park will therefore be utilising agricultural land that has already been degraded.

The proposed use of the property for a Solar Farm will complement the surrounding land uses and will be in line with the objectives and guidelines of the SDF representing Council Policy.

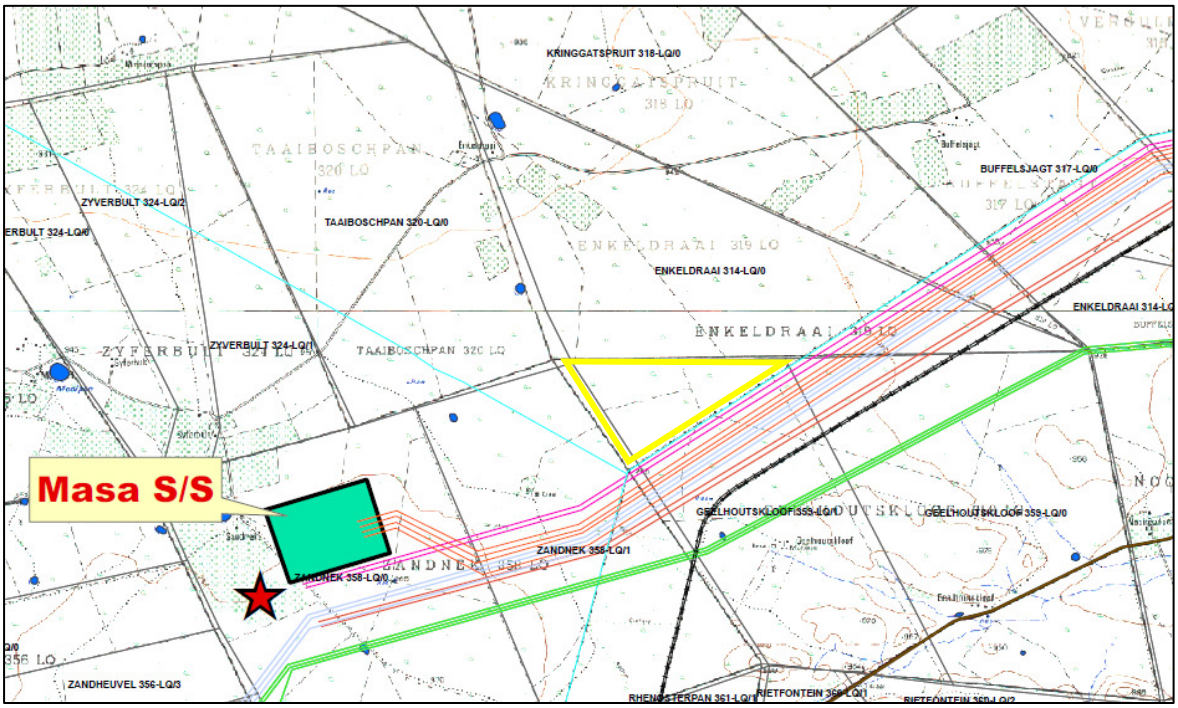
The envisaged Delta Solar Park should also be considered in view of the **Waterberg District Environmental Management Framework (WDEMF)** that is in the process of being finally approved and adopted.

The WDEMF outlined Environmental Management Zones. The application property is situated within **ZONE 11, MAJOR INFRASTRUCTURE CORRIDORS** and the railway line cutting through the property forms the southern boundary of this zone. This zone represents areas where the concentration of linear infrastructure proposed in order to prevent the unnecessary large impact that uncoordinated infrastructure location would have on the district.
The Desired State of this zone mostly forms part of the game and cattle farming areas (Zone 4). It is however proposed that these areas also be used as the major corridors for bulk infrastructure including high voltage power lines, railway lines, major roads and pipelines. This is necessary in order to prevent these infrastructure elements from impacting negatively on more sensitive areas in the district.

The WDEMF indicates linear infrastructure including major roads, railway lines, electricity distribution lines, pipelines, etc; as preferred activities within this Zone. Other compatible activities in this zone are: 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. No activities that will compromise the functioning of the zone as an Industrial corridor should be permitted. The proposed Solar Park will be complementing this “Industrial Zone”.

Eskom has indicated that the projects does not interfere with Eskom’s present and future developments and do not negatively affect the voltage in the area. Eskom, as an interested and affected party, recognized the positive outcome of the project in terms of the possibility of meeting the local growth of the energy consumption that is expected.

Figure 1: Project site (in yellow), existing and planned Eskom overhead power line and Delta (also called Masa) Main Transmission Substation (map received by Eskom)



2.2. NEED AND DESIRABILITY OF THE PROJECT

South Africa currently relies principally on fossil fuels (coal and oil) for the generation of electricity. At the present date, Eskom generates approximately 95% of the electricity used in South Africa. On the other hand, South Africa has a largely unexploited potential in renewable energy resources such as solar, wind, biomass and hydro-electricity to produce electricity as opposed to other energy types (fuel or coal). South Africa's electricity supply still heavily relies upon coal power plants, whereas the current number of renewable energy power plants is very limited. In the last few years, the demand for electricity in South Africa has been growing at a rate approximately 3% per annum.

These factors, if coupled with the rapid advancement in community development, have determined the growing consciousness of the significance of environmental impacts, climate change and the need for sustainable development. The use of renewable energy technologies is a sustainable way in which to meet future energy requirements.
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 (IRP1) and with the Kyoto Protocol. Subsequently the Department of Energy of South Africa (DoE) decided to undertake a detailed process to determine South Africa's 20-year electricity plan, called Integrated Resources Plan 2010-2030 (**IRP 2010**).

The IRP1 (2009) and the IRP 2010 (2011) outline the Government's vision, policy and strategy in matter of the use of energy resources and the current status of energy policies in South Africa. In particular, the IRP 2010 highlights the necessity of commissioning 1200 MW with solar PV technology by the end of 2015. In order to achieve this goal, the DoE recently announced a Renewable Energy IPP (Independent Power Producers) Procurement Programme.

The REIPP Procurement Programme, issued on 3rd August 2011, envisages the commissioning of 3725 MW of renewable projects (1450 MW with solar photovoltaic technology) capable of beginning commercial operation before the end of 2017.

The Minister also said that the REIPP Procurement Programme, being a flagship programme of the Department and having received worldwide recognition, will proceed, and in that regard in 2015 a new determination will be announced to maintain the momentum of the programme and to build on current successes. A determination for an **additional 3600 MW** will be made in accordance with the IRP 2010. This includes an additional 200 MW for the Small Renewable IPP Procurement Programme, for renewable energy projects up to 5 MW (DOE Media Statement of 12 December 2014). 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_2 emissions.

The purpose of the Delta Solar Park is to add new capacity for the generation of renewable electric energy to the national electricity supply in compliance with the IPP Procurement Programme and in order to meet the "sustainable growth" of the Limpopo Province. The use of solar radiation for power generation is considered as a non-consumptive use and a renewable natural resource which does not produce greenhouse gas emissions. The generation of renewable energy will contribute to the growth of South Africa's electricity market, which has been primarily dominated up to this date by coal-based power generation. With specific reference to photovoltaic energy, and the proposed project, it is important to consider that South Africa has one of the highest levels of solar radiation in the world.

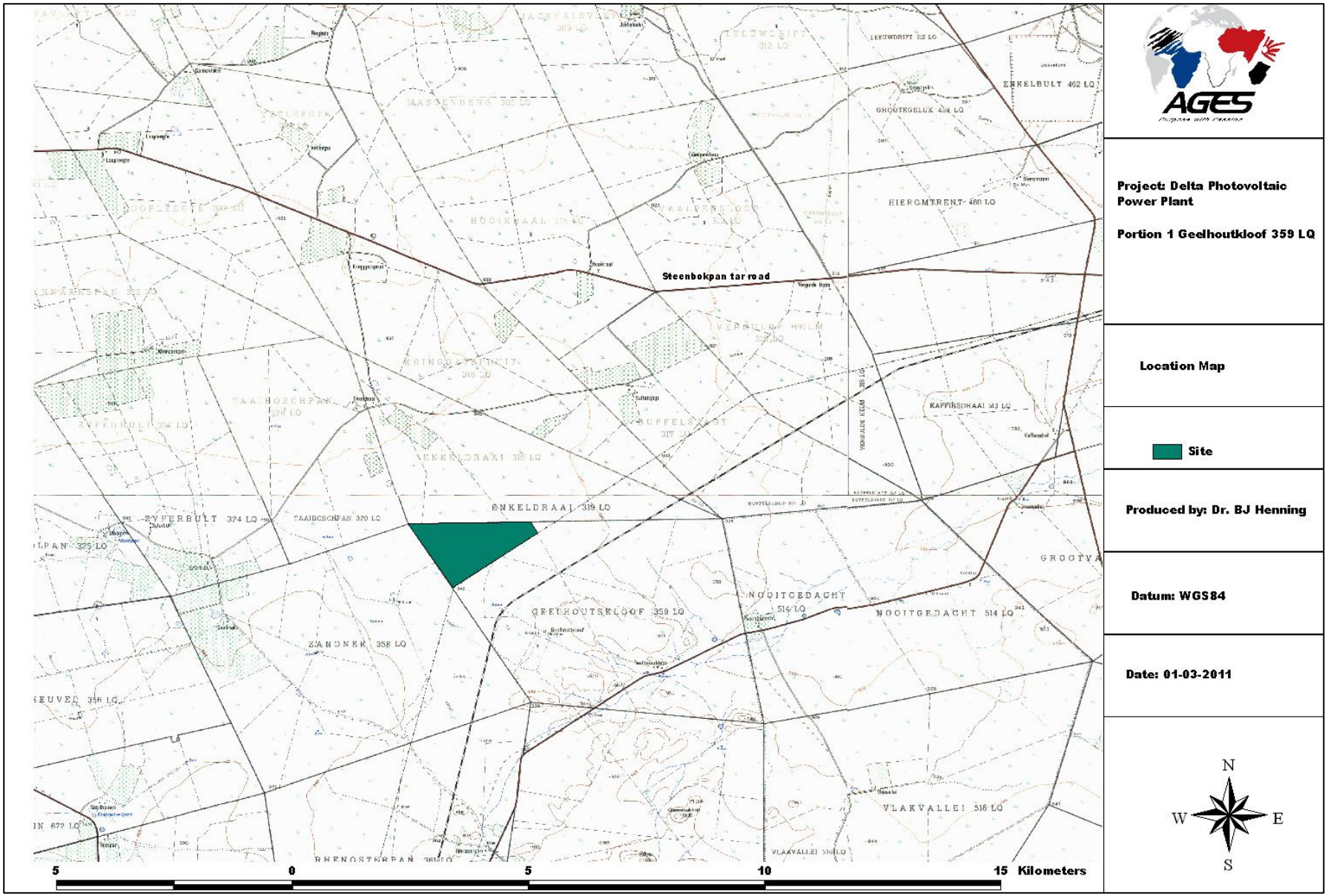
In the light of the REIPP procurement Programme requirements, the **Delta Solar Park** has been developed according to the following main characteristics:

- the installed capacity is within the “eligible capacity” defined by the rules of the RFP (from 1 MW to 75 MW);
- the construction phase will last approximately 15 months and the PV plant will be able in commercial operation before the end of 2020.

The reasons for the location of the project in the selected area can be synthesized as follows:

- low requirement for municipal services;
- compliance with national and provincial energy policies and strategies;
- no impact on people health and wellbeing;
- no waste and noise;
- no impact on air quality;
- compatibility with the ecosystem and the surrounding landscape;
- likelihood of social and economic development of marginalized, rural communities; and
- attraction of environmentally aware (green) tourists to the area.

Figure 2: Regional Map



3. AUTHORITIES, LEGAL CONTEXT AND ADMINISTRATIVE REQUIREMENTS

The legislative and regulatory framework of reference for the solar power plant project includes statutory and non-statutory instruments by which National, Provincial and Local authorities exercise control throughout the development of the same project.

The development and the environmental assessment process of a solar power plant project involve various authorities dealing with the different issues related to the project (economic, social, cultural, biophysical etc.).

3.1. REGULATORY AUTHORITIES

3.1.1. National Authorities

At national level, the main regulatory authorities and agencies are:

- *Department of Energy (DoE):* the Department is competent and responsible for all policies related to energy, including renewable energy. Solar energy is contemplated and disciplined under the White Paper for Renewable Energy and the Department constantly conducts research activities in this respect;
- *Department of Environmental Affairs (DEA):* the Department is competent and responsible for all environmental policies and is the controlling authority under the terms of NEMA and EIA Regulations. The DEA is also the competent authority for the proposed project, and is entrusted with granting the relevant environmental authorisation;
- *National Energy Regulator of South Africa (NERSA):* the Regulator is competent and responsible for regulating all aspects dealing with the electricity sector and, in particular, issues the licence for independent power producers;
- *South African Heritage Resources Agency (SAHRA):* the Agency is responsible for the protection and the survey, in association with provincial authorities of listed or proclaimed sites, such as urban conservation areas, nature reserves and proclaimed scenic routes under the terms of the National Heritages Resources Act (Act no. 25 of 1999);
- *South African National Roads Agency Limited (SANRAL):* the Agency is responsible for all National road routes.

3.1.2. Provincial Authorities

At provincial level, the main regulatory authority is the *Limpopo Department of Economic Development, Environment and Tourism (LEDET);* this Department is responsible for environmental policies and is the Provincial authority in terms of NEMA and the EIA Regulations. The Department is also the commenting authority for the proposed project.
The project should comply with the *Limpopo Environmental Management Act, 2003* (LEMA).

3.1.3. Local Authorities

The district and local municipal authorities are the principal regulatory authorities responsible for planning, land use and the environment. In the Limpopo Province, municipalities and district municipalities are involved in various aspects of planning and the environment related to solar energy facilities development. The local municipality is the Lephalale Local Municipality which is part of the Waterberg District Municipality.

Under the terms of the Municipal System Act (Act no. 32 of 2000), all municipalities are deemed to go through an Integrated Development Planning (IDP) process in order to devise a five-year strategic development plan for the area of reference.
The identification of priority areas for conservation and their positioning within a planning framework of core, buffer, and transition areas is the subject of bioregional planning. Priority areas are identified and defined with reference to visual and scenic resources. Their identification and protection is granted through visual guidelines drafted for the area included in bioregional plans.

The Lephalale Municipality has a **Spatial Development Framework** for the entire jurisdiction of Lephalale. In terms of the SDF Plan of Lephalale, the property is situated in the area alongside an **Industrial corridor** along Road D1675, which is the road between Lephalale and Steenbokpan. This corridor is seen as a major spine of the mining and petro-chemical cluster.
Lephalale has attained the status of a growth node of national importance. Not only is it identified as a Provincial Growth Point in the Limpopo Spatial Rationale, it is experiencing enormous growth in mining and the energy industries. The SDF of Lephalale emphasises the following important projects related to the mining and petro-chemical sectors:

- Medupi Power Station is under construction;
- Feasibility investigations are underway for a third power station by Eskom (Masa or Delta MTS);
- EXXARO announced expansion of Grootgeluk Mine to supply Medupi Power Station;
- EXXARO is engaged in feasibility investigation for coal beneficiation into “coke” for various industrial uses;
- SASOL is investigating the feasibility of establishing a coal to liquid industrial plant. This has massive development implications in that a development far bigger than the existing Lephalale town might be necessary; and
- ANGLO-coal is known to be investigating the possibility of a gas extraction operation.

All these projects have significant development implications for Lephalale. Changes in land-use are foreseen and will require special zoning. The triangle between Lephalale, the Stockpoort node and the Steenbokpan node will significantly be spatially re-defined in the coming years.

The property is located within this prominent area close to Steenbokpan and more specifically adjacent to the Eskom site for the **new Delta (Masa) transmission substation** on the adjacent farm Zandnek 358 LQ. 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 and the potential Mafutha project by SASOL.

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Local authorities also provide specific by-laws and policies in order to protect visual and aesthetic resources with reference to urban edge lines, scenic drives, special areas, signage, communication masts etc.

Finally, there are also various non-statutory bodies and environmental groups, who are involved in the definition of various aspects of planning and the protection of the environment, which may influence the development of the proposed project.

3.2. LEGISLATION, REGULATIONS AND GUIDELINES

A review of the relevant legislation involved in the proposed development is detailed in table 1 below.

Table 1: Review of relevant legislation

National Legislation	Sections applicable to the proposed project
Constitution of the Republic of South Africa (Act no. 108 of 1996)	• Bill of Rights (S2) • Rights to freedom of movement and residence (S22) • Environmental Rights (S24) • Property Rights (S25) • Access to information (S32) • Right to just administrative action (S33)
Fencing Act (Act no. 31 of 1963)	• Notice in respect of erection of a boundary fence (S7) • Clearing bush for boundary fencing (S17) • Access to land for purpose of boundary fencing (S18)
Conservation of Agricultural Resources Act (Act no. 43 of 1983)	• Prohibition of the spreading of weeds (S5) • Classification of categories of weeds & invader plants and restrictions in terms of where these species may occur (Regulation 15 of GN R0148) • Requirement and methods to implement control measures for alien and invasive plant species (Regulation 15E of GN R0148)
Environment Conservation Act (Act no. 73 of 1989)	• National Noise Control Regulations (GN R154 dated 10 January 1992)
National Water Act (Act no. 36 of 1998)	• Entrustment of the National Government to the protection of water resources (S3) • Entitlement to use water (S4) - Schedule 1 provides the purposes which entitle a person to use water (reasonable domestic use, domestic gardening, animal watering, fire-fighting and recreational use) • Duty of Care to prevent and remedy the effects of water pollution (S19) • Procedures to be followed in the event of an emergency incident which may impact on water resources (S20) • Definition of water use (S21) • Requirements for registration of water use (S26 and S34) • Definition of offences in terms of the Act (S151)
National Forests Act (Act no. 84 of 1998)	• Protected trees
National Environmental Management Act (Act no. 107 of 1998)	• Definition of National environmental principles (S2): strategic environmental management goals and objectives of the government applicable within entire RSA to the actions of all organs of state, which may significantly affect the environment • NEMA EIA Regulations (GN R543, 544, 545, 546, & 547 of 18 June 2010) • **new NEMA EIA Regulations 2014 (GN R. 982, 983, 984, 985 of 4 December 2014)** • Requirement for potential impact on the environment of listed activities to be considered, investigated, assessed and reported on to the competent authority (S24 - Environmental Authorisations)

	• Duty of Care (S28): requirement that all reasonable measures are taken in order to prevent pollution or degradation from occurring, continuing and recurring, or, where this is not possible, to minimise and rectify pollution or degradation of the environment • Procedures to be followed in the event of an emergency incident which may impact on the environment (S30)
National Heritage Resources Act (Act no. 25 of 1999)	• SAHRA, in consultation with the Minister and the MEC of every province must establish a system of grading places and objects which form part of the national estate (S7) • Provision for the protection of all archaeological objects, paleontological sites and material and meteorites entrusted to the provincial heritage resources authority (S35) • Provision for the conservation and care of cemeteries and graves by SAHRA, where this is not responsibility of any other authority (S36) • List of activities which require notification from the developer to the responsible heritage resources authority, with details regarding location, nature, extent of the proposed development (S38) • Requirement for the compilation of a Conservation Management Plan as well as a permit from SAHRA for the presentation of archaeological sites for promotion of tourism (S44)
National Environmental Management: Biodiversity Act (Act no. 10 of 2004)	• Provision for the MEC for Environmental Affairs/Minister to publish a list of threatened ecosystems and in need of protection (S52) • Provision for the MEC for Environmental Affairs/Minister to identify any process or activity which may threaten a listed ecosystem (S53) Provision for the Member of the Executive Council for Environmental Affairs/Minister to publish a list of: critical endangered species, endangered species, vulnerable species and protected species (S56(1) - see Government Gazette 29657 • Three government notices have been published up to date: GN R150 (Commencement of Threatened and Protected Species Regulations, 2007), GN R151 (Lists of critically endangered, vulnerable and protected species) and GN R152 (Threatened Protected Species Regulations)
National Environmental Management: Air Quality Act (Act no. 39 of 2004)	• Provision for measures in respect of dust control (S32) • Provision for measures to control noise (S34)
National Environmental Management: Waste Management Act (Act no. 59 of 2008)	• Waste management measures • Regulations and schedules • Listed activities which require a waste licence
Limpopo Environmental Management Act (Act No. 7 of 2003) (LEMA)	• No person may pick, import, export, transport, possess, cultivate or trade in a specimen of a specially protected or protected plant species. • The Appendices to the Act provide an extensive list of species that are protected. A permit is required for all these species, if they are expected to be affected by the proposed development.
Occupational Health and Safety Act (Act No. 85 of 1993)	• Health and safety of all involved before and after construction must be protected.

Guideline Documents	Sections applicable to the proposed project
South African National Standard (SANS) 10328, Methods for environmental noise impact assessments in terms of NEMA no. 107 of 1998	• Impact of noise emanating from a proposed development may have on occupants of surrounding land by determining the rating level • Noise limits are based on the acceptable rating levels of ambient noise contained in SANS 10103
Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads	• The Guidelines outline rules and conditions related to transport of abnormal loads and vehicles on public roads and detailed procedures to be followed for the grant of exemption permits

Policies and White Papers	Sections applicable to the proposed project
The White Paper on the Energy Policy of the Republic of South Africa (December 1998)	• The White Paper supports investment in renewable energy initiatives, such as the proposed solar power plant project
The White Paper on Renewable Energy (November 2003)	• The White Paper outlines the Government's vision, policy, principles, strategic goals and objectives for the promotion and the implementation of renewable energy in South Africa
Integrated Resource Plan (IRP1) Integrated Resources Plan 2010-2030 (IRP 2010).	• The first Integrated Resource Plan (IRP1) was released in late 2009. Subsequently the DoE decided to undertake a detailed process to determine South Africa's 20-year electricity plan, called Integrated Resources Plan 2010-2030 (IRP 2010). • The IRP1 and the IRP 2010 outline the Government's vision, policy and strategy in matter of the use of energy resources and the current status of energy policies in South Africa. • **In particular, the IRP 2010 highlights the necessity of commissioning 1200 MW with solar PV technology by the end of 2015.**
Request For Qualification and Proposals For New Generation Capacity under the IPP Procurement Programme (3 August 2011)	• The IPP Procurement Programme, issued on 3rd August 2011 by the DoE, envisages the commissioning of **3725 MW** of renewable projects (**1450 MW with Solar photovoltaic technology**) **capable of beginning commercial operation before the end of 2017**. The Department of Energy has already announced the intention to procure an additional **3,600 MW** of renewable energy projects by **2020** (DOE Media Statement of 12 December 2014).
Equator Principles (July 2006)	• The Equator Principles provide that future developments with total project capital costs of US$10 million or more shall be financed only if socially and environmentally sustainable

3.3. LISTED ACTIVITIES IN TERMS OF NEMA

The "listed activities" in terms of sections 24 and 24D of NEMA involved (or *potentially* involved) in the proposed development are detailed in table 2 below.

Table 2: Listed Activities in terms of sections 24 and 24D of NEMA potentially involved in the proposed development

Listed activities	Description of project activity that triggers listed activity
GNR. 544, Item 10 ***The construction of facilities or infrastructure for the transmission and distribution of electricity:*** ***I. Outside urban areas or industrial complexes with a capacity of more than 33 kilovolts but less than 275 kilovolts***	The project will be established outside urban areas. The connection of the Delta Solar Park to the Eskom grid will be done according to the Eskom connection solution, which entails: (i) one small on-site high-voltage loop-in loop-out substation with one or more high-voltage power transformer(s) stepping up the voltage to the voltage of the Eskom grid (132 kV), a high-voltage busbar with protection an metering devices ("switching station") and a control building; (ii) two new sections of 132 kV line, approximately 100 m long, allowing the Eskom "Thabazimbi Combined - Waterberg 1" 132 kV power line to loop in and out of the 132 kV busbar of the on-site substation. The connection may also entail interventions on the Eskom grid according to Eskom's connection requirements/solution.
GN R.544, Item 22 ***The construction of a road, outside urban areas,*** ***(i) with a reserve wider than 13,5 metres***	Access to the Delta Solar Park will be from a new access road getting to the property from the Rad D1675 (coming from Lephalale) crossing the Farm Pontes Estates 712 LQ and the Farm Enkeldraai 314 LQ and approximately 8 km long. During the construction phase, the road reserve may be wider than 13.5 meters in order to allow the transportation of abnormal loads (e.g. the high-voltage step-up transformers of the new on-site high-voltage substation). Internal roads will be maximum 8.0 m wide with a road reserve maximum 12.0 m wide. At the turning points / intersection points, some internal roads may be wider than 8.0 m and the road reserve may be wider than 13.5 m, due to the shape of the intersection / turning points.
GN R.545, Item 1 ***The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more***	Sole Energy is proposing the establishment of the "Delta Solar Park" project on a part (±234 ha) of Portion 1 (Remaining Extent) of the Farm Geelhoutskloof 359 LQ, Lephalale Local Municipality, Waterberg District Municipality, Limpopo Province. The project will consist of construction, operation and maintenance of a Photovoltaic (PV) Power Plant with a generation capacity exceeding 20 MW (up to 75 MW).
GN R.545, Item 15 ***Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more***	The proposed Photovoltaic Power Plant with associated infrastructure and structures will be constructed and operated on a footprint up to 160 hectares within a property measuring 838.3128 hectares. The required footprint should be cleared from the existing trees and bushes. The project will be established on undeveloped land and the proposed activity is regarded as "industrial".

GN R.546, Item 14 ***The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, except where such removal of vegetation is required for:*** ***a) In Limpopo*** ***All areas outside urban areas.***	The proposed Photovoltaic Power Plant with associated infrastructure and structures will be constructed and operated on a footprint up to 160 hectares within a property measuring 838.3128 hectares. The required footprint should be cleared from the existing indigenous vegetation, outside urban areas.

The **footprint** (fenced area) of the proposed development is up to **160 ha,** to be located on the northern side of the property.

The footprint of the proposed development will be located OUTSIDE any watercourse / drainage line / wetland / pan or undevelopable areas indicated in the Ecological Impact Assessment. The salt pan (endorheic depression) located on the Farm Enkeldraai 314 LQ along the corridor of the new access road has been avoided and the road will run outside the 32m buffer zone of the pan. No infilling or depositing of any material or dredging, excavation, removal or moving of soil will take place in the proximity (<32m) of any watercourse / drainage line / wetland / pan, considering that the construction activities will be restricted to the proposed PV plant fenced area / footprint. Therefore **Activities 11 and 18 of GN R. 544 are NOT APPLICABLE**.

It should be noted that:

- this authorisation process is conducted **under the old EIA Regulations 2010**, since started in October 2014;
- all the 2010 Listed Activities applied for are still listed in the new EIA Regulations 2014, except for GN R. 546, Item 14;
- the similar Listed Activities under the new EIA Regulations 2014 include the following: **GN R. 983, Item 11 and 24; GN R.984, Item 1 and 15**.

Please find below the 2010 Listed Activities applied for, and the similar listed activities under the new EIA Regulations 2014.

Table 3: Comparison between Listed Activities in terms of EIA Regulations 2010 and new EIA Regulations 2014 - potentially triggered by the proposed development

Listed activity as described in GN R 544, 545 and 546 of 2010 (old EIA Regulations 2010)	Similar Listed activity as described in GN R 983, 984 and 985 of 2014 (new EIA Regulations 2014)
GN R.544, Item 10 (i) The construction of facilities or infrastructure for the transmission and distribution of electricity - outside urban areas or industrial complexes with a capacity of more than 33 kilovolts but less than 275 kilovolts	**GN R.983 Item 11 (i)** The development of facilities or infrastructure for the transmission and distribution of electricity - outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts.
GN R.544, Item 22 (i) The construction of a road, outside urban areas - with a reserve wider than 13,5 metres	**GN R.983 Item 24 (ii)** The development of – a road with a reserve wider than 13,5m, or where no reserve exists where the road is wider than 8m.
GN R.545, Item 1 The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more	**GN R.984 Item 1** The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 MW or more
GN R.545, Item 15 Physical alteration of undeveloped, vacant or derelict land for industrial use where the total area to be transformed is 20 ha or more	**GN R.984 Item 15** The clearance of an area of 20 ha or more of indigenous vegetation
GN R.546, Item 14 The clearance of an area of 5 hectares or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation, a) In Limpopo, All areas outside urban areas.	**N/A**

The current EIA procedure of the Delta Solar Park **includes the connection to the Eskom grid.** Furthermore, a part of the connection infrastructure (the 132 kV busbar of the on-site substation and the two new sections of 132 kV power line) may be executed, owned and operated by Eskom.

Final layout and site plans have been drafted by Sole Energy following the inputs received via public participation. All information acquired was analysed in order to determine the proposed final development layout and site plans. Such approach ensured a holistic view of future requirements of the site and that resources are utilised to their full availability in terms of social and environmental sustainability. It must also be pointed out that this application and all other development applications, in the area, are considered together in order to ensure general sustainability in the Local and District Municipal areas.

4. PROJECT DESCRIPTION AND FUNCTIONING

The project envisages the establishment of a solar power plant with a **maximum generation capacity at the delivery point of up to 75 MW.**
The construction timeframe is estimated to be approximately 15 months, whereas the commissioning date will depend on the IPP Procurement Programme timeframe.

The preferred technical solutions envisage:

- **thin-film PV modules or mono/polycrystalline PV modules,**
- **fixed mounting systems** or **1-axis horizontal trackers.**

The estimated annual energy production is calculated in approximately:

- **1950 kWh/kWp/year** (load factor = 0.223), in the case of PV modules mounted on fixed mounting systems; or
- **2,200 kWh/kWp/year** (load factor = 0.251) in the case of PV modules mounted on trackers.

Therefore, the Delta Solar Park will generate:

- **160.1 GWh per year** in the case of PV modules mounted on fixed mounting systems; or
- **190.1 GWh per year** in the case of PV modules mounted on trackers.

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 meteo-data from Meteonorm 7 (years 1991-2010) and the simulation is made for the timeframe of 1 year.
The output (1,950 kWh/kWp/year and 2,200 kWh/kWp/year) is also called “full net equivalent hours”, which represent the average energy injected into the grid per 1 kWp of installed capacity.
The *Global Horizontal Irradiation* of the site is 2,106 kWh/m^2/year (Meteonorm 7, years 1991-2010).

The energy generated by the Delta Solar Park will reduce the quantity of pollutants and greenhouse gases emitted into the atmosphere. The reduced amount of greenhouse gases 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 Delta Solar Park.

The quantity of the avoided CO_2 is calculated as follows: the energy produced by the Delta Solar Park (up to 160.1 GWh/yor 190.1GWh/y) is multiplied by the Eskom’s average emission factor which is 1.015 t CO_2/MWh (*source*: Energy Research Centre, University of Cape Town. (2009 *Carbon accounting for South Africa*).

In the case of Delta Solar Park, the **avoided CO_2 emissions** are approximately **192,931 tons of CO_2 per year** in the case of PV modules mounted on fixed mounting systems, or **162,564 tons of CO_2 per year** in the case of PV modules mounted on trackers.

Considering that 1 kg of coal generates approximately 3.7 kWh (supposing a caloric value of 8000 kcal/kg and a coal plant efficiency of 40%), **the coal saved by the Delta Solar Park will be approximately 51,373 tons of coal / year** in the case of PV modules mounted on fixed mounting systems, or **43,287 tons of coal / year** in the case of PV modules mounted on trackers.

The detailed description of the characteristic and functioning of the PV plant and its connection is given in the following paragraphs.

4.1. PROJECT LAYOUT

The layout of the proposed development is the result of a comparative study of various layout alternatives and had been defined in consideration of the results of some specialists studies conducted during this scoping phase.

The PV plant is designed and conceived in order to minimize visual and noise impacts, as well as to operate safely and assuring a high level of reliability, with low water consumption and the need only for easy and quick maintenance and repair for approximately 25-30 years.

The footprint (fenced area) of the Delta Solar Park will be up to 160 ha.

The main drives of the proposed layout are:

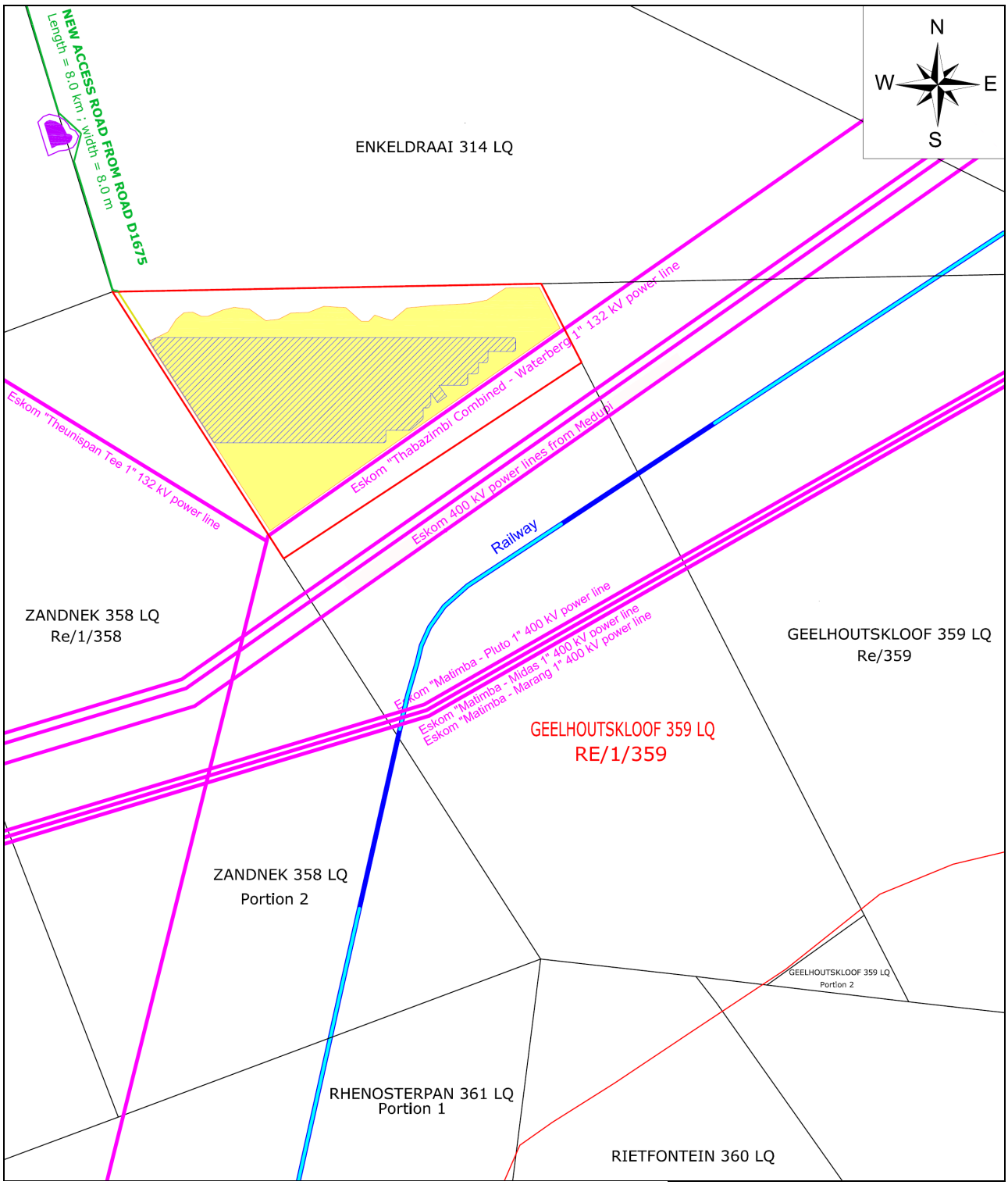
- to maximize the energy production and the reliability of the PV plant, by choosing proven solar technologies: thin-film or mono/polycrystalline solar modules mounted on single-axis horizontal trackers (SAT) or on fixed mounting systems;
- to develop the PV power plant on the northern side of the property, already separated from the southern side by a railway and by several existing and planned overhead high-voltage power lines, as showed in Figure 1. The selected project site will cover an area of 234 hectares, between the railway and the northern boundary of the property;
- to avoid the Marula tree area which is situated at the top of the northern boundary. The Marula tree area will instead be used as vegetation buffer zone, in order to minimise the visual impact of the proposed development.

The proposed layout plan (attached as Annexure A and also shown in Figure 4 below) was drawn using PV modules mounted on trackers; in the case of PV modules mounted on fixed mounting systems, the layout plans do not change, except for the orientation of the PV arrays: East-West instead of North-South.
The required **footprint** - corresponding on the fenced area - **will not exceed 160 ha**, and the maximum height of the structures (PV modules and support frames) will be approximately 3.1 m above the ground level. Therefore the impacts and mitigation measures will remain exactly the same.

The project layout and the other PV plant components are detailed in the following drawings:

- DLSP_00.1_r1 Locality Map with indication of the proposed Development Area
- DLSP_00.2_r1 Locality Map with indication of the new access road
- DLSP_00.3_r0 Development Area, new access road and sensitivity
- DLSP_01_r0 Layout plan - PV power plant up to 75 MW
- DLSP_03_r0 Mounting System – Alternative option 1: fixed mounting systems
- DLSP_04_r0 Mounting System – Alternative option 2: single-axis horizontal trackers
- DLSP_05_r0 Medium-voltage stations
- DLSP_06_r0 Control building and medium-voltage receiving station
- DLSP_07_r0 On-site high-voltage loop-in loop-out substation
- DLSP_08_r0 Warehouse

Figure 3: Proposed Development Area of the Delta Solar Park

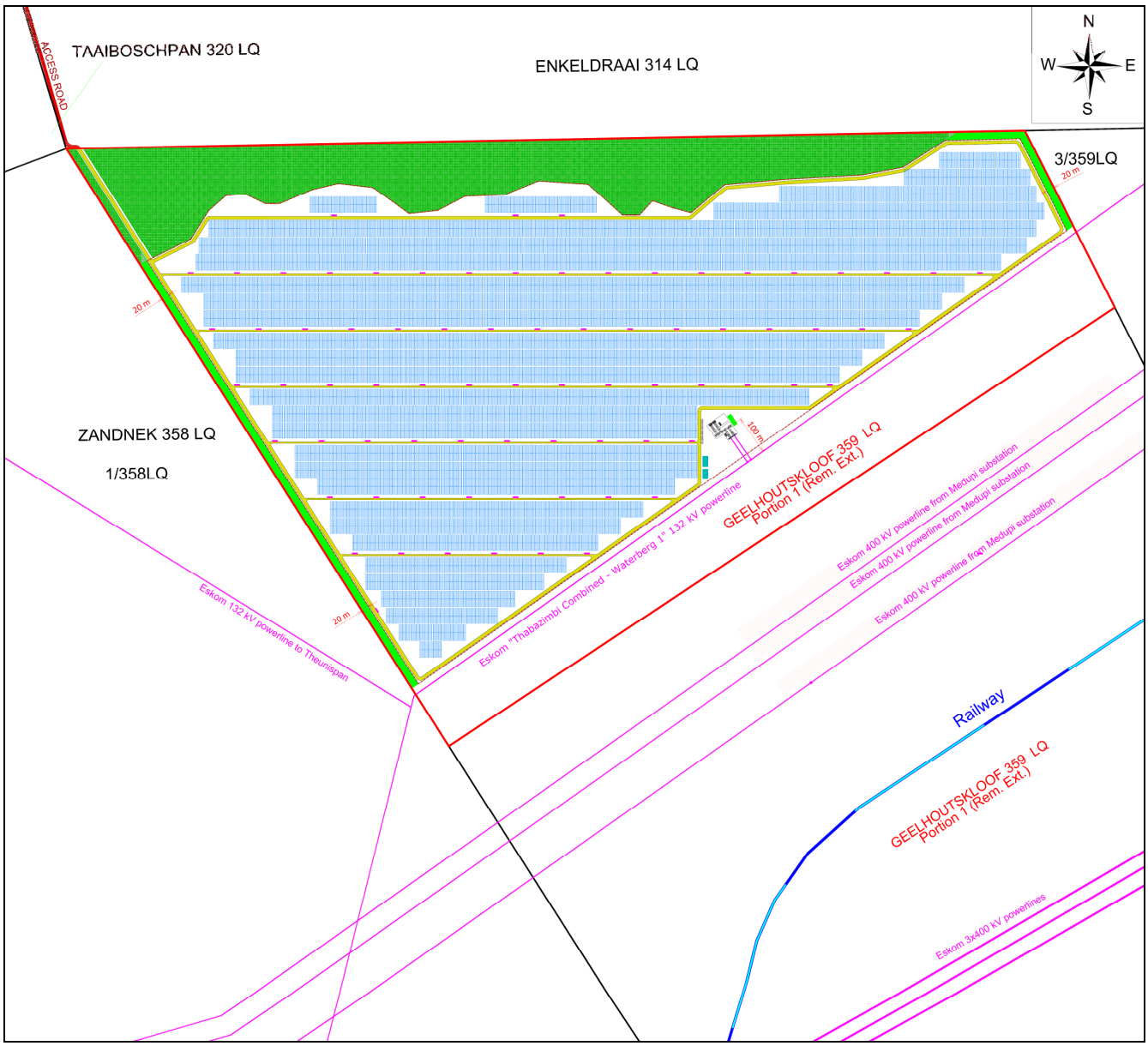


PV plant footprint already approved by the Environmental Authorisation 12/12/20/2152
Extent: 90 hectares

New PV plant footprint
Extent: up to 160 hectares

Study Area of the EIA process already conducted
Extent: ±234 hectares

Figure 4: Proposed Layout Plan of the Delta Solar Park



Fenced area (footprint): 160 hectares

PV arrays

Medium voltage stations

Medium voltage receiving station and control building

High-voltage loop-in loop-out substation
2+1 40 MVA 22kV/132kV step-up transformers

Internal roads

Warehouses

Eskom power lines

Marula trees

Vegetation buffer zone (existing vegetation)
Width: 20 m

4.2. PRIMARY COMPONENTS

The Photovoltaic (PV) Power Plant together with its connection infrastructures and structures will require the installation of the following equipment:

- Photovoltaic modules (mono-crystalline, polycrystalline or thin-film solar modules)
- Mounting systems (fixed or single-axis horizontal trackers) for the PV arrays and related foundations
- Internal cabling and string boxes
- Medium voltage stations, hosting DC/AC inverters and LV/MV power transformers
- Medium voltage receiving station(s)
- Workshop & warehouses
- One small on-site high-voltage loop-in loop-out substation with high-voltage power transformers, stepping up the voltage to the voltage of the Eskom's grid, and one high-voltage busbar with metering and protection devices (also called "switching station")
- two new sections of 132 kV line, 100 m long, for the loop-in loop-out connection to the **Eskom "Thabazimbi Combined – Waterberg 1" 132 kV power line**, which crosses the project site (on-site connection);
- Electrical system and UPS (Uninterruptible Power Supply) devices
- Lighting system
- Grounding system
- Access from the District Road D1675 (between the towns of Steenbokpan and Lephalale), through a new access road - 8.0 km long - running parallel to the western boundary of the Farms Pontes Estates 712 LQ and Enkeldraai 314 LQ, North of the project site
- Internal roads
- Fencing of the site and alarm and video-surveillance system
- Water access point and water extraction on-site borehole(s) point, water supply pipelines, water treatment facilities
- Sewage system (*Ballam Waterslot* or *Lilliput* system).

The connection may also entail interventions on the Eskom grid according to Eskom's connection requirements/solution. During the construction phase, the site may be provided with additional:

- water access point and water extraction on-site borehole(s) point, water supply pipelines, water treatment facilities;
- pre-fabricated buildings;

to be removed at the end of construction.

Table 4: Project components

Component	Description / Dimensions
Project site	**A portion (234 hectares) of Portion 1 (Remaining Extent) of the Farm GEELHOUTSKLOOF 359 LQ** Lephalale Local Municipality Waterberg District Municipality Limpopo Province LPI code: T0LQ00000000035900001 Latitude: 23° 45' 40" S Longitude: 27° 25' 40" E
PV plant footprint	**PV plant footprint (fenced area): up to 160 ha on the northern side of the property**

	Geo-graphical coordinates of the footprint / security fence: P01: 23° 45' 31.7" S ; 27° 25' 03.6" E P02: 23° 46' 06.3" S ; 27° 25' 28.0" E P03: 23° 45' 29.0" S ; 27° 26' 25.6" E P04: 23° 45' 21.5" S ; 27° 26' 21.4" E P05: 23° 45' 21.5" S ; 27° 26' 14.7" E P06: 23° 45' 23.9" S ; 27° 26' 11.0" E P07: 23° 45' 24.5" S ; 27° 26' 07.3" E P08: 23° 45' 25.3" S ; 27° 25' 55.1" E P09: 23° 45' 27.6" S ; 27° 25' 52.2" E P10: 23° 45' 27.8" S ; 27° 25' 46.0" E P11: 23° 45' 25.3" S ; 27° 25' 42.9" E P12: 23° 45' 27.8" S ; 27° 25' 27.0" E P13: 23° 45' 25.3" S ; 27° 25' 20.7" E
Site access	Access point to Delta Solar Park will be from the north-western corner of the site, which could be reached from to the Road D1675 (between the towns of Steenbokpan and Lephalale), through a new access road - 8.0 km long - running parallel to the western boundary of the Farms Pontes Estates 712 LQ and Enkeldraai 314 LQ, North of the project site. Access from Road D1675: 23° 41' 35.6" S; 27° 23' 14.3" E Turning point 1: 23° 43' 24.9" S ; 27° 24' 18.0" E Turning point 2: 23° 44' 49.8" S ; 27° 24' 45.7" E Turning point 3: 23° 44' 53.6" S ; 27° 24' 50.0" E Turning point 4: 23° 44' 58.7" S ; 27° 24' 48.7" E Turning point 5: 23° 45' 22.2" S ; 27° 24' 56.5" E Turning point 6: 23° 45' 22.5" S ; 27° 24' 57.6" E Security gate at the PV plant fence: 23° 45' 31.6" S ; 27° 25' 03.7" E Length: 8.0 km
Generation capacity	up to 75 MW
Proposed technology	The preferred technical solutions are: **PV solar modules**: thin-film modules or monocrystalline or polycrystalline modules **Mounting systems:** fixed mounting systems or single-axis horizontal trackers (SAT)
Panel Dimensions	It depends on the technical solutions and electrical configuration. In any case the minimum and maximum height above the ground level will not exceed the values indicated at the item below.
Height of PV module supporting structures from ground level	Maximum height (highest point of PV arrays): 3.1m above ground level Minimum height (lowest point of PV arrays): 0.7m above ground level
Width and length of internal roads	The main internal road around the security fence is max. 8.0 m wide and approximately 7 km long. Internal roads are 4.0 m wide.
Height of Fencing	Security fence around the footprint: maximum height: 3.0 meters above the ground level
New on-site high-voltage loop-in loop-out substation	**<u>On-site high-voltage loop-in loop-out substation - within fenced area</u>** Substation Fence: 80 m x 80 m Substation Footprint: 0.4 ha Latitude 23° 45' 45.3" S Longitude 27° 25' 55.1" E
Loop-in loop-out lines	**<u>Two new sections of 132 kV power line</u>** for the connection to the the Eskom "Thabazimbi Combined – Waterberg 1" 132 kV power line Length: max. 100 m each Loop-in Line starting point: 23° 45' 46.0" S; 27° 25' 55.7" E Loop-in Line ending point: 23° 45' 48.0" S; 27° 25' 57.2" E Loop-out Line starting point: 23° 45' 45.8" S; 27° 25' 56.0" E Loop-out Line ending point: 23° 45' 47.8" S; 27° 25' 57.6" E

4.2.1. Project functioning and connection of the solar park to the Eskom grid

Solar energy facilities using PV technology convert sun energy to generate electricity through a process known as the Photovoltaic Effect, which consists of the generation of electrons by photons of sunlight in order to create electrical energy. The preferred technical solutions are:

- thin-film modules or mono / polycrystalline modules, mounted or:
- fixed mounting systems or mounted on horizontal 1-axis trackers,

which at present represent the best performing options in terms of reliability and costs/efficiency.

The PV technology is in constant and rapid evolution, this means that the final choice of the type of solar modules (thin-film, mono-crystalline or polycrystalline) and mounting system (fixed or tracker) can be taken at the time of the commission date, on the basis of the availability of PV modules and mounting systems, of the worldwide market and of the cost-efficiency curve.
The required footprint - corresponding on the fenced area - will not exceed 160 ha, and the maximum height of the structures (PV modules and support frames) will be approximately 3.1 m above the ground level. Therefore the impacts and mitigation measures will not change. For further reference please refer to section 5.2.

The following description is referred to the examples of “thin-film PV modules on fixed mounting systems” and of “polycrystalline modules on trackers”, but the combination of “thin-film PV modules on trackers” and “polycrystalline PV modules on fixed mounting systems” is also possible and feasible. The required **footprint** (including internal roads) will not exceed **160 ha.**

PV modules will be assembled on zinced steel or aluminium frames, to form PV arrays. The metal frames that sustain PV arrays are set to the ground by fixed support poles.

A) In the case of PV modules mounted on fixed mounting systems:

Each mounting frame will host several PV modules along two or more parallel rows consisting of PV modules placed side by side, with the position of the PV arrays northwards and at an optimized tilt. The rows are mounted one on top of the other, with an overall mounting structure height **up to 3.1 meters above ground level**.

Figure 5: Lateral views of PV arrays mounted on fixed mounting systems

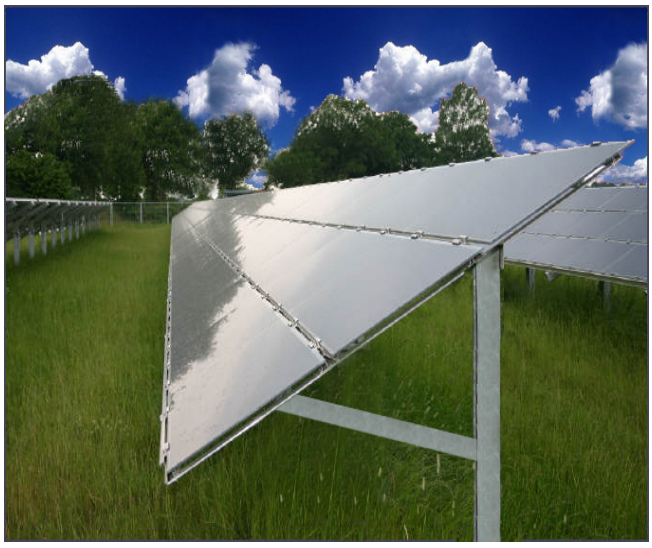


Figure 6: Frontal view of PV arrays mounted on fixed mounting systems

For further details, Please refer to the Figures 5 and 6 above and to the drawing included in Annexure A:

- DLSP_03_r0 *Mounting System – Alternative option 1: fixed mounting systems*

B) In the case of PV modules mounted on trackers:

Each PV array is composed of several PV modules disposed along one or more parallel rows consisting of PV modules placed side by side.
Each tracker is composed by several PV arrays North-South oriented and linked by an horizontal axis, driven by a motor. The horizontal axis allows the rotation of the PV arrays toward the West and East direction, in order to follow the daily sun path.
The maximum mounting structure height will be **up to 3.1 meters above ground level**.

Figure 7: Simulation views of the PV arrays mounted on horizontal 1-axis tracker

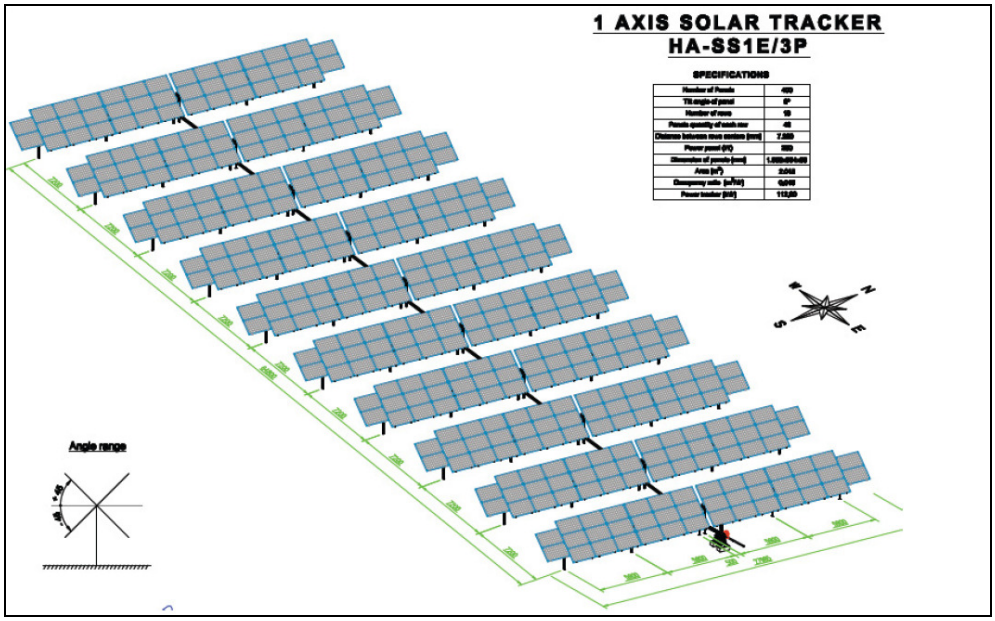


Figure 8: Frontal views of the PV arrays mounted on horizontal 1-axis tracker

For further details, see also the drawing of the Annexure A:

- DLSP_04_r0 *Mounting System – Alternative option 2: single-axis horizontal trackers*

C) In both cases:

PV modules are series-connected outlining PV strings made of several modules, so that the PV string voltage fits into the voltage range of the inverters. PV strings are set up in order to be connected to DC-connection boxes. Each String Box allows the parallel connection of several PV strings (also called "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. The PV sub-fields are thought to be linked to central inverters, located in **75 medium voltage stations**.
Each station comprises two adjacent prefabricate buildings designed to host two **DC/AC inverters**, with a total nominal output AC power of 1,000 kW (16 parallel sub-fields), and a **medium voltage power transformer** of 1000 kVA. The DC/AC inverters are deemed to convert direct current (DC) into alternate current (AC) at low voltage (270 V); subsequently the AC will pass through a medium-voltage transformer in order to increase the voltage up to 22 kV (or 11 kV).

The medium-voltage stations are detailed in the drawing of the Annexure A:

- DLSP_05_r0 *Medium-voltage stations*

The energy delivered from the 75 medium voltage stations will be collected into one (or more) **medium voltage receiving station**(s), parallel connecting all the 75 PV fields of the PV generator. From the medium voltage receiving station, the energy will be delivered to two high-voltage power transformers (40 MVA each, plus one as spare), which will step up the electric energy from the medium voltage level (11 kV or 22 kV) to the Eskom required connecting voltage (i.e.132 kV). The power transformers will be connected to an on-site 132 kV busbar (the so called "***switching station***"), to be equipped with protection and metering devices, according to Eskom requirements.

The **Eskom** "**Thabazimbi Combined – Waterberg 1**" **132 kV power line** - which crosses the project site - will loop in and out the 132 kV busbar of the on-site substation through two new sections of 132 kV line, 100 m long.

The new on-site HV substation will need to be equipped with circuit breakers upstream and downstream, in order to disconnect the PV power plant and/or the power line in case of failure or grid problems**.**

Two **metering devices and related kiosks** are included in the layout: one for Eskom, close to the 132 kV busbar, and one for Sole Energy, close to the power transformers. The kiosks (2.4 x 4.8 x 3.2 m) will contain the peripheral protection and control cabinets and the metering devices. The on-site HV sub-station, composed of the power transformers, the control building, the 132 kV busbar with protection and metering devices and the kiosks, will have a **footprint covering approximately 4,000 m^2**. The new power line and the busbar (*switching station*) of the on-site HV substation will be owned and operated by Eskom Distribution.

The layout of the on-site high-voltage substation as well as of the control building and the subdivision between Eskom's side and Sole Energy's side are detailed in the drawings included in Annexure A:

- DLSP_06_r0 *Control building and medium-voltage receiving station*
- DLSP_07_r0 On-site *high-voltage loop-in loop-out substation*

The power generation capacity at the delivery point will be up to 75 MW.

4.2.2. Access road and internal roads

The access point to the Delta Solar Park will be from the north-western corner of the site, which could be reached from to the Road D1675 (between the towns of Steenbokpan and Lephalale), through a new access road - 8.0 km long - running parallel to the western boundary of the Farms Pontes Estates 712 LQ and Enkeldraai 314 LQ, North of the project site.

Please refer to the figure below and to the drawing of the Annexure A:

- DLSP_00.2_r1 *Locality Map with indication of the new access road*

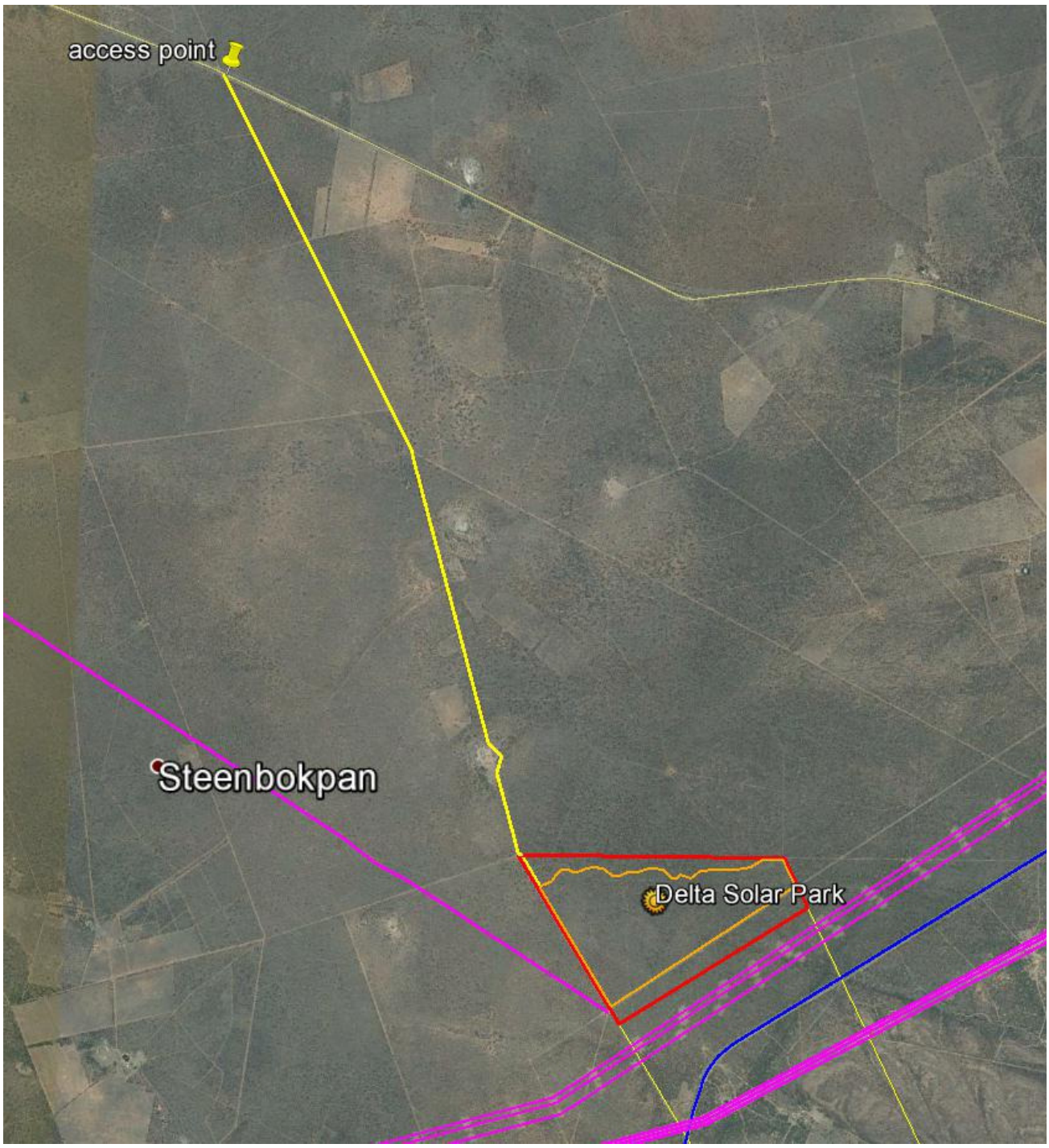
Table 5: Geo-graphical co-ordinates of the new access road (8.0 km)

Access road	Latitude	Longitude
Access from Road D1675 (Pontes Estates 712 LQ)	23° 41' 35.6" S	27° 23' 14.3" E
Turning point 1 (Pontes Estates 712 LQ / Enkeldraai 314 LQ)	23° 43' 24.9" S	27° 24' 18.0" E
Turning point 2 (Enkeldraai 314 LQ)	23° 44' 49.8" S	27° 24' 45.7" E
Turning point 3 (Enkeldraai 314 LQ)	23° 44' 53.6" S	27° 24' 50.0" E
Turning point 4 (Enkeldraai 314 LQ)	23° 44' 58.7" S	27° 24' 48.7" E
Turning point 5 (Enkeldraai 314 LQ)	23° 45' 22.2" S	27° 24' 56.5" E
Turning point 6 (project site)	23° 45' 22.5" S	27° 24' 57.6" E
Security gate at the PV plant fence (project site)	23° 45' 31.6" S	27° 25' 03.7" E

Internal roads will consist of gravel roads designed in accordance with engineering standards. The roads will have a width of 8.0 meters allowing for the slow moving of heavy vehicles.

Once the solar farm will be in operation the internal roads will mainly be used for maintenance and inspections. The vertical alignment of the roads will not present significant challenges due to the flatness of the terrain. The entire development will be contained inside a fenced area and the roads are not intended for public use.

Figure 9: New access road from Road D1675 (8.0 km)



4.2.3. Lighting system

The lighting system will consist of the following equipment:

- Floodlight-towers: maximum 10 meters high, with 6x400W directional lamps, installed around the HV loop-in loop-out substation. Normal lighting: 15 lux; up to 40 lux in case of emergency.
- Street lighting along internal roads, for the stretch from the access point up to the HV substation inside the property: 1 streetlamp, maximum 5.5 meters high, every 20 meters, having a metal-haloids lamp of 400 W.
- 2x400 W spotlights (SAP type) mounted on the top of medium-voltage stations.

The lighting of the MV stations and of the on-site HV substation will be on only in case of intrusion/emergency or necessity to reach the MV stations / HV substation during the night.
During the night, the video-surveillance system will use infra-red (or micro-wave) video-cameras, which do not need a lighting system (which could reduce the functioning).

4.2.4. Storm-water collection system

Given the low rainfall, flat topography and low flow speed of run-off, **no formal storm water structures are required** as the proposed gravel roads will be developed at ground level so as not to disturb the natural flow of storm water. This means that run-off will not be concentrated and the existing drainage patterns will be left undisturbed.

4.2.5. Water requirements

4.2.5.1. Water requirements during the construction phase

The construction phase will last approximately **15 months**.

A) Construction of internal gravel roads

- Water is necessary for the construction of internal gravel roads, in order to get the gravel compacted to optimum moisture content (OMC).
- The surface of internal gravel roads will be approximately 100,000 m^2.
- 50 liters of water / m^2 of internal of roads will be required.
    - 100,000 m^2 x 50 l/m^2 = 5,000 m^3 over 15 months

B) Workers

- Approximately 100 people are expected to be employed during the construction period, although this number can increase to 200 for short spaces of time during peak periods. Each worker needs 30 liters / 8 working hours for sanitary use.
- Water consumption will be:
    - 100 people x 30 l/person x 330 working days = 990 m^3 over 15 months

C) Concrete production

- Concrete is necessary for the basements of the medium-voltage stations, the high-voltage substation, the control building and the warehouse and for the foundations of the mounting systems. The overall amount of concrete to be produced will be approximately 10,000 m^3
- 200 litres of water are needed for 1 cubic meter of concrete.
    - 10,000 m^3 x 200 l/m^3 = 2,000 m^3 over 15 months

D) Vehicle cleaning

As mitigation measure, the cleaning of vehicles like excavators, mechanical diggers and pile rammers will be done once or twice per month and no during working days, also in order to not increase the water requirement during the construction activities. In order not to waste a large amount of water, high pressure cleaners will be used.
Overall, the water requirement for cleaning activity is very low.

The overall and average water consumption during construction is detailed in the following table.

Table 6: Water consumption during the construction phase of the project

WATER REQUIREMENT DURING THE CONSTRUCTION PHASE OF THE PROJECT		
DESCRIPTION	**UNIT**	**TOTAL**
Timeframe of the construction activities	*months*	15
Timeframe of the construction activities	*days*	450
Timeframe of the construction activities	*working days*	330
Overall water consumption for internal roads	m^3	5,000
Overall water consumption for sanitary use	m^3	990
Overall water consumption for concrete production	m^3	2,000
OVERALL WATER CONSUMPTION	***m^3***	**7,990**
OVERALL WATER CONSUMPTION	***m^3/day***	**17.76**
EQUIVALENT WATER FLOW OVER 15 MONTHS (450 DAYS)	***l/s***	**0.206**

Storage tanks will be sized in order to provide a reserve of water approximately **200 cubic meters**.

4.2.5.2. Water requirements during the operational phase

During operation, water is only required for the operational team on site (sanitary use), as well as for the cleaning of the solar panels.
Further water consumption may be only for routine washing of vehicles and other similar uses.

A) Water for sanitary use

Approximately 35/40 people will be employed during the operation phase of the PV power plant, which will have a lifetime of 25 - 30 years.
The Delta Solar Park will be in operation 7 days per week; therefore personnel will operate according to shifts. The surveillance team will be present during day-time, night-time and weekends. The average number of people working at the site on the same time will be of **14 people daytime and 6 people at night**.
The average daily water consumption for sanitary use is estimated to be **60 litres** / **day** / **person** per **20 people** (14 people daytime and 6 people at night), The daily water consumption will be approximately **1,200 litres/day.**

B) Water consumption to clean the PV modules

The cleaning activities of the solar panels will take place **twice per year**.
It is assumed that up to 1.0 liters per m^2 of PV panel surface will be needed. Therefore, the amount of water for cleaning is up to **840 m^3 per cleaning cycle and 1,680 m^3 per year**.
PV modules cleaning activity can last less than 1 month. If the cleaning activity lasts approximately 2 weeks (12 working days), the daily water consumption will be approximately **71,000 liters/day**, **over 12 days**.

Conclusion

The daily water requirement will be approximately **1,200 liters/day** over 12 months for sanitary use (i.e. **36,000 l/month** and **438 m^3/year**).
The water consumption will increase to **72,200 liters/day** during the cleaning of the solar modules (71,000 liters/day for cleaning activity and 1,200 for sanitary use), which will last less than a month and will occur twice a year during the dry period. PV modules are conceived as self-cleaning when it rains. It is further proposed that **90,000 l** of water will be stored in **storage tanks** for fire, emergency and washing of panels twice a year.

The overall and average water consumption during operation is detailed in the table below.

Table 7: Water consumption during the operational phase of the project

WATER REQUIREMENT DURING THE OPERATIONAL PHASE OF THE PROJECT		
DESCRIPTION	**UNIT**	**TOTAL**
Average daily water consumption for sanitary use	*l/day*	1,200
Average daily water consumption during cleaning activity (*)	*l/day*	72,200
Average monthly water consumption for sanitary use (over 30 days)	*l/month*	36,000
Annual water consumption for sanitary use	***m^3/year***	**438**
Annual water consumption for PV modules cleaning activities (twice/year)	***m^3/year***	**1,680**
ANNUAL WATER CONSUMPTION DURING OPERATION	***m^3/year***	**2,118**
DAILY WATER CONSUMPTION DURING OPERATION (average over 365 day)	***m^3/day***	**5.80**
EQUIVALENT WATER FLOW OVER 365 DAYS	***l/s***	**0.067**

(*) over 12 working days, twice per year

4.2.5.3. Water provision during construction and operation

The site is located within the **A42J Quaternary**, and is situated on the **Limpopo Water Management Area.**

Under the old General Authorization Regulations (Gazette No. 26187, Notice No. 399 published on 26 March 2004, still in force), in the Quaternary catchment A42J no groundwater abstraction is allowed for under General Authorization.

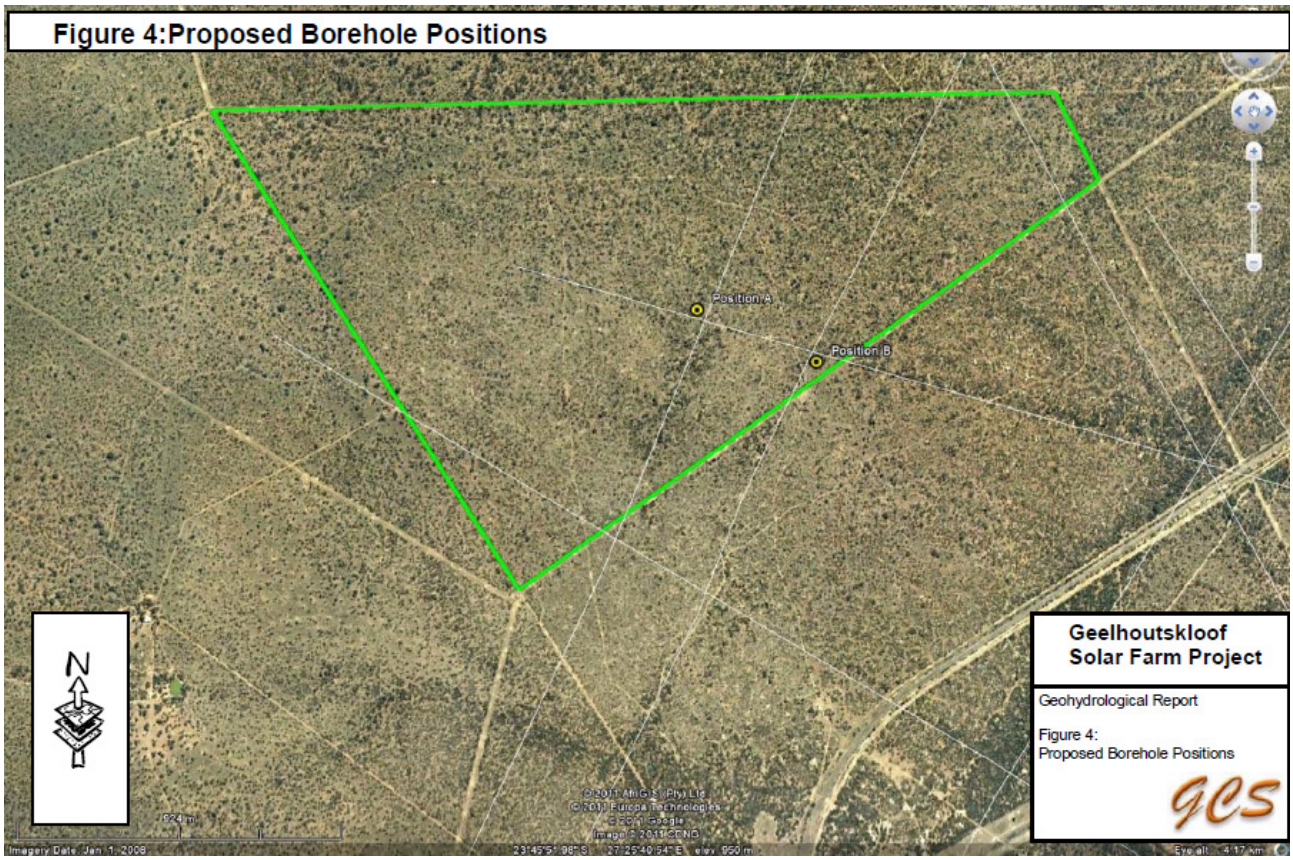
Under the new General Authorization Regulations (Gazette No. 35223, Notice No. 288 published on 4 April 2012 - not in force yet), in the Quaternary catchment A42J 45 m3/ha/annum are allowed for under GA.

The Recorded Mean annual precipitation is 428 mm per annum, with an annual run-off of 4 mm. The groundwater recharge is 7.25 mm/m^2 per year. The estimated annual groundwater recharge (7.25 mm/m^2 per annum) from an average annual precipitation of 428 mm falling on 234 ha (project site) will result in 16,965 m^3 of water available. The maximum annual water requirement for the project is 2,118 m^3. **The scale of abstraction relative to recharge is 12.48% (Category A).**

There are currently no boreholes on the site. A water supply borehole is planned before construction on site commence. Two possible locations have been identified, as showed in the Figure 10. The general groundwater condition within the Waterberg aquifer suggests that the aquifer can sustain the planned project, both for construction and operational phases.

A Water Use License Application was submitted to Department of Water Affairs on 26 April 2011 and revised on 13 August 2013 (proof of submission is attached as Annexure N).

Figure 10: Possible locations of the new borehole for water provision during construction and operational phases



4.2.6. Sewerage

Considering that the proposed development will not include formal residential properties there is no need to connect the municipal sewer reticulation system. Sewer reticulation will be handled by the patented and commercially available *Ballam Waterslot* (or similar) sewer treatment system.
The sewer system will therefore consist of an installation to serve the offices of the control building. It is foreseen that the system will be installed in line with the requirements of the manufacturer. Typical systems consist of a conservancy tank (built underground on site), and a patented digester. Most systems require electricity to power the pumps and fans used in aeration process, although some systems use wind power (whirlybird). The system could require chlorine tablets available commercially.

The effluent from the *Ballam Waterslot* (or similar) system will be suitable for irrigation of lawns, or re-use in the dwellings as water for the flushing of toilets, or for fire-fighting purposes. This could reduce the overall water requirement of the development substantially.

A Water Use License Application was submitted to Department of Water Affairs on 26 April 2011 and revised on 13 August 2013 (proof of submission is attached as Annexure N).

4.2.7. Refuse removal

During the construction phase, solid waste will mainly consist of vegetation material as a result of the clearing activity. Other type of solid waste will be: wood from packaging, boxboards, expanded polystyrene and household waste. Vegetation material from clearing activity can be recycled to be re-used as organic fertilizer. Other solid wastes will be recycled as much as possible. Non-recyclable waste will be delivered to the closest landfill of the Municipality.
During the operational phase (25 - 30 years), solid waste will mainly consist of household waste from the operational team. Other type of solid waste will come from the maintenance activity in case of failure of some components.

At the end of the project lifetime, the PV plant will be decommissioned. Silicon of the PV modules and cables (copper and/or aluminium conductor) will be recycled, as well as the aluminium (or zinced steel) frames and piles of the mounting systems. Sole Energy will enter into an agreement with the Lephalale Local Municipality for the PV plant's refuse at the nearby municipal refuse site. No refuse will be buried or incinerated on site. Measures to manage waste have been included in the Draft EMPr (Annexure M).

4.3. TEMPORARY CONSTRUCTION CAMP

The construction camp (approximately 10ha) will be located on the southern side of the planned footprint, in an area around the planned on-site substation.

The construction site area will be gradually reduced at the completion of the last four PV fields (4 MW) and on-site substation, and at the end of the works all the construction area will be converted into the last PV arrays. The optimal location of the construction site is an important element of the planning phase also in order to minimize impacts on the surrounding environment.

The site's location has been dictated by the nature of the works to be undertaken, specialist studies, site restrictions, town planning intended uses and access.

The area identified for the construction site had to meet the following requirements:

- sufficient size;
- proximity to existing roads;
- availability of water and energy;
- low environmental and landscape value;
- sufficient distance from residential areas; and
- proximity to the worksite.

In addition, to ensure environmental compatibility, the following factors have been considered:

- restrictions on land use (landscape, archaeological, natural, hydrological, etc.);
- terrain morphology;
- presence of high environmental value areas (e.g. wetlands); and
- sand & stone supply.

The establishment of the construction site will be divided into four phases. Steps included here do not follow a time sequence, but considered overlapping and simultaneous events.

4.3.1. Phase I

The area will be fenced to prevent intrusion of animals and to protect against materials theft within the site. A video surveillance system will be provided.

4.3.2. Phase II

During the fencing operation as described in Phase I, the most valuable trees, if any, will be removed and placed temporarily in a safe location for future planting at the end of work. This procedure is required for environmental mitigation. The other low value tree species will be cut down and transferred to facilities for wood processing.

4.3.3. Phase III

At completion of the works defined in Phases I and II, the following step will be the site clearing and the construction of internal roads. The internal road network should ensure a two-way traffic of heavy goods vehicles in order to minimize trips. The road system is planned for a width of 8 meters. Roads will be of dry and compacted materials. The facility will require constant access control, a weigh-house for heavy trucks, removable structures for the storage of yard tools and temporary storage areas. During Phase III, the installation of MV/LV transformers connected to the Eskom grid is also planned, as well as the laying of underground electrical cables.

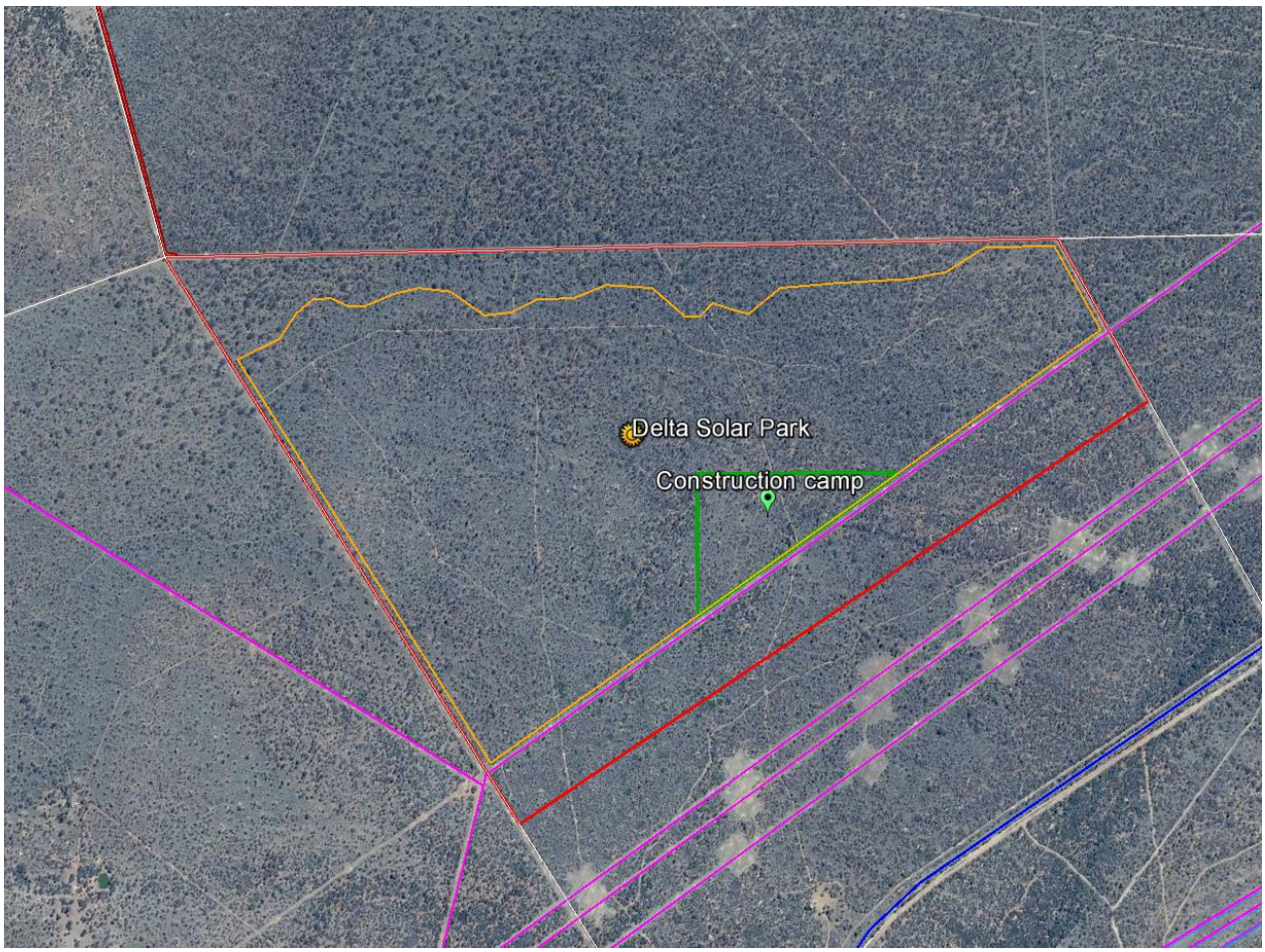
4.3.4. Phase IV

Temporary storage areas of materials and workshops will be constructed and used for:

- temporary storage of photovoltaic modules (covered with compacted dry material in order to avoid direct contact with the ground);
- temporary storage for frames and piles of the mounting systems of the PV arrays;
- storage and processing of building material for construction (sand, gravel, concrete batching and mixing plant, steel, etc.);
- drinking water storage for human consumption;
- worker care facilities and site management buildings,
- prefabricated housing modules for workers who may require accommodation inside the site (only key personnel should be allowed to stay overnight);
- technical cabins and management offices;
- medical care unit in a prefabricated module, in order to allow immediate first aid and minor surgical emergency;
- recreation area and canteen (prefabricated modules);
- parking lots for employees (located close to the staff housing), for visiting staff (located close to the offices area), and for trucks and work vehicles during inactivity;
- workshop and storage facilities on the site for contractors;
- electrical network for living units, offices and service structures;
- water supply for living units through polyethylene pipes connected to storage;
- *Ballam Waterslot* or similar sewer treatment system. The treated water will be used to moisten dusty areas and reduce dust gathering due to windy actions;
- temporary chemical toilets, and
- solid waste collection point.

All facilities present in the construction site will be covered with dry material in order to avoid mud formation in case of rain.

Figure 11: Temporary construction camp (10 ha)



4.3.5. Earthworks

Clearing activity is required in order to remove shrubs and trees from the planned footprint (160 ha).

Due to the flatness of the development area, no earthworks are envisaged for the installation of the PV module mounting systems. The mounting systems will consist of metallic frames to be assembled on-site, supported by the driven piles or pre-bored cast-in-situ concrete piles. Concrete ballasted footing foundations are also possible.

Earthworks will be required during the construction of internal roads and access road. The vertical alignment of the roads will not present any significant challenges due to the flatness of the terrain so that no deep cuts or fills will be required. Considering a road pavement thickness of 300 mm and an overall road surface approximately 100,000 m^2, the amount of cut or fill is estimated to be approximately 30,000 m^3.
Given the low rainfall, flat topography and low flow speed of run-off - no formal storm water structures are required as the proposed gravel roads will be developed at ground level, so as not to disturb the natural flow of storm water. This means that run-off will not be concentrated and the existing drainage patterns will be left undisturbed.

Small earthworks will be required for the installation of the medium-voltage stations. None of these activities should require earthworks in excess of 500 mm cut or fill.

Only the foundation plate for the small high-voltage substation may require earthworks in excess of 500 mm cut or fill (the footprint will be up to 4000 m^2).
The topsoil stripping will result in temporary spoils heaps which must be spread over the site upon completion of the project. Underground cables will be laid down along the internal roads.
The concrete necessary for the basements of the medium-voltage stations, the high-voltage substation, the control building and the warehouse will be provided from the commercial sources in the vicinity of the development (Lephalale). Gravel necessary for the construction of internal roads may be provided from the commercial sources in the vicinity of the development (Lephalale).

4.4. TRAFFIC IMPACT OF THE PROPOSED DEVELOPMENT

4.4.1. Traffic impact – construction phase

Approximately 100 people are expected to be employed during the construction period (15 months), although this number can increase to 150/200 for short spaces of time during peak periods. A small accommodation area with few prefabricated buildings inside the work site may be foreseen, if accommodation facilities in Lephalale are not sufficient to accommodate all workers.

Overall traffic to and from the work site will amount to approximately **1000 medium** / **heavy vehicle trips** over the whole construction period. As indicated in the table below, the average number of medium and heavy trucks to and from the site will be of **3 trucks per working day.** Medium and heavy trucks will access / leave the site only during the working days (Monday to Friday), during daytime. The provision of a fuelling area on the work site could reduce the load of heavy vehicles on public roads. The installation of two steel fuel tanks (capacity of 30,000 litres each) is recommended.

Table 8: Construction timeframe: average daily trips of medium and heavy vehicles

Transportation of:	**months**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
fencing and tools	trips/month	8	8	0	0	0	0	0	0
clearance of the site (vegetation transportation)	trips/month	56	32	0	0	0	0	0	0
piles / frames for mounting systems	trips/month	0	0	20	20	20	20	20	0
Sands & gravel for on-site concrete production	trips/month	0	30	48	48	48	52	52	54
PV modules	trips/month	0	0	0	0	0	0	0	0
MV stations	trips/month	0	0	0	0	0	12	12	12
HV substation components	trips/month	0	0	8	8	8	0	0	0
cables	trips/month	0	0	0	0	0	0	0	16
Average trips per month	trips/month	**64**	**70**	**76**	**76**	**76**	**84**	**84**	**82**
Average trips per working day (*)	trips/day	**2.9**	**3.2**	**3.5**	**3.5**	**3.5**	**3.8**	**3.8**	**3.7**

Transportation of:	**months**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**TOTAL**
fencing and tools	trips/month	0	0	0	0	0	0	0	**16**
clearance of the site (vegetation transportation)	trips/month	0	0	0	0	0	0	0	**88**
piles / frames for mounting systems	trips/month	0	0	0	0	0	0	0	**100**
Sands & gravel for on-site concrete production	trips/month	52	48	32	0	0	0	0	**464**
PV modules	trips/month	0	16	32	68	66	34	0	**216**
MV stations	trips/month	12	12	0	0	0	0	0	**60**
HV substation components	trips/month	0	0	0	0	0	0	0	**24**
cables	trips/month	16	0	0	0	0	0	0	**32**
Average trips per month	trips/month	**80**	**76**	**64**	**68**	**66**	**34**	**0**	**1000**
Average trips per working day (*)	trips/day	**3.6**	**3.5**	**2.9**	**3.1**	**3.0**	**1.5**	**0.0**	**3.03**

(*) assuming 22 working days per month

4.4.2. Traffic impact – operation phase

The traffic impact during the operation phase will be insignificant, considering that about 35/40 people will work on the PV facility, in the following manner:

- during the daytime approximately 14 people;
- during the night-time, 6 people.

4.5. MANAGEMENT OF THE SOLAR PARK DURING OPERATION

Approximately 35/40 people will be employed during the operation phase of the PV power plant, which will have a lifetime of 25 - 30 years. Delta Solar Park will be in operation 7 days per week; therefore personnel will operate according to shifts. The surveillance team will be on site during day-time, night-time and weekends.

The operational team will consist of the following people:

- 1 person as plant manager
- 1 person for administration
- 4 people as technicians / plant operators
- 9/12 people for electric and generic maintenance
- 20/22 people as guards

The "**fire team**" will be composed of people for generic maintenance, who will attend a comprehensive fire-fighting training program. After this training programme, the fire team will be able to drive/use/manage properly the fire extinguishers and the fire fighting vehicle, that will be available on the site.

5. PROJECT ALTERNATIVES

The EIA Regulations, Section 28(1)(c) and NEMA, Section 24(4), require investigation and consideration of feasible and reasonable alternatives for any proposed development as part of the environmental impact assessment process. Therefore, a number of possible alternatives for accomplishing the same objectives must be identified and investigated.

In particular:

- the property on which, or location where, it is proposed to undertake the activity;
- the location within the current identified site;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity (schedule, process);
- the sustainability of other alternatives, and
- the option of not implementing the activity (No Go Alternative).

5.1. SITE ALTERNATIVES

Several sites have been inspected in order to find out the best solution for the PV power plant. The following selection criteria were applied:

- Connection availability and proximity
- Land availability
- Proper land surface area (±150 ha)
- Current land use
- Low environmental impact (low biodiversity)
- Low agricultural potential
- High solar radiance
- Socio-economic issues (land cost and local community unemployment)

The macro area of Lephalale and surrounding farms was investigated, due to the high value of solar irradiation and the presence of several power lines that allow an easy connection solution. Three sites were selected during the feasibility assessment:

- **Alternative Site 1: Portion 1 of the Farm Zandnek 358 LQ**
  - Portion 1 of the Farm Zandnek has been evaluated as a potential site for the solar project, due to its favourable morphology (fairly flat area) and to its proximity to the proposed Delta substation.
  - Portion 1 is crossed by the Eskom “Thabazimbi Combined – Waterberg 1” 132 kV power line (derivation towards the Eskom Teunispan rural substation) and by several 400 kV overhead power lines coming from the Matimba and Medupi Power Plants.
  - The Eskom “Thabazimbi Combined – Waterberg 1” 132 kV power line has been indicated by Eskom as available for the connection of a PV power plant.
  - Finally, Portion 1 proved to be a feasible alternative for the establishment of a solar park, but it was not certain the possibility of connection since the 132 kV line crosses the northern part of the property not with the main line but only with a derivation line. The main line of the existing 132 kV power line, though, crosses the site in the southern portion but that area falls mainly outside the industrial corridor of Lephalale.

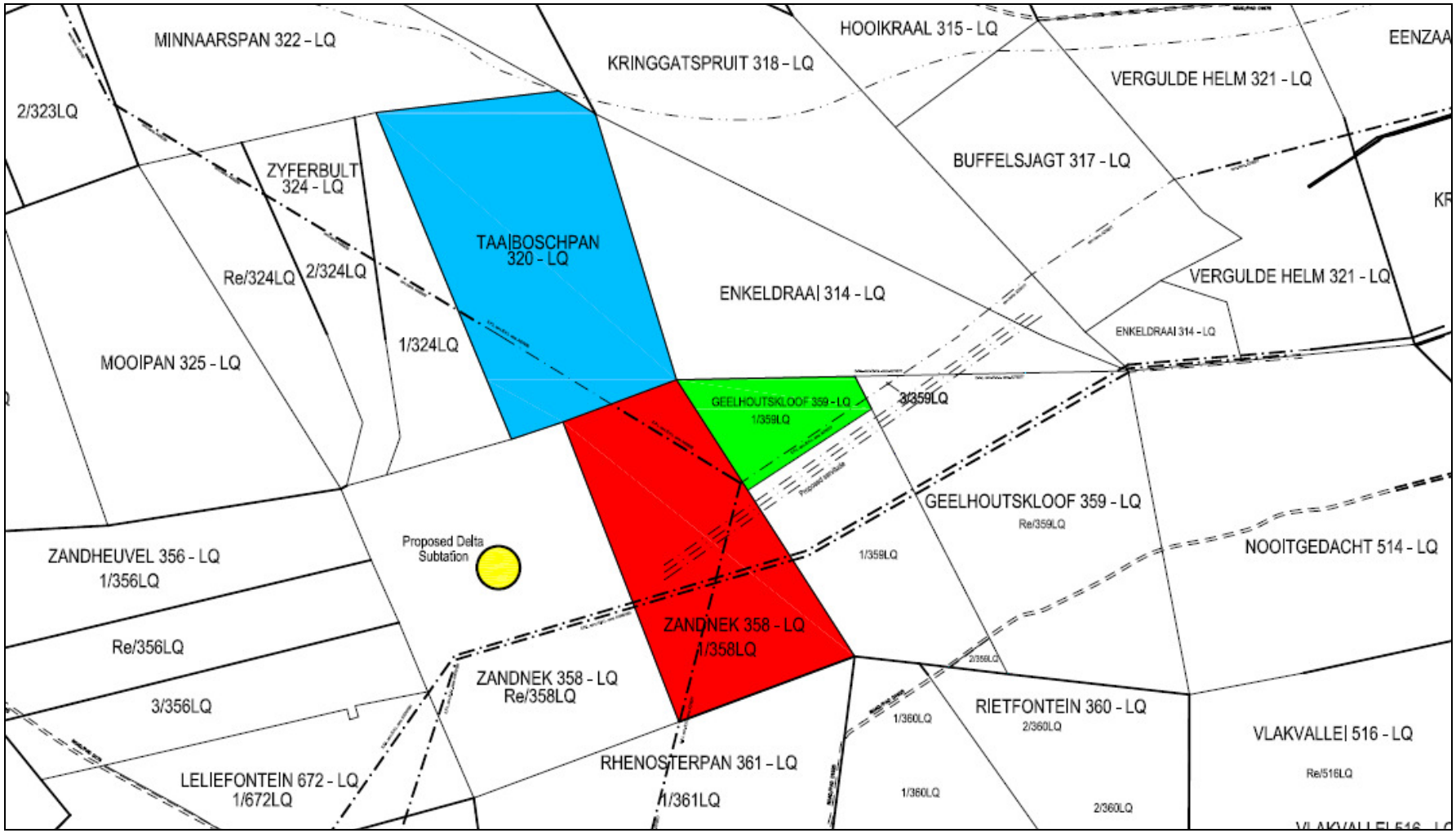
- **Alternative Site 2 (preferred): Portion 1 (Rem. Ext.) of the Farm Geelhoutskloof 359 LQ**
  - The northern side of Portion 1 has been evaluated as a potential site for the solar project, due its favourable morphology (fairly flat area).
  - The southern side of the Portion 1 is not suitable for the development of a solar park due to the severely undulated terrain morphology.
  - The northern side of the Portion 1 is separated from the southern side by a railway line and by many existing and planned Eskom HV power lines.
  - Portion 1 is crossed by the Eskom "Thabazimbi Combined – Waterberg 1" 132 kV power line and by several 400 kV overhead power lines coming from the Matimba and Medupi Power Plants.
  - The Eskom "Thabazimbi Combined – Waterberg 1" 132 kV power line has been indicated by Eskom as available for the connection of a PV power plant.
  - The northern side of the Portion 1 is inside the "***industrial corridor - Major Infrastructure corridor areas"*** of the Spatial Development Framework of the Waterberg District Municipality.
  - In conclusion, the northern side of Portion 1 is the **preferred alternative** for the establishment of a solar park.

- **Alternative Site 3: Farm Taaiboschpan 320 LQ**
  - The farm has been evaluated as a potential site for the solar project, due its favourable morphology and to its proximity to the proposed Eskom Delta (Masa) substation.
  - The possible connection to Delta substation has been evaluated as not feasible with respect to the construction time schedule of the PV project, due to the timeframe related to the construction of Delta substation, which is not known at the present date.
  - The site is crossed by a 132kV power line fed by the Eskom "Thabazimbi Combined – Waterberg 1" 132 kV power line although the connection to this power line has been evaluated as not feasible by Eskom (since it is not the main line but a derivation towards the Teunispan rural Eskom substation).
  - In conclusion, the site hasn't been considered as a feasible option for the proposal solar park, because of lack of an available connection.

Therefore, **the northern side (234 ha) of Portion 1 (Remaining Extent) of the Farm Geelhoutskloof 359 LQ (Alternative Site 2)** is the ***preferred site***, being the most suitable and available alternative.

The location of the alternative sites is indicated in Figure 12 below.

Figure 12: Location of the Alternative Sites



Alternative site 1: red
Alternative site 2: green (preferred)
Alternative site 3: cyan
Planned Eskom Delta (Masa) main transmission substation: yellow circle

5.2. TECHNOLOGY ALTERNATIVES

5.2.1. PV Plant and Solar Thermal Power Plant

The alternative to PV 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.

The final choice is the PV option because these kinds of project result in:

- lower construction costs;
- lower operating and maintenance costs (O&M);
- it is a simpler, quicker and more experienced technology; and
- lower environmental impact, considering that, among other factors, the PV solution requires a minor quantity of water.

5.2.2. Solar Photovoltaic (PV) Technology

The project envisages photovoltaic power plants with a generating capacity up to 75 MW, on a footprint up to 160 ha.

The preferred types of PV modules are:

- **monocrystalline or polycrystalline PV modules** and,
- **thin-film PV modules**,

which currently represent the best performing options in terms of reliability and costs/efficiency.

At present, mono/polycrystalline modules provide higher solar conversion efficiency (14% to 16%), if compared to the thin-film /PV modules (9% to 13%).On the other hand, thin-film modules (or amorphous silicon / Cd-Te as well) are cheaper and best performing at high temperatures, having an efficiency degradation of only 0.25 %/℃ instead of 0.45 %/℃ in the case of mono/polycrystalline modules.

However, it is important to consider the fact that the PV technology is in continuous evolution and it may be possible that thin-film (or amorphous silicon / Cd-Te as well) PV modules achieve a higher solar conversion efficiency in a very short time.

Furthermore, it should be kept into account the high volatility of prices of PV modules which depends on the worldwide availability of modules. Therefore the final choice will be taken at the commissioning date, on the basis of the prices and availability of mono/polycrystalline and thin-film / amorphous silicon / Cd-Te PV modules.

The development will not exceed the current planned footprint (160 ha).Therefore, the final choice of the type of PV modules, whatever it is, will not imply any additional visual or environmental impacts nor the necessity of specific or different mitigation measures.

5.2.3. Alternatives for the Mounting System of the PV Modules

The preferred technical solutions for the proposed solar park entails PV modules mounted on **fixed mounting systems** (*alternative option 1*) or on **horizontal single-axis trackers** (*alternative option 2*). The tracking solution is the best performing in terms of efficiency, because its energy production is approximately 15% more if compared with fixed systems. This type of technology is characterized by higher technical complexity and deeper installing and maintenance costs, if compared with the fixed mounting solution. The selected tracking system is the horizontal single-axis tracker (SAT), which doesn't differ from the fixed system, except for the presence of the tracking devices and the orientation of the rows of the PV arrays (north - south instead of west – east direction).

The technology of mounting systems is under continuous evolution. Consequently, the final decision about the mounting system technology will be taken only at the commissioning date: if addressed toward the fixed mounting system or toward horizontal single-axis trackers, the layout of the PV power plant will not imply any additional visual or environmental impacts nor the necessity of specific or different mitigation measures. The development will not exceed the currently planned footprint (230ha) and the height of the structures (PV modules and support frames) will be maximum 3.1 m above the ground level.

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.

5.3. LAYOUT DESIGN, LOCATION AND CONNECTION ALTERNATIVES

The site chosen for the establishing of the proposed Delta Solar Park is **a part (234 ha) of Portion 1 (Remaining Extent) of the Farm Geelhoutskloof 359 LQ.** The PV power plant will have a generating capacity **up to 75 MW**, on a footprint **up to 160 ha**.

5.3.1. Layout design and Location Alternatives

The layout of the proposed development is the result of a comparative study of various layout alternatives and had been defined in consideration of the results of specialists studies conducted during the first application process and revised / updated during the scoping phase.
The PV plant is designed and conceived in order to minimize visual and noise impacts, as well as to operate safely and assuring a high level of reliability, with low water consumption and the need only for easy and quick maintenance and repair for approximately 25-30 years.
As mentioned in the paragraph 4.1 - *Project layout*, the main drives of the proposed layout are:

- to maximize the energy production and the reliability of the PV plant, by choosing proven solar technologies: thin-film or mono/polycrystalline solar modules mounted on single-axis horizontal trackers (SAT) or on fixed mounting systems;
- to develop the PV power plant **on the northern side of the property**, already separated from the southern side by a railway and by several existing and planned overhead high-voltage power lines. The selected project site will cover an area of 234 hectares, between the railway and the northern boundary of the property;
- to avoid the Marula tree area which is situated at the top of the northern boundary. The Marula tree area will instead be used as vegetation buffer zone, in order to minimise the visual impact of the proposed development.

The proposed layout plan was drawn using PV modules mounted on trackers; in the case of PV modules mounted on fixed mounting systems, the layout plans do not change, except for the orientation of the PV arrays: East-West instead of North-South.

The required **footprint** - corresponding on the fenced area - **will not exceed 160 ha**, and the maximum height of the structures (PV modules and support frames) will be approximately 3.1 m above the ground level. Therefore the impacts and mitigation measures will remain exactly the same.

The project layout and the other PV plant components are detailed in the following drawings:

- DLSP_00.1_r1 Locality Map with indication of the proposed Development Area
- DLSP_00.2_r1 Locality Map with indication of the new access road
- DLSP_01_r0 Layout plan - PV power plant up to 75 MW
- DLSP_03_r0 Mounting System – Alternative option 1: fixed mounting systems
- DLSP_04_r0 Mounting System – Alternative option 2: single-axis horizontal trackers
- DLSP_05_r0 Medium-voltage stations
- DLSP_06_r0 Control building and medium-voltage receiving station
- DLSP_07_r0 On-site high-voltage loop-in loop-out substation
- DLSP_08_r0 Warehouse

5.3.2. Connection Alternatives

As previously described, Portion 1 of the Farm Geelhoutskloof 359 LQ is traversed by several overhead power lines along the east-west direction:

- the Eskom “Thabazimbi Combined – Waterberg 1” 132 kV power line;
- 3 x 400 kV Eskom power lines, coming from Matimba Power Station;
- Eskom “Medupi - Marang” 3 x 400 kV power lines, between the railway and the Eskom “Thabazimbi Combined – Waterberg 1” 132 kV power line.

Different connection solutions have been considered with reference to the proposed project. The *first connection option* foresees a new high-voltage overhead power line linking the PV power plant to the HV substation of the Eskom Medupi Power Plant. This solution would be extremely costly and would entail high visual and environmental impacts, due to the length of the corridor, over 15 km. Furthermore, Eskom evaluated this solution as not feasible for security reasons because a direct connection to a substation dedicated to a power station is not allowed.

A *second connection option* is the so-called LILO (loop in loop out) connection to one of the existing 400 kV power lines coming from Eskom Matimba and Medupi Power Plants has been evaluated. This second option, although possible, is extremely costly and would require a voltage transformation from 11 kV or 22 kV (output voltage from the MV stations of the PV power plant) up to 400 kV, which means high electric losses (low efficiency of the system).

The *third connection option* is a **LILO (loop in loop out) connection to the Eskom “Thabazimbi Combined – Waterberg 1” 132 kV power line** crossing the site along the northern boundary. This solution has been recommended by Eskom and will entail the construction of a small “loop-in loop-out” substation (*switching station*) linked to the mentioned power line through two new sections of line 100 m long. This solution is the **preferred one**, because it grants high transmission efficiency and low costs of connection and moreover, this connection, is within the selected site portion (on-site connection). With this solution furthermore there will be no need of any servitude agreements.

Eskom is the entity which should assess the connection solutions described in this EIA Report. Eskom also coordinates the necessary liaising between Sole Energy, Eskom Transmission, Eskom Distribution and Eskom Land & Rights Department. The preferred connection solution has been confirmed by Eskom in the Cost Estimate Letter issued on 5 August 2014 (Eskom Ref. IPP 44922446, attached as Annexure N).

Figure 13: 132kV power line crossing the site (Thabazimbi Combined - Waterberg 1)

5.4. NO-GO ALTERNATIVE

The no-go alternative is the option of not establishing a Photovoltaic Power Plant on the site, or any of its alternatives. The environment will remain in its current state (*status quo*). This will not create any new employment opportunities, and therefore the anticipated economic benefits of the project will accrue to the study area (see the paragraph 6.5 *Socio-Economic Environment*).

Should this alternative be selected the socio-economic and environmental benefits related to the use of renewable energy resources will not be realised with prejudice to the development of the area. The benefits related to the establishment of a renewable energy power plant are for example analysed in detail in the REFIT Regulatory Guideline published by NERSA (March 2009:

- ***Enhanced and increased energy security***: renewable energy plays an important role in terms of power supply, improving grid strength and supply quality and contemporarily reducing transmission and distribution costs and losses.
- ***Resource economy and saving***: the energy production by coal fired plants consumes a significant amount of water, this amount of water could instead be saved if a renewable energy facility like the proposed one is put in operation.(the Energy White Paper envisages that the implementation of its targets will determine water savings approximately 16.5 million kilolitres). This will be beneficial on the large scale for the water conservation measures that the country is currently undertaking.
- ***Support of new technologies and new industrial sectors***: the development and establishment of renewable energy power plants contribute to the growth of new technologies and new industrial sectors with benefits for its economy.
- ***Exploitation and capitalization of South Africa's renewable resources***: with the aim of increasing energy security.
- ***Employment creation and career opportunities***: the construction and operation of a renewable energy power plant contributes to job creation and new career opportunities.
- ***Pollution reduction***: the use of renewable energy resources decreases the demand and the dependence from coal and oil for electricity generation.
- ***Contrast to Global warming and climate mitigation***: the development of renewable energy contributes to reduce global warming through the reduction of greenhouse gas (GHG) emissions.
- ***Protection of natural foundations of life for future generations***: the development and establishment of renewable energy power plants offers the opportunity of consistently reducing the risks related to climate change caused by CO2 and CO emissions, therefore preserving life for future generations.
- ***Acceptability to society and community***: the use of renewable energy is largely accepted by society and community as a mean to reduce pollution concerns, improve human health and wellness, protect the environment, the ecosystem and climate;
- ***Commitment to and respect of international agreements***: in particular in light of the possible commitment to the Kyoto Protocol.

6. STATUS QUO OF THE RECEIVING ENVIRONMENT

The receiving environment has been described using a combination of specialist inputs, on-site observations, a review of existing literature and utilizing Geographic Information Systems (GIS) planning tools.

6.1. PROPERTY DESCRIPTION AND CURRENT LAND USE

The proposed development will stretch over a part (±234 ha) of Portion 1 (Remaining Extent) of the Farm Geelhoutskloof 359 LQ.

Portion 1 (Remaining Extent) of the Farm Geelhoutskloof 359 LQ

Surveyor-general 21 digit site	T0LQ00000000035900001
Local Municipality	Lephalale
District Municipality	Waterberg
Province	Limpopo
Extent	838.3128 ha
Land Owner	H.J.L. HILLS BOERDERY (PTY) LTD
Contact Person	Mr. Hendrik Johannes Lambertus Hills
Title Deed Number	T52917/2007
Current land use	farming
Geo-graphical Co-ordinates	23° 45' 40" S, 27° 25' 40" E (proposed footprint)

The site is located in the Limpopo province in the Waterberg District Municipality, Lephalale Local Municipality.
The property is located ±20 km west of Lephalale town and ±15km east from Steenbokpan. It is located adjacent to the proposed Eskom Delta Substation, planned on the Remainder of Farm Zandnek 358 LQ. The property is located in an area earmarked for industrial uses within the ***"industrial corridor - major infrastructure corridor areas*" of the Spatial Development Framework of the Waterberg District Municipality.**

As aforementioned, Portion 1 of the Farm Geelhoutskloof 359 L.Q. is already affected by infrastructure such as:

- railway line adjacent to the site along the southern boundary;
- the Eskom Thabazimbi Combined – Waterberg 1" 132 kV power line;
- 3x400 kV power lines coming from the Eskom Matimba Power Plant, crossing the Portion 1 along the east-west direction;
- Eskom "Medupi - Marang" 3x400kV power lines, which cross the Portion 1 in the corridor between the railway and the Eskom Thabazimbi Combined – Waterberg 1" 132 kV power line.

The 234 ha portion (project site) identified for the proposed Delta Solar Park is situated along the northern border of the farm, north of the railway line and Eskom power line servitudes. In terms of the land use rights, it is important to highlight that **the Council of the Lephalale Local Municipality has approved a "*Special Consent*" application on 19 April 2011**. The approved land use rights will apply to the northern portion only and read as follows: ***Agriculture IV(iv): Industrial purposes: Agro-industry*** for a Renewable Energy Generation project (Photovoltaic Solar Power Plant) and ancillary land uses, subject to specific conditions. The Special Consent from the Municipality is attached as Annexure N.

The new rights applied for in respect of the renewable energy project should be seen as additional rights as the primary rights will remain Agricultural. The proposed development will not permanently affect the agricultural or grazing value of the site as the re-growth of grass will take place under the panels as the mounting systems are at least 0.7 m above ground level.
The renewable energy facility is expected to have a lifespan of approximately 25 to 30 years and the power plant infrastructure would be decommissioned once it has reached the end of its economic life: **all structures will be removed and the land will return to agricultural land.** This will enable natural re-growth of indigenous vegetation and fauna re-population as well as the reuse of the area for agricultural and grazing purposes.

6.2. SURROUNDING AREAS

The surrounding areas are mainly used for game grazing purposes. However **these areas are in the process of being converted to industrial uses** in the light of the development of the nearby Medupi power station as well as the planned Eskom Delta (Masa) substation.
In terms of the Lephalale SDF, the property is situated in the area alongside an Industrial corridor, Road D1675, which is the road between Lephalale and Steenbokpan. This corridor is seen as a major spine of the mining and petro-chemical cluster.

Lephalale has attained the status of a growth node of national importance. Not only is it identified as a Provincial Growth Point in the Limpopo Spatial Rationale, but is also experiencing enormous growth in mining and the energy industries. The SDF of Lephalale emphasises the following important projects related to the mining and petrochemical sectors:

- Medupi Power Station.
- Feasibility investigations are underway for a third power station by Eskom.
- EXXARO announced expansion of Grootgeluk Mine to supply Medupi Power Station.
- EXXARO is engaged in feasibility investigation for coal beneficiation into “coke” for various industrial uses.
- SASOL is investigating the feasibility of establishing a coal to liquid industrial plant. This has massive development implications and a development far bigger than the existing Lephalale town might be necessary.
- ANGLO Coal is known to be investigating the possibility of a gas extraction operation.

All these projects have significant development implications for Lephalale. Changes in land-use are foreseen and will require special zoning. The triangle between Lephalale, the Stockpoort node and the Steenbokpan node will significantly be spatially redefined in the coming years.

6.3. OTHER RENEWABLE ENERGY PROJECTS CLOSE TO THE PROPOSED DEVELOPMENT

The renewable energy projects closest to the proposed Delta Solar Park and already selected by the DoE under the REIPP Procurement Programme is the **Tomburke Solar Park**: a 75 MW Photovoltaic plant located in the Lephalale Local Municipality, at the junction between the national road N11 and the regional road R572, **95 km** North-East of the proposed Delta Solar Park. This project has been selected by the DoE under the Window 3 of the REIPP Procurement Programme.

Due to the distance (minimum 95 km) from the proposed Delta Solar Park of the other renewable energy projects already built or under construction or selected by the DoE, as well as mitigation measures implemented for the proposed Delta Solar Park, **the cumulative impacts are not applicable.**

6.4. ENVIRONMENTAL FEATURES

6.4.1. Climate

Lephalale normally receives about 428 mm of rain per year, with most rainfall occurring mainly during midsummer. It receives the lowest rainfall (0 mm) in June and the highest (81 mm) in January. The monthly distribution of average daily maximum temperatures shows that the average midday temperatures for Lephalale 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.

6.4.2. Topography and drainage

The site is located on a valley floor land facet. The highest point on the property is along the northern boundary, 960 m amsl. The lowest point is at the southern corner (948 m amsl). The shortest distance between the highest and lowest points is 1380 m. The property is situated on the floodplain. Drainage across the site occurs as sheet-wash and sub-surface flow with no prominent surface drainage features in the area.

6.4.3. Soils, geology and geo-technical features

A Geo-technical Study (Annexure I1) was conducted in order to assess the geo-technical characteristics of the site.

Portion 1 of the farm Geelhoutskloof 359 LQ is situated on a valley-floor land facet. The land facets are underlain by quaternary sediments and sedimentary units of the Waterberg group.
The property is underlain by a single land facet with two soil profiles: a shallow profile consisting of thin quaternary sand cover (less than 1 m thick covering a weathered to slightly weathered sandstone) and a profile consisting of a quaternary sand profile of between and 3 m thick overlying the Waterberg sandstone rock.

Two soil profiles were identified on site from 7 trial pits:

- **The very loose to loose sand** represent the quaternary sand deposit (Qs) overlying the weathered Waterberg sandstone (Mm).
- **A dense to very dense shallow gritty weathered sand** overlying moderately to fresh Waterberg sandstone.

The NHBRC Site Classification for the Waterberg profile area is C. The recommended NHBRC foundation solution is normal strip footing foundations with good site drainage. The NHBRC Site Classification for the quaternary profile area is C1. The recommended NHBRC foundation solution is improved strip foundations or improved soil raft is recommended. The foundation material is to be compacted to 93% MOD AASHTO DENSITY at -1% to +2 % of optimum moisture content.

In light of the low density and loose consistency of the quaternary sand, coupled with a potential for collapse, it is recommended that the mini-piles used for the foundations of the panel frames be driven to refusal, founding on the Waterberg sandstone formation.

The expected excavatability of the whole site is soft to a depth of at least 1.5 m. The potential for collapse of side walls of deep excavations is minor. Excavation below 3 m will be variable to hard.

Land use Zone A (as indicated in the Report) is **developable with a low risk** and is classed as a Geotechnical Land Use Classification of F2, referring to excavatability and pilling depth.

Land use Zone B (as indicated in the Report) is **developable with a moderate risk** and is classified as a Geotechnical Land Use Classification of A2D2.

No shallow or perched groundwater was observed in the trial pit excavations. Flooding is not an identifiable risk for this project.

No evidence of current or past surface mining is evident on the property. No underground mining current or historic occurred under the property.

Construction materials are available from local suppliers in the area. Good quality aggregate and crushed rock can be sourced from waste rock dumps at nearby mines.

The study concluded that the project site is suitable for the proposed development, if the highlighted recommendations are adhered to as a minimum requirement.

6.4.4. Geo-hydrology

A Geo-hydrological Study (Annexure I2) has been conducted in order to determine hydrogeology of the site and investigate the possibility to drill a new borehole.

The property is underlain by quaternary sediment sand sedimentary units of the Waterberg Group. The Waterberg group rocks are a poor aquifer. Groundwater occurrences are generally associated with fracture zones and dykes. The groundwater recharge is 7.25 mm per year (ref. Groundwater Resource Directed Measures Database). According to the GRDM database, the static groundwater level in the area is at 27 m below surface. The borehole yields in the area ranges between 0.5 l/s and 2 l/s.
The quality of water derived from the Waterberg aquifer is generally good with low dissolved salts and are only slightly acidic.

The site is located within the **A42J Quaternary**, and is situated on the **Limpopo Water Management Area.**

Under the old General Authorization Regulations (Gazette No. 26187, Notice No. 399 published on 26 March 2004, still in force), in the Quaternary catchment A42J no groundwater abstraction is allowed for under General Authorization.

Under the new General Authorization Regulations (Gazette No. 35223, Notice No. 288 published on 4 April 2012 - not in force yet), in the Quaternary catchment A42J 45 m3/ha/annum are allowed for under GA.

The Recorded Mean annual precipitation is 428 mm per annum, with an annual run-off of 4 mm. The groundwater recharge is 7.25 mm/m^2 per year.
The estimated annual groundwater recharge (7.25 mm/m^2 per annum) from an average annual precipitation of 428 mm falling on 234 ha (project site) will result in 16,965 m^3 of water available. The maximum annual water requirement for the project is 2,118 m^3. **The scale of abstraction relative to recharge is 12.48% (Category A).**

6.4.4.1. Groundwater availability on the project site

There are currently no boreholes on the site. A water supply borehole is planned before construction on site commence. Two possible locations have been identified, as showed in the Figure 6.

The general groundwater condition within the Waterberg aquifer suggests that the aquifer can sustain the planned project, both for construction and operational phases.

6.4.5. Ecology (fauna & flora)

An Ecological Impact Assessment has been conducted by Exigo in order to describe the ecology (fauna and flora) present in the site, to assess its ecological sensitivity and to indicate the most suitable areas for the proposed development.

6.4.5.1. Vegetation types

The development site lies within the Savannah 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 shows that the site is classified as Western Sandy Bushveld and Limpopo Sweet Bushveld, with elements of both these vegetation types represented on the site.

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.

The Western Sandy Bushveld has a least threatened conservation status, with about 6% statutorily conserved and about 4% that has been transformed. The landscape and vegetation features of this vegetation type include flats and undulating plains characterized by tall open woodland to low woodland with the tree layer dominated by both broad-leaved and microphyllous tree species. The landscape and vegetation features of the site include mixed and broadleaf woodland.

After the initial ecological surveys of the study area, the analysis of the data resulted in the identification of three major vegetation units on the proposed development site. The detailed species list for each vegetation unit is included in the ecological report.
The following vegetation units were identified on the project site and access road corridor:

1. ***Sclerocarya birrea – Grewia – Combretum* woodland:**
    - Open *Sclerocarya – Combretum* woodland (access road corridor);
    - Dense *Sclerocarya – Combretum – Grewia* woodland (project site and access road corridor);
2. ***Combretum apiculatum – Grewia bicolor – Acacia nigrescens* woodland** (project site and access road corridor);

3. **Mixed *Combretum apiculatum – Terminalia sericea*:**
    - Mixed *Combretum – Terminalia – Grewia* woodland (access road corridor);
    - Mixed *Terminalia – Pterocarpus – Grewia* woodland (project site and access road corridor);
4. **Old fields** (access road corridor);
5. **Acacia woodland associated with freshwater pans (including quarries):**
    - Pans (access road corridor);
    - Riparian woodland (access road corridor).

6.4.5.1.1. Sclerocarya birrea – Grewia – Combretum woodland (project site and access road corridor)

The Marula – Red bushwillow woodlands are characterized by a definite dominance of marula and red bushwillow in the tree layer, while white raisin dominate the shrub layer of the vegetation unit. The marula – red bushwillow variation is characterized by an equal dominance in the woody layer by the tree species marula and red bushwillow, while the shrub layer is less well developed.

No red data plant species were noted in the area. The dense stands of the protected marula trees provide the most unique floristic component of this vegetation unit as an entity.

The following recommendations concerning the development should be implemented:
- The density 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 *medium-high sensitivity* even though no red data plant species were observed on site.
- The access road and solar plant development within this vegetation unit would not have a large impact in terms of the current nature and distribution of this vegetation type relating to the larger surrounding area. No development is planned in these areas considering that the solar plant avoided this area, while the access road will be located on an already existing servitude road and track.
- A permit should be obtained for the eradication of any protected marula trees.

6.4.5.1.2. Combretum apiculatum – Grewia bicolor – Acacia nigrescens woodland (project site and access road corridor)

This vegetation unit occurs in the south-western and central sections of the proposed development site and represents open woodland dominated by the medium tall red bushwillow tree species and tall knobthorn trees, while the shrub layer is dominated by the shrub species Grewia bicolr. The presence and dominance of red bushwillow indicate that the soils are shallower in this area compared to the northern section of the site that forms deep sandy soils. The woody layer forms an open woody structure with a dense grass layer in between dominated by Digitaria eriantha and Eragrostis rigidior.

No red data plant species were observed in this vegetation unit or could potentially occur.

The following recommendations concerning the development should be implemented:

- The vegetation unit is classified as having a *medium sensitivity* due to the widespread status as part of the Savanna Biome. The township development could be supported in this vegetation unit.
- A permit would be needed for the eradication of the protected tree species and can be obtained from DAFF. Protected tree species such as *Sclerocarya birrea* and *Boscia albitrunca* occur in low densities in this vegetation unit.
- The development of the photovoltaic power plant can be supported in this area.
- The development of the Photovoltaic Power Plant should preferably be clustered to prevent the impact on large areas of natural woodland and the layout is therefore sufficient in this regards.

6.4.5.1.3. Mixed Combretum apiculatum – Terminalia sericea woodland (project site and access road corridor)

This vegetation unit is characterised by the dominance of red bushwillow and silverclusterleaf in the tree layer.

The northern section of the proposed access road represents the Mixed Combretum – Terminalia – Grewia woodland vegetation unit and is completely dominated by broadleaf woodland with a well-developed shrub layer. The woody layer of the vegetation unit is mostly dominated by broadleaf species such as *Terminalia sericea*, *Combretum apiculatum*, Grewia species and *Commiphora pyracanthoides*.

The southern section of the solar plant footprint area represents the Mixed Terminalia – Pterocarpus – Grewia woodland and forms typical undulating sandy plains derived from sandstone.

No red data species occurs; probably as a result of the habitat being different to red data species habitat.

The following recommendations can however be made regarding the development in this plant community:
- The vegetation unit is classified as having a *medium sensitivity* due to the widespread status as part of the Savanna Biome.
- A permit would be needed for the eradication of these species and can be obtained from DAFF. Protected tree species such as *Sclerocarya birrea* and *Boscia albitrunca* occur in low densities in this vegetation unit.

6.4.5.1.4. Old fields (access road corridor)

The degraded grassland areas in the project area represent old cultivated fields (small pockets of degraded grassland). Many exotic weeds and alien invasive species occur in this area, and considering the degraded and modified state of this area. Some of the degraded grassland represents old fields in a state of succession.
No detailed surveys were conducted on the old fields considering that the solar plant or access road will not directly impact on these degraded areas.

6.4.5.1.5. Endorheic pans and surrounding Acacia riparian woodland (access road corridor)

The pans on the site bisecting represent endorheic system and represent small closed basins or playas in geomorphological literature.
The pans on the proposed development site should be considered *highly sensitive areas.* The pans are seasonally flooded and support a specific ecosystem of faunal and floral components.
No specific vegetation structure exists in the actual pan surface area.
Although no red data species were noted in the area the vegetation unit as an entity represent a sensitive ecozone. The following recommendations for the area should be adhered to

- The pans and surrounding riparian woodland has a *high sensitivity*. Specific mitigation measures should be implemented where the access roads cross the riparian woodland or temporary zones of the pans. The potential to impact on the sensitive pan habitat is high and therefore the Acacia woodland along the periphery of the pans provides a sufficient buffer zone.
- The pans should be monitored over the longer term to prevent any negative impact on these sensitive ecosystems.

6.4.5.2. Protected flora, plants & trees

According to Mucina & Rutherford (2006), an important central bushveld endemic found within this region is *Piaranthus atrosanguineus*, a succulent stapeliad. It is scantily distributed along the Limpopo River valley from Gaborone in Botswana eastwards to Zeerust and northwards to Lephalale and into areas north of the Soutpansberg (Bruyns, 2005). 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 red data species was found in the area during two seasonal surveys, 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.

The National Forest Act, 1998 (Act No. 84 of 1998) provides a list of tree species that are considered important in a South African perspective as a result of scarcity, high utilization, common value, etc. In terms of the National Forest Act of 1998, these tree species may not be cut, disturbed, damaged, destroyed and their products may not be possessed, collected, removed, transported, exported, donated, purchased or sold – except under license granted by DAFF (or a delegated authority). Obtaining relevant permits are therefore required prior to any impact on these individuals. The protected tree species occurring on the site are ***Boscia albitrunca*** (isolated individuals) and ***Sclerocarya birrea.*** 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 project site which were avoided by the proposed layout plan.

Plant species are also protected in the Limpopo Province according to the **Limpopo Environmental Management Act, 2003 (LEMA)**. According to this ordinance, no person may pick, import, export, transport, possess, cultivate or trade in a specimen of a specially protected or protected plant species. The Appendices to the ordinance provide an extensive list of species that are protected, comprising a significant component of the flora expected to occur on site. Communication with Provincial authorities indicates that a permit is required for all these species, if they are expected to be affected by the proposed project. After a detailed survey, no protected or specially protected plant was found. Some encroachment of silver cluster leaf and shrub species occur in the area and should be controlled as stipulated in the CARA regulations.

6.4.5.3. Fauna

Two surveys were conducted during February 2011 and February 2015 to identify specific fauna habitats, and to compare these habitats with habitat preferences of the different fauna groups (birds, mammals, reptiles, amphibians) occurring in the quarter degree grid. The area represents broadleaf vegetation component with a diverse vegetation structure and height class. A detailed species list for the fauna of the area is included in the appendixes of the report.

As result of the fauna analysis, the following recommendations and mitigating measures need to be implemented to ensure the survival of these species other fauna habitats and feeding grounds:

- If one considers the habitat descriptions of the red data species, none of them are limited in range or threatened as a direct result of habitat loss in the southern African sub-region. The impact of the development on the red data species would therefore be less than predicted.
- The development would not have a significant impact on the red data fauna 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 footprint of the Photovoltaic Power Plant. This will be on small sections in relation to the total available surrounding habitat for fauna. Development also 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 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 footprint to allow fauna to move freely between the different vegetation units on the property. In this regard the Marula woodland, surrounding outcrops and natural woodland that occurs to the north and south of the proposed development area will be more than sufficient as corridors.
- No high sensitivity areas occur on site, although the Marula woodland represent moderate - high sensitive areas in the area and mitigation measures should be implemented to ensure that these habitats are protected.
- The few taller (>3m) indigenous trees within this area also provide resting/perching sites for larger birds like vultures, birds of prey, arboreal reptiles and mammals that might occur/pass through the area and, other than the proposed footprint for the development, should preferably be preserved. These larger trees should be protected as far as possible and be incorporated into the proposed energy development. A monitoring programme needs to be implemented by a specialist if any rare species are confirmed on the property.

The fauna impact assessment concluded that the cumulative negative impact of the development on the fauna has the potential to be *moderate to low*. However, considering the general mitigation and management actions suggested in the report as taken on site, *the impact on faunal populations should be low.*

6.4.5.4. Summary and results of the Ecological Impact Assessment

Most development has an impact on the environment. In this case, the area on which the Photovoltaic Power Plant footprint will be built will be cleared, therefore directly impacting on the environment. The development will have a small impact on the vegetation and general ecology of the area, even though some of the natural habitat and vegetation will be completely modified during the construction.

Detailed ecological (fauna habitat & flora) surveys were conducted during February 2011 and February 2015 to verify the ecological sensitivity and ecological components of the site at ground level. Considering the results from the field surveys, limited mitigation needs to be implemented to prevent any negative impacts on the ecosystem. Natural corridors such as the Marula woodland on site and the outcrops and natural woodland of the surrounding area will be preserved. The areas to the south of the proposed development site is affected by existing and planned Eskom power lines.

A sensitivity analyses was conducted to identify the most suitable site for the development of the Photovoltaic Power Plant. From these ecological surveys the following observations was made:

- The most suitable area for the development would be on any of the natural woodland areas other than the Marula woodlands (moderate-high sensitive woodland areas).
- The moderate-high sensitive Marula woodlands should be preserved as corridors for fauna and as a buffer between the development and the neighbouring properties.

Only small sections of natural woodland will be modified through the development if one considers the vegetation types (Western Sandy Bushveld; 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. The vegetation units identified on site varies from natural to slightly encroached.

No red data plant species were found in the study area due to the state of the vegetation and physical environment of the larger area mostly not being suitable for any of the red data plant species that may be found in the area. Protected tree species can be eradicated once a permit has been obtained from DAFF.

The outcome of the study was that the planned development can be supported since the proposed layout of the PV Plant, connection infrastructure and access road is consistent with the sensitivity map and do not impede into the sensitive Marula woodland identified during the ecological survey.

6.4.6. Avifauna

An Avifauna Impact Assessment (Annexure E) was conducted by Exigo in order to determine if the proposed development would have negative impact on avifauna.

A number of potential impacts were individuated and assessed:

- Direct habitat destruction
- Habitat fragmentation
- Electrocutions
- Collision
- Disturbance of human activities and noise.

A series of specific mitigation measures have been individuated in respect of all the aforementioned potential impacts in the Avifauna Impact Assessment. It was concluded that the proposed development would not impact negatively over any avian habitats of high conservation value. 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 minimal. Provided that the mitigation measures and recommendations in the Avifauna Report are adhered to, it is unlikely that the proposed development will have a long-term, significant negative impact on the local avifauna.

6.4.7. Visual

A Visual Impact Assessment (Annexure J) has been conducted by NLA in order to determine the visual impact of the proposed activity.

Vegetation does however play a major role in screening the proposed intervention from adjacent and nearby sensitive viewers. A vegetation buffer zone 20 metres wide - composed by the existing vegetation - is foreseen along the perimeter of the area where the solar power plant will be developed, in order to avoid any visual impact also from close observation points. Furthermore, the northern boundary is screened by a wide buffer zone of Marula trees.

The effect of the lighting at night will be low, considering that at night only streetlamps from the access point up to the loop-in loop-out substation on the property will be switched on. This is because video-surveillance system will use infrared (or microwave) video cameras, that do not need a lighting system (which could reduce the functioning).

The negative impact of night lighting, glare and spotlight effects, can be mitigated using the following methods:

- Install light fixtures that provide precisely directed illumination to reduce light “spillage” beyond the immediate surrounds of the project site – this is especially relevant where there are open views from the nearby farmsteads and tourist attractions towards the proposed intervention.
- Minimise the amount of light fixtures to the bare minimum and connecting these lights to motion sensors can also considered in reducing light pollution.

As results of the Visual Impact Assessment, it was determined that the ***intensity*** of the visual impact of the proposed Solar Park would be ***LOW.***

The *significance* of all components of the proposed project before mitigation measures were rated as *MODERATE NEGATIVE*; and **the *significance* after mitigation measures have been applied correctly**, as ***LOW to MODERATE*** due to the nature of the proposed project and the character of the receiving landscape.

For the amended project the PV plant capacity had been increased up to 75MW and the footprint up to 160 hectares. Because of the density and height of the existing vegetation as well as the minor increase in the footprint area, the amended layout would not result in a change in the intensity or significance of the visual impact.

6.5. SOCIO-ECONOMIC ENVIRONMENT

A report on the socio-economic considerations related to the proposed project was compiled by Glen Steyn & Associates - development economists (see Annexure K).

The following issues were highlighted in the report:

- The national and local economies will benefit from civil contractor work, labour and building materials that will be required on site. On the whole, a share of approximately 40% of total CAPEX (investment costs) will be sourced locally. This share is likely to increase once there will be a specific and competitive industry in the Republic of South Africa able to supply PV modules and other technological components.
- Raising of the capital to finance the installation of solar electricity generation capacity by Sole Energy represents a significant benefit for the South African economy.
- After approval, the project will take approximately 8 months to be built and could have a lifetime of 25 - 30 years. Approximately 100 people are expected to be employed during the construction period, although this number can increase to 150 for short spaces of time during peak periods. During operational phase, the power plant will require a permanent staff of approximately 25 people. That impact will be positive, also in consideration of the slowing down of the recruitment rate due to mining stabilization activities.
- The presence of permanent security personnel may be beneficial to the overall safety and security situation in the area.
- Approximately 50% of the operation costs will have a local economic return (mostly for maintenance works by local sub-contractors), then the impact will also be positive during operation phase (25 - 30 years).
- The most important economic benefit is likely to be the experience that will be gained with regard to solar electricity generation in Limpopo and in South Africa, considering that this forms part of a national strategic plan, but from a zero base. This experience will be essential for the roll-out of the strategy, for efficiency improvements and for the establishment of a local manufacturing supply chain for equipment requirements. The project will also make a contribution towards reducing the carbon emissions per unit of electricity generated in South Africa, albeit very small to start with.
- The proposed project is consistent with national, provincial and municipal development. It provides an opportunity to launch the implementation of the national renewable energy generation program, with particular reference to solar energy. The important issue emerging from the local economic development strategy is the imperative of local recruitment.
- Furthermore**, the project will comply to the Economic Development Requirements, as requested by the REIPP Procurement Programme, issued on 3rd August by the DoE. This economic development programme identifies needs of the surrounding communities in order to have a positive socio-economic impact. In particular, Sole Energy is required to identify a Local Community for the purpose of entering into a partnership for the project.**

6.6. AGRICULTURAL POTENTIAL

An Agricultural Potential Impact Assessment on soils potential (Annexure F) was compiled by Exigo, after a soil analysis was conducted. The current land-use of the proposed development site is grazing by livestock. Neighbouring farms are being used for livestock grazing or mining purposes.

The proposed development site shows some variations in terms of soil characteristics and soil types identified during the survey. The classification of soils on the farm was based on land type description and the Binomial System for South Africa, which classifies soils into forms and families based on the diagnostic horizon of the soil profile. Exposed soil profile characteristics created by road cuttings in the field were also used in describing the local soil form. Soil identification and classification of the dominant soil type were done. The soils were classified into broad classes according to the dominant soil form and family as follows:

- Deep, red-yellow apedal sandy soils of the Hutton / Clovelly soil form (project site and access road corridor);
- Black clayey soils of the Katspruit / Rensburg Soil Form associated with pans (access road corridor);
- Shallow sandyclay soils of the Sterkspruit Soil Form (access road corridor).

The area is expected to receive an annual total rainfall between 300 and 500 mm, mostly between October to April. This amount is moderate to low. The site is considered to be located in an area marginal for rained arable crop production. The high variability in rainfall distribution within the area and the high incidence of frost during the winter months could however render dryland farming a risky venture, even under irrigated conditions. The climatic conditions, in combination with the sandy nature of the soil are the main factors determining the soils to be unsuitable for arable agriculture. The climatic conditions of the area renders the area investigated unfavourable for effective crop production. Economically viable crop production is therefore not considered as a viable option on this site. The current vegetation at the proposed site of development consists mainly of shrubland with a well-developed grass layer. According to databases (ARC) the grazing capacity of the area for livestock is 9-13 LSU's per hectare which indicates the veld to be mixed with a medium palatability as a result of the shallow nature of the soils. When applying the national norms applicable to Act 70 of 70, which indicates the land unit to be able to carry 60 LSU's per farm unit, an economically viable farm for this area will be between 540 ha and 780 ha.

The nature of the vegetation at the farm is however marginal for extensive livestock production. Using planted pasture to supplement livestock production is however possible but this could be constrained by high demand for irrigation water due to the shallow and often sandy nature of the soil and relatively higher day temperatures in summer.

The low agricultural potential and moderate grazing potential of the soils is confirmed by the Agricultural Maps below (Figures 16 to 19):

- **Agricultural Potential Map** - indicating that the project site is classified as *Low Agricultural Potential.*
- **Land Capability Map** - indicating that the project footprint area is classified as *Non-Arable - Moderate potential grazing land.*
- **Potential Grazing Capacity Map (1993)** - indicating that the project site has a potential grazing capacity of **9 - 13 ha** / **large stock units**. This grazing potential is *medium*, if compared to the maximum value indicated in the legend: less 4 ha / large stock units.
- **Potential Grazing Capacity Map (2007)** - indicating that the project site has a potential grazing capacity of **11 - 15 ha** / **large stock units**, which is *medium*. This map (2007) is not official yet and should be further confirmed by the Department of Agricultural, therefore in the calculation below we refer to the Map (1993).

It can be deduced that the project site, being **838.31 ha in extent**, would allow for **64 to 93 *potential* large stock units (LSU's)**, while the proposed development (up to 160 ha in extent) would entail a reduction of its grazing potential for only 12 to 18 *potential* large stock units.

Therefore, the property is a viable grazing farm (52 to 75 LSU's > 60 LSU's) both with and without the proposed development in place.

These maps were generated from the Website: ***http://www.agis.agric.za/agisweb/agis.html***
[AGIS (Agricultural Geo-Referenced Information System) Comprehensive Atlas, commissioned by the Department of Agricultural to CETI Development CC (http://www.ceit.cc/)]

6.7. CULTURAL AND HERITAGE RESOURCES

An archaeological-cum-heritage assessment (Annexure H) was conducted to ascertain whether there are any remains of significance in the area that will be affected by the proposed development. No site-specific actions or any further heritage mitigation measures are recommended as no heritage resource sites or finds of any value or significance were identified in the indicated study area.

Figure 14: Vegetation Map

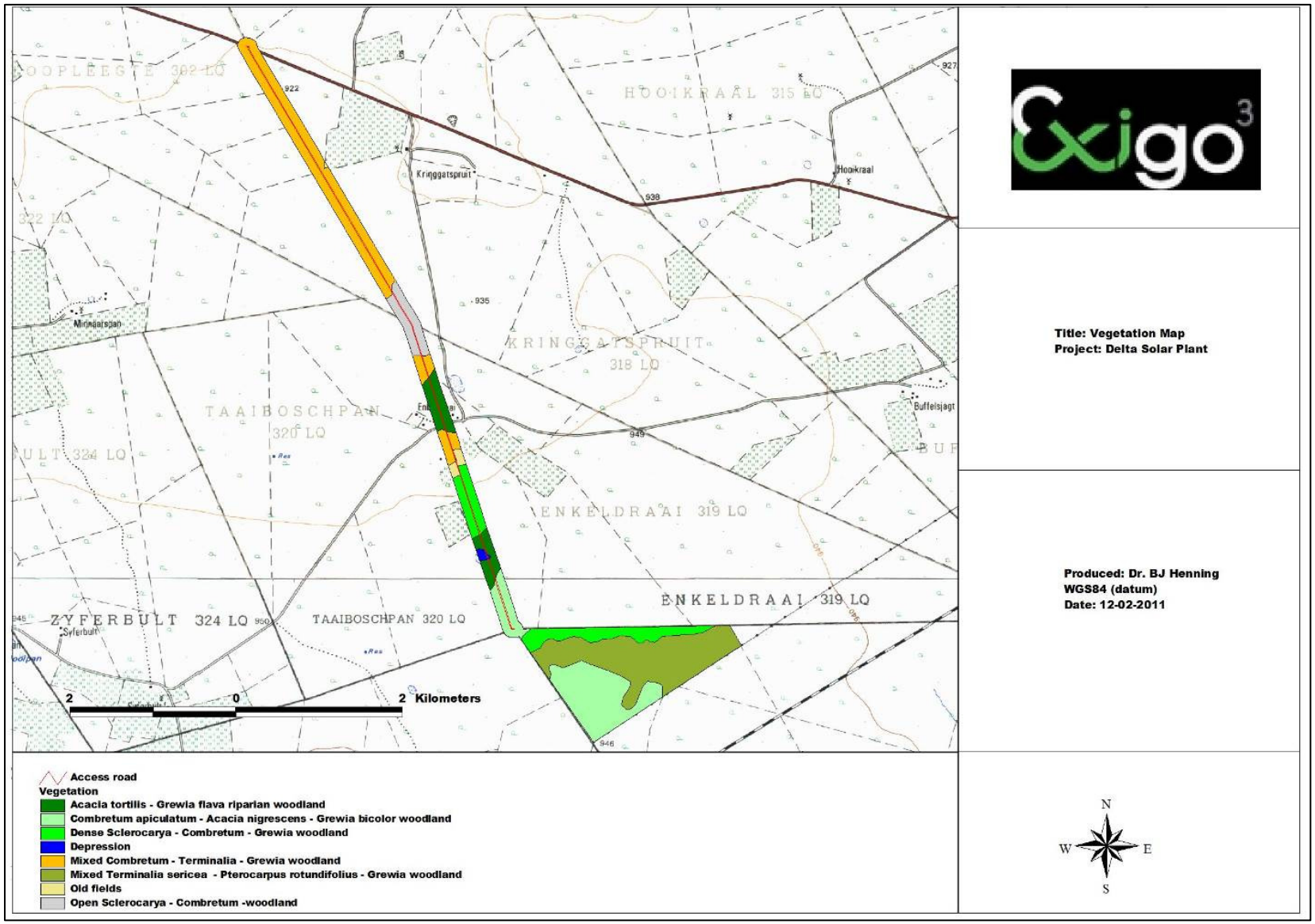


Figure 15: Sensitivity Map

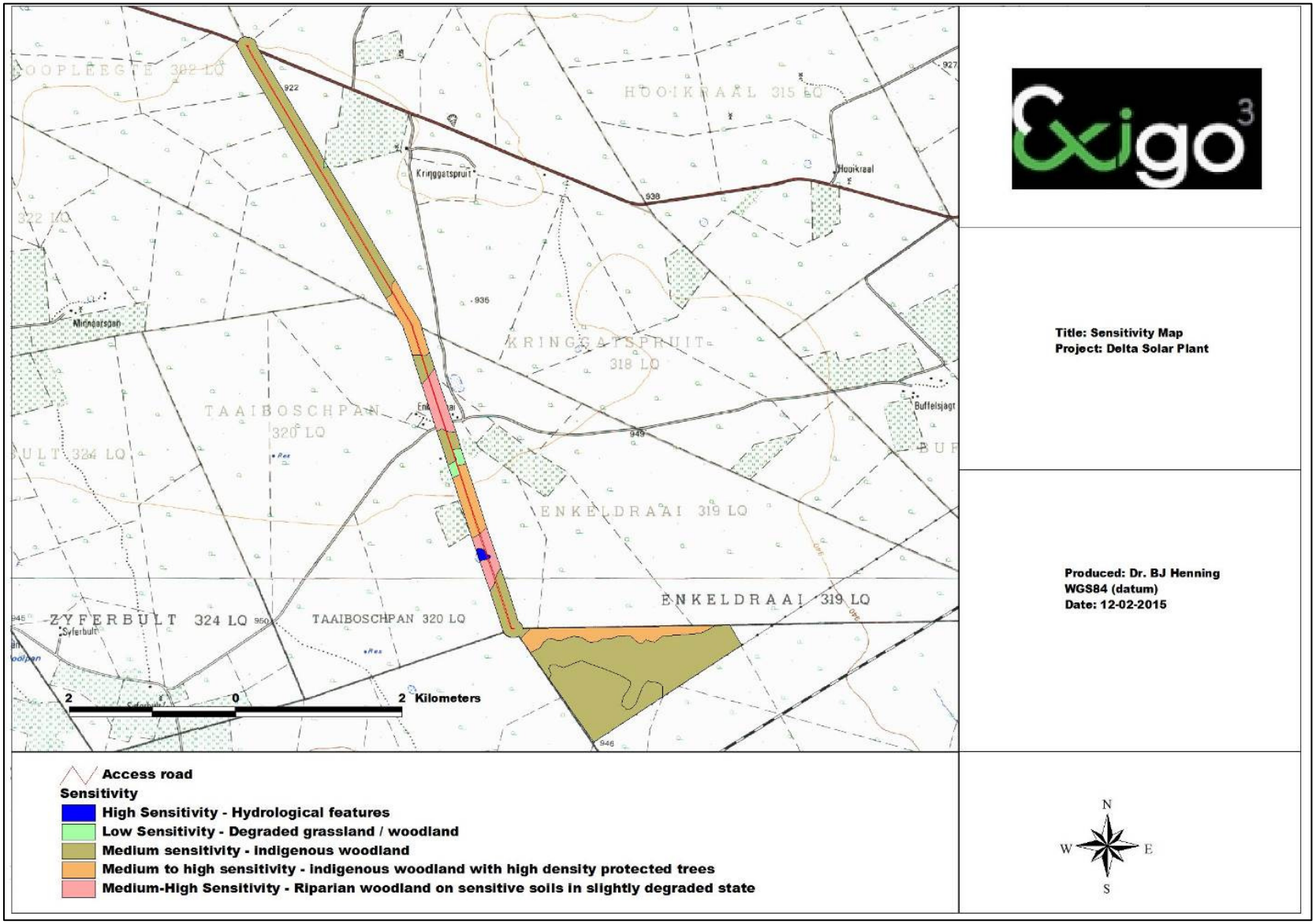


Figure 16: Agricultural Potential Map

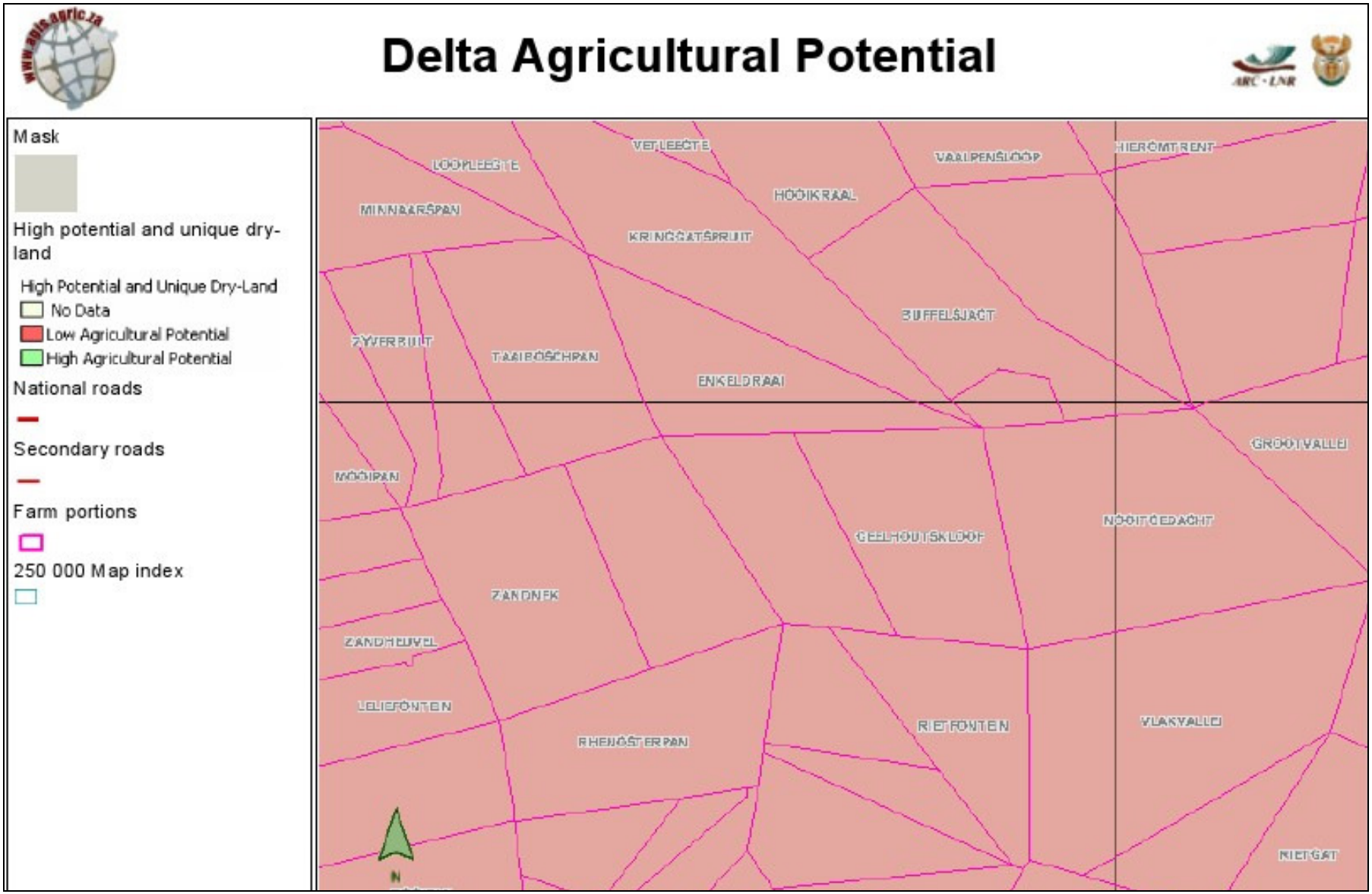


Figure 17: Land Capability Map

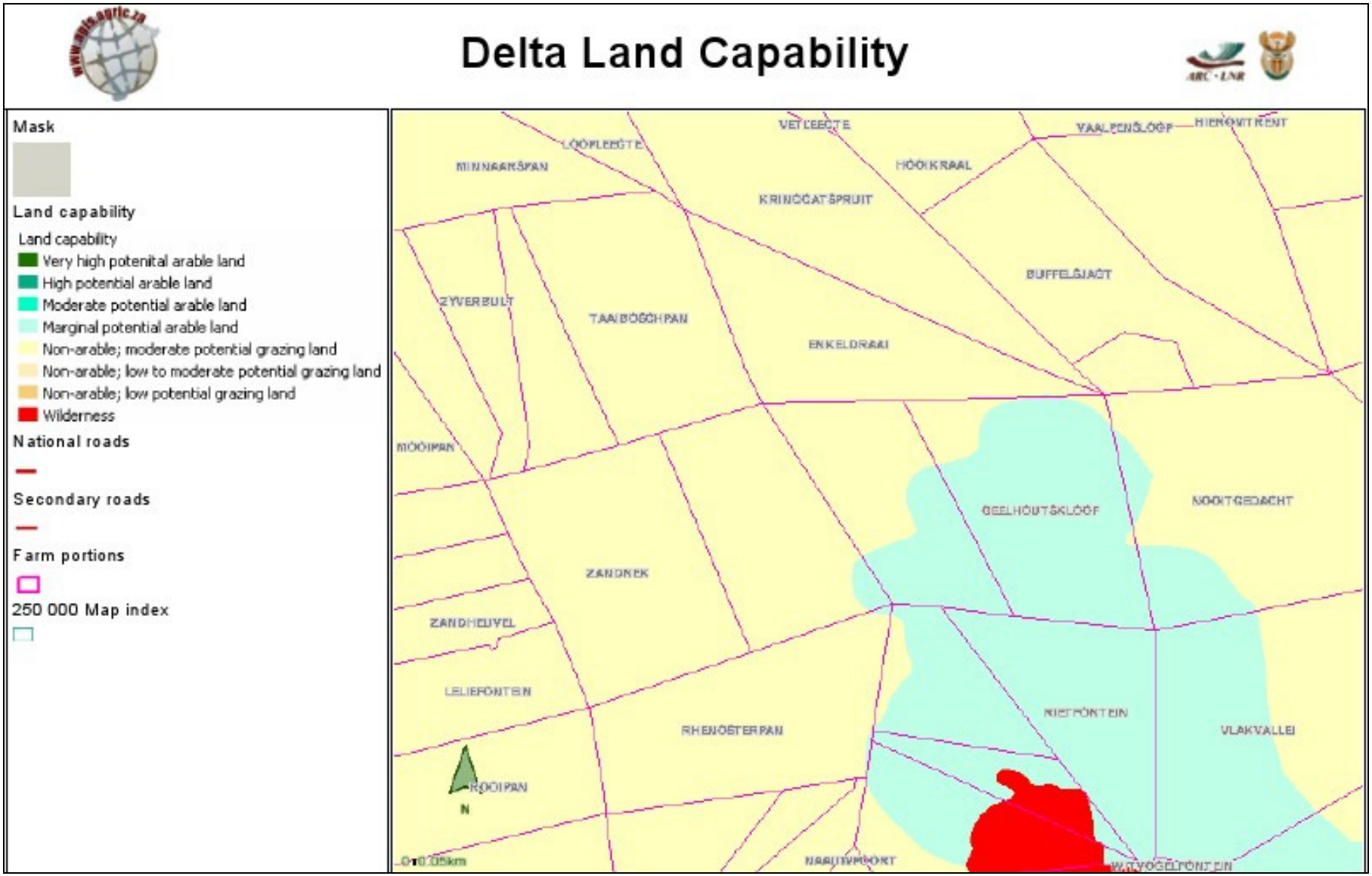


Figure 18: Potential Grazing Capacity Map (1993)

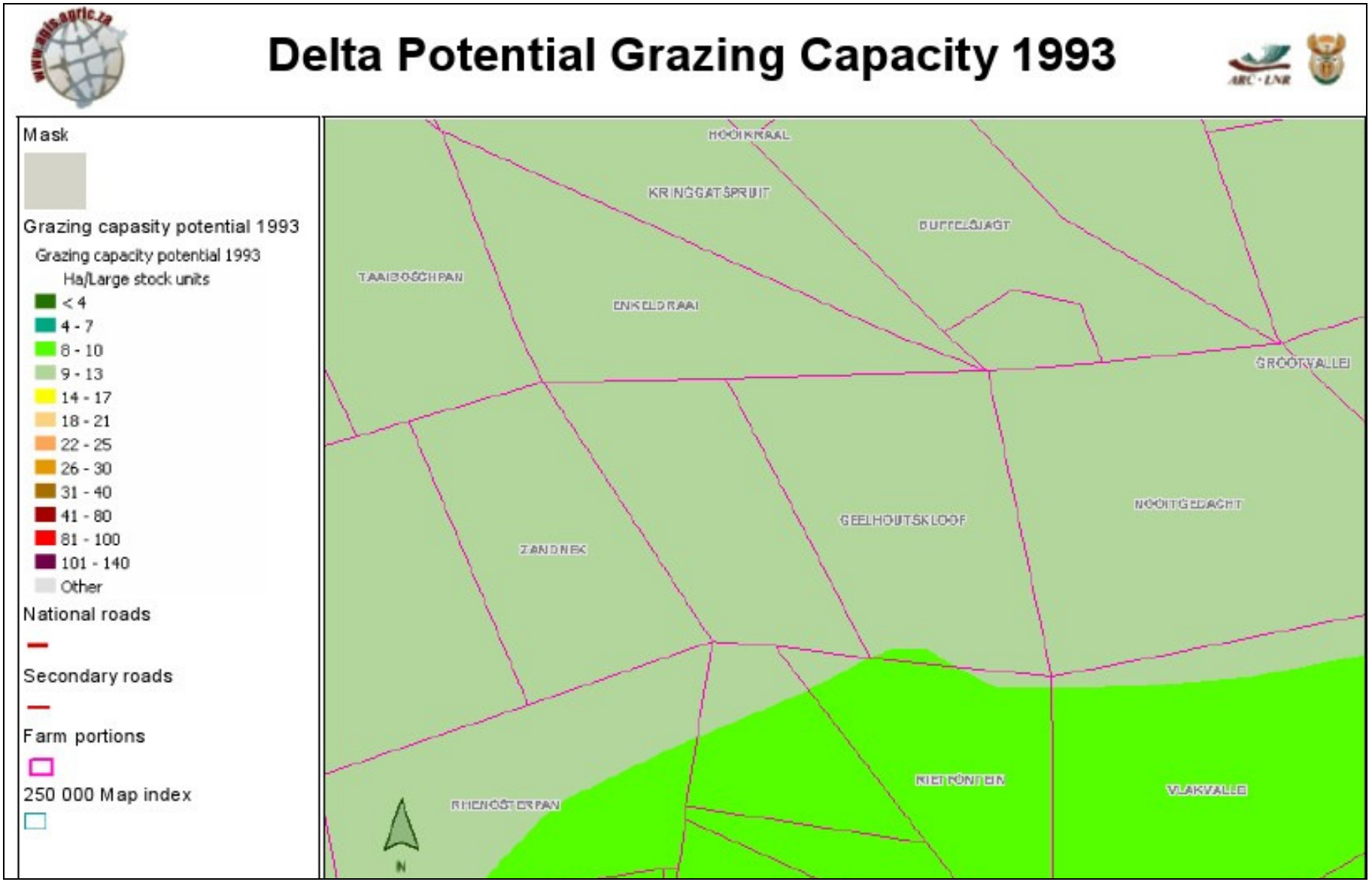
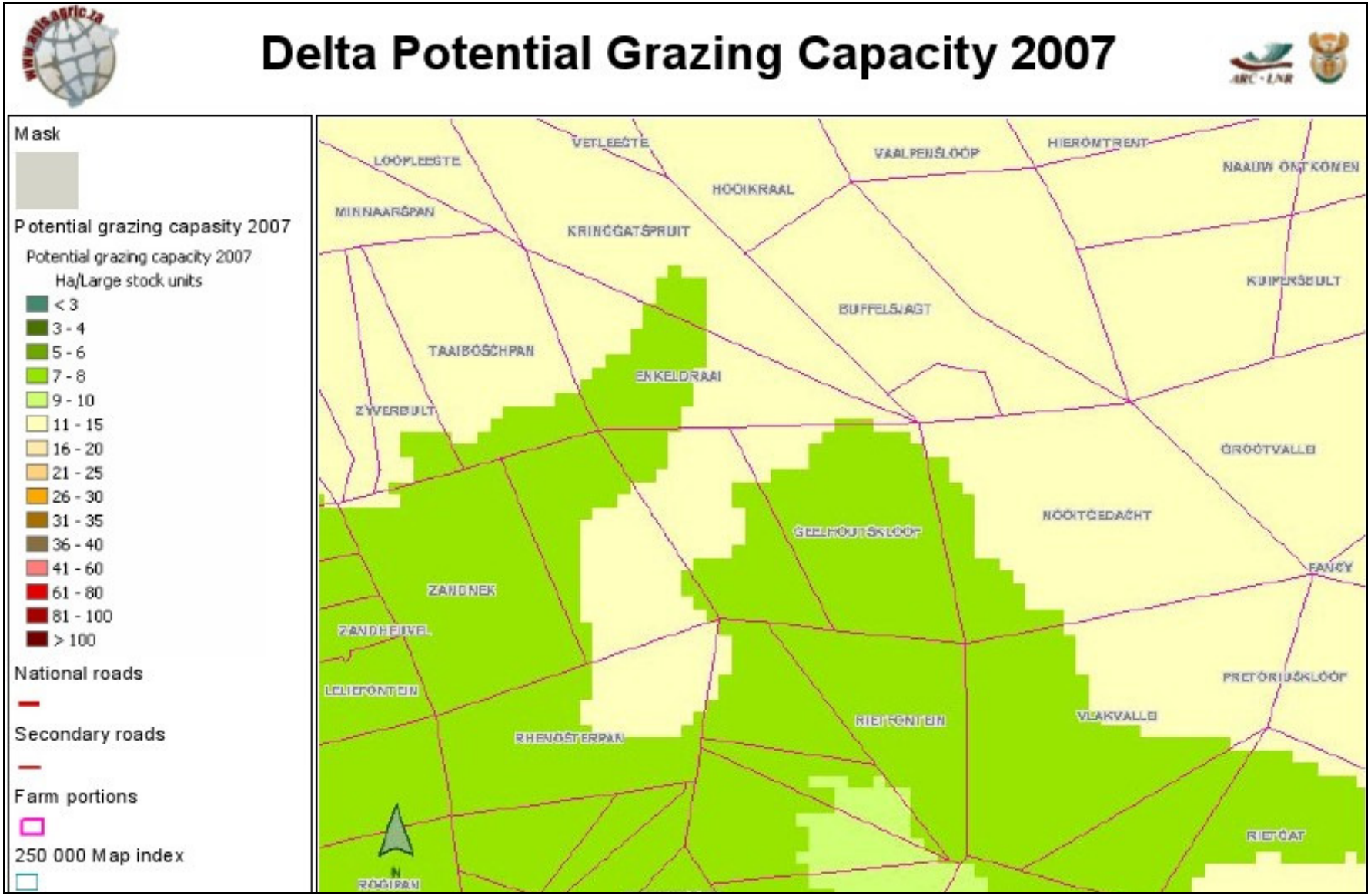


Figure 19: Potential Grazing Capacity Map (2007)



7. ENVIRONMENTAL IMPACT ASSESSMENT (EIA) PROCESS AND PUBLIC PARTICIPATION PROCESS (PPP)

The environmental impact studies can be summarized in a two-phased approach:

- Phase 1: Environmental Scoping Phase
- Phase 2: Environmental Impact Assessment (EIA) and Environmental Management Program (EMPr)

The scope of the EIA procedure is to provide an assessment of all impacts related to the proposed project in compliance with the EIA Regulations 2010.

7.1. SCOPING PHASE

The Scoping Phase aims to produce the following:

- a description of the proposed activity, the property and the receiving environment;
- the identification of potential significant positive and negative impacts;
- the identification of opportunities and constraints, alternatives and mitigation measures which need to be evaluated and investigated during the successive EIA phase, especially in order to prevent environmental fatal flaws and sensitive or “no-go” areas.

The Scoping Phase includes the Public Participation Process. The PPP has the aim to identify concerns and issues by the interested and affected parties (I&AP’s).

In particular, in the case of the proposed development, issues and concerns raised by the I&AP’s and key stakeholders during the Public Participation Process were collected, processed and addressed in the Comments and Response document which formed a part of the submitted Final Scoping Report.

All issues and concerns identified during the Scoping Phase were documented in the Final Scoping Report which was submitted to the DEA together with a Plan of Study for EIA.

7.2. EIA PHASE

The next (current) step of the EIA process is the development of guidelines for execution of the impact assessment and the compilation of an Environmental Impact Assessment Report.

The database of the stakeholders and I&AP’s developed during the scoping process is used as a reference to ensure that stakeholders are involved and participate in this second phase of the EIA process.

All relevant issues considered during the Scoping Phase are further investigated and assessed during this EIA Phase of this project. The EIA involves various specialist studies and should provide an overall assessment of the biophysical, social and economic environment affected by the proposed project.

A detailed assessment is carried out in terms of environmental criteria and rating of significant impacts of all options identified in the scoping phase. Appropriate mitigation measures are identified and recommended for all significant impacts. These measures are also included in an

Environmental Management Programme (EMPr), submitted together with the Environmental Impact Assessment Report (EIAR) to the DEA.

During the EIA phase, stakeholders and I&AP's were notified, in writing, of the continuation of the project to the EIA Phase and are informed as to the way forward and where and when the Draft Environmental Impact Assessment Report is made available for review. Comments from the stakeholders and I&AP's on the Draft EIA Report and the Draft EMP have been incorporated into this Final EIA Report.

The stakeholders and I&AP's will furthermore be informed of the final decision regarding the Environmental Authorization and the appeal process.

7.3. PUBLIC PARTICIPATION PROCESS

All relevant I&AP's have been identified and involved in the public participation process from the beginning of the project as per sections 54, 55, 56 and 57 of the EIA regulations 2010.

The public participation process offers the opportunity to become actively involved through constant sharing of information. The main purposes of the public participation process are to ensure that:

- all relevant information in respect of the application is made available to I&AP's for their evaluation and review;
- reasonable opportunity is given to I&AP's to comment and to submit queries related to the proposed project;
- comments and queries by the I&AP's to the Draft Scoping and to the EIA Reports are submitted and evaluated in a reasonable timeframe and in predetermined terms.

The initial informative stage of the public participation was done from 17 October 2014 until 17 November 2014.

The public was informed of the change in the proposed development and a database of Interested and Affected parties was compiled, based on the previous EIA process.

In the enclosed Annexure C there is the list of all components of the public participation process.

The public was informed of the project by means of:

- Site notices, which were put up at the proposed development site;
- Background Information Documents (BID) were sent to all adjacent land owners;
- A Notice was published in a local newspaper, which is distributed in the general area;
- Sending of BIDs to other possible interested and affected parties/stakeholders.

A data base of registered I&AP's has been established to date and will be maintained and added to as required.

Site notices were put up on site on the fence surrounding the proposed development area on 17 October 2014. A Background Information Document was sent to each of the adjacent landowners and the I&AP register of the previous EIA process was used.

Proof of this is attached in Annexure C. A number of these documents were also distributed to the relevant governmental departments including *inter alia* Department of Water Affairs, Agriculture Land Reform & Rural Development *etc*. Other identified interested and/or affected parties/stakeholders include Eskom, the Local municipality, the District municipality *etc*. Proof of all correspondence is included in Annexure C.

A newspaper advertisement was published in the 17 October 2014 edition of the Mogol Post, which is a local newspaper, distributed in the nearby towns and surrounds.

No responses were received during the initial public participation process.

The Draft Scoping Report was made available for comments from 6 January 2015 until 6 February 2015.

Hard copies of the Draft Scoping Report were sent to the Local Municipality office as well as all applicable governmental organizations.

During the initial public participation process there was a serious extended strike by the Post Office. We are reliant on the Post Office in the distribution of documents as we have to send it by registered mail in order to obtain proof that this was done. Where possible alternative methods were used and include *inter alia* the use of e-mail messages.
During the next stages of the EIA process all adjacent landowners were sent notifications again and no one was excluded.

The Final Scoping Report and the Plan of Study for EIA were approved by the DEA on 31 March 2015.

The Draft EIA Report was made available for comments and was provided to registered I&AP's and applicable governmental departments from 23 April 2015 until 3 June 2015. On 3 June 2015 letters were sent out to I&APs, indicating that the Final EIA Report was available for comments. Only the provincial Department of Agriculture requested a copy on CD and this was hand delivered to their offices in Polokwane. Proof of this is included in Annexure C. No comments were received on the Final EIA Report from any I&APs.

7.3.1. Further steps in Public Participation Process

To ensure a transparent and complete public participation process the following steps are still to be taken during the rest of the EIA process:

- Final EIA Report will now be submitted to the DEA.
- Registered I&AP's and governmental organizations will be notified about the final decision of the DEA (Environmental Authorisation granted or not).
- A Comments and Responses Report was compiled and is included in this Final EIA Report.

8. METODOLOGY USED FOR THE IDENTIFICATION AND ASSESSMENT OF THE IMPACTS

The potential environmental impacts identified in the study have been quantified and the significance of the impacts has been assessed according to the criteria set out below. Each impact has been assessed and rated. The assessment of the data, where possible, has been based on broadly accepted scientific principles and techniques. In defect, judgements and assessments are necessarily based on the consultant's professional expertise and experience.

8.1. PROJECT PHASING

For the purpose of assessing these impacts, the project has been divided into phases from which impacting activities can be identified:

- **Planning**
- **Site clearing & construction phase**
- **Operational phase**

The phases have been carefully examined in relation to the PV plant and in relation to the connection infrastructure. Indeed, as already described, in this document all impacts and mitigations are defined also for the connection infrastructure, although this part of the project may be executed, owned and operated by Eskom.

As far as the **decommissioning** phase is concerned, it is important to specify that this phase will be subject to a decommissioning plan once the project is nearing its operational life (25-30 years). Decommissioning will also be subject to an environmental authorization.

This phase is important because it states the **reversibility of the development** and has to be carefully planned and executed, in order to enable the natural re-growth of indigenous vegetation and fauna re-population as well as the reuse of the area for agricultural and grazing purposes. For this reason, in the Draft Environmental Management Plan the decommissioning phase has been included and carefully analyzed, in order to anticipate activities and actions to be taken in order to minimize the relevant impacts.

The decommissioning phase, as described in Chapter 10, is similar to the commissioning phase but all possible care must be considered for the recycling of the materials and for the re-establishment of the site as it was the *status quo – ex ante* the development.

8.2. ASSESSMENT CRITERIA

The terms of reference for the study include criteria for the description and assessment of environmental impacts. These criteria are drawn from the *Integrated Environmental Management Guidelines Series, Guideline 5: Assessment of Alternatives and Impacts*, published by the Department of Environmental Affairs and Tourism in terms of the Environmental Impact Assessment. These criteria include:

Table 9: Impact Assessment Criteria

Nature of impact This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, and how.		
Extent The physical and spatial size of the impact.	**Site**	The impact could affect the whole, or a measurable portion of the above-mentioned properties.
	Local	The impacted area extends only as far as the activity, e.g. a footprint.
	Regional	The impact could affect the area including the neighbouring farms, the transport routes and the adjoining towns.
Duration The lifetime of the impact; this is measured in the context of the lifetime of the proposed base.	**Short term**	The impact will either disappear with mitigation or will be mitigated through natural process in a span shorter than any of the phases.
	Medium term	The impact will last up to the end of the phases, where after it will be entirely negated.
	Long term	The impact will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter.
	Permanent	The only class of impact, which will be non-transitory. Mitigation either by man or natural process will not occur in such a way or in such a time span that the impact can be considered transient.
Intensity	**Low**	The impact alters the affected environment in such a way that the natural processes or functions are not affected.
	Medium	The affected environment is altered, but function and process continue, albeit in a modified way.
	High	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
Probability This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time.	**Improbable**	The possibility of the impact occurring is very low, due either to the circumstances, design or experience.
	Probable	There is a possibility that the impact will occur to the extent that provisions must be made therefore.
	Highly probable	It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the undertaking of the activity.
	Definite	The impact will take place regardless of any prevention plans, and there can only be relied on mitigation actions or contingency plans to contain the effect.

Determination of significance. Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.	**No significance**	The impact is not substantial and does not require any mitigation action.
	Low	The impact is of little importance, but may require limited mitigation.
	Medium	The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels.
	High	The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Mitigation is therefore essential.

The general approach to this study has been guided by the principles of Integrated Environmental Management (IEM). In accordance with the IEM Guidelines issued by the DEA, an open, approach, which encourages accountable decision-making, has been adopted. The underpinning transparent principles of IEM require:

- informed decision-making;
- accountability for information on which decisions are made;
- a broad interpretation of the term “environment”;
- an open participatory approach in the planning of proposals;
- consultation with I&APs;
- due consideration of alternatives;
- an attempt to mitigate negative impacts and enhance positive impacts of proposals;
- an attempt to ensure that the social costs of development proposals are outweighed by the social benefits;
- democratic regard for individual rights and obligations;
- compliance with these principles during all stages of the planning, implementation and decommissioning of proposals; and
- the opportunity for public and specialist input in the decision-making process.

The study is also guided by the requirements of the EIA Regulations in terms of the NEMA. The NEMA EIA Regulations, which are more specific in their focus than the IEM principles, define the detailed approach to the EIA process.

9. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

9.1. POTENTIAL IMPACTS

Potential impacts associated with the construction and operational phases of the Delta Solar Park together with its connection infrastructure are outlined and evaluated hereinafter.

As previously described, **construction activities** for the establishment of PV power plants include:

- land clearing activities necessary for preparation of the site and access routes;
- excavation and filling activities;
- transportation of various materials;
- construction of the storage structures;
- installation of the PV modules and construction of associated structures and infrastructure;
- construction of the on-site loop-in loop-out substation, construction of the two new sections of power line - approximately 100 m long - which will deliver the energy to the Eskom "Thabazimbi Combined – Waterberg 1" 132 kV power line.

Environmental impacts associated with the **operational phase** of a solar energy facility may include visual and other impacts.

The **decommissioning activities** of the PV plant mainly include the removal of the project infrastructure and the restoring of the site *status quo ante*.

The identification of impacts will be based on:

- legal and administrative requirements;
- the nature of the proposed activity;
- the nature of the receiving environment;
- specialist studies;
- issues raised during the public participation process.

Potential impacts may include:

- Impacts on soils & agricultural potential;
- Impacts on ground water;
- Impacts on the road system and traffic;
- Impacts on air quality and potential emissions;
- Geological, soil and erosion impacts;
- Impacts on avifauna;
- Impacts on vegetation;
- Impacts on heritage resources;
- Noise impacts;
- Impacts on tourism;
- Social impacts;
- Visual impacts.

9.2. CUMULATIVE IMPACTS

Cumulative impacts are NOT applicable since there are no renewable energy projects already built / under construction / selected by DoE in the proximity of the proposed project site. The closest existing project is the 75 MW Tom Burke Solar Park, located in the Lephalale Local Municipality **95 km** North-East of the proposed Delta Solar Park

9.3. SPECIALIST STUDIES

Due to the nature of the project, a number of specialist studies are required in the EIA process in order to investigate the potential environmental impacts associated with the proposed development. Detailed studies have been carried out to address these impacts throughout the EIA process. The public participation process provides valuable information in the identification of issues requiring further and specific investigation throughout the EIA process. The specialist studies which have been conducted and attached to this EIA Report are the following:

- Ecological Impact Assessment (Annexure D)
- Avifauna Impact Assessment (Annexure E)
- Agricultural Potential Assessment (Annexure F)
- Wetland Delineation Study (Annexure G)
- Heritage Impact Assessment (Annexure H)
- Geo-technical Report (Annexure I1)
- Geo-hydrological Report (Annexure I2)
- Visual Impact Assessment (Annexure J)
- Socio-economic Impact Assessment (Annexure K)
- Services Report (Annexure L)

9.4. IMPACTS & MITIGATION MEASURES

9.4.1. Construction & operational phases impacts and mitigation measures

In this section, all the possible impacts that can be predicted in both the construction and operational phases of the PV plant are addressed. Specific mitigation measures are proposed and the significance of these impacts is described with and without the mitigation measures. Considering that all or part of the construction infrastructure may be owned and/or operated by Eskom, the mitigation measures described in the following paragraphs and in particular in the attached Environmental Management Plan can be, accordingly, of the responsibility of Eskom or of the developer.

9.4.1.1. Atmospheric pollution and noise

Construction Phase

During this phase there will be a concentration of earthmoving equipment and construction vehicles that will level the area, clear vegetation for construction purposes and in the process will create dust and exhaust smoke that will impact on air quality. There will also be more noise created by the vehicles during this phase. Burning of waste and fires at construction sites may also create smoke.

Operational phase

The increased traffic volumes and people will lead to increased levels of air pollution and noise. Smoke from burning of waste can cause air pollution.

Project Phase	Impact :Atmospheric Pollution and noise								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Earthworks and Vegetation clearance	Air pollution : Dust	Low-medium	Medium-high	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Vehicle movement	Air pollution : Smoke	Low	Medium-high	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Vehicle movement	Air pollution : Dust	Low	Medium-high	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Vehicle movement	Noise pollution	Low-medium	Medium-high	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Burning of cleared vegetation, solid waste & veld fires	Air pollution by excessive smoke	Low-medium	Medium-high	Low-medium	Medium	Medium	Low-medium	Medium
	Cooking fires of workers	Air pollution : Smoke	Low	Medium-high	Low-medium	Medium	Medium	Low	Medium
Operation	Vehicle movement	Noise pollution	Low-medium	Medium-high	Low-medium	High	Medium-high	Low-medium	Medium
	Fireplaces and veldt fires	Air pollution caused by smoke	Low-medium	Medium-high	Low-medium	High	Medium-high	Low-medium	Medium
	Burning of vegetation refuse and solid waste	Air pollution by excessive smoke	Low-medium	Medium-high	Low-medium	High	Medium-high	Low-medium	Medium

Mitigation measures - Construction Phase

- Vehicles must be well serviced so that it does not produce excessive smoke and noise.
- Speed of construction vehicles should be kept as low as possible to reduce generation of dust and noise.
- Construction areas must be damped to prevent excessive dust formation.
- The clearing of the site should be done in phases as the construction progresses.
- Construction should only take place during the hours between sunrise and sunset on weekdays and Saturdays.
- Contractors must comply with Provincial noise regulations. The construction machinery must be fitted with noise mufflers and be maintained properly.
- Vegetation cleared from the site and solid waste generated by the construction teams may not be burned on site or surrounding areas, but regularly removed to municipal waste site.
- Fire belts must be made around the development according to the regulations of the Veld and Forest Fire Act.
- The cleared vegetation should stock-piled and removed to a licensed waste disposal site on a regular basis.

Mitigation Measures - Operational Phase

- Speed of vehicles on roads should be controlled e.g. speed bumps and speed restrictions.
- All roads should preferably be sealed to eliminate dust formation caused by strong winds and vehicle movement.
- Solid waste should not be burned on the project area.
- Fire belts around the development must be made according to the regulations of the Veld and Forest Fire Act.
- Vegetation refuse should be composted if possible and re-used.

9.4.1.2. Groundwater and surface water pollution

Planning Phase

- The pan (endorheic depression) found on Farm Enkeldraai 314 along the corridor of the access road should be avoided and the road should run outside the 32 m buffer zone of the pan; a 32 m buffer zone should be preserved around the pan boundary, as indicated in the Wetland Delineation Study (Annexure G) and in the Ecological Impact Assessment (Annexure D).

Construction Phase

- Lack of sanitation could result in ground water pollution and associated health risks.
- Construction vehicles will be refuelled at the construction camp.
- Spillage of fuel and lubricants from construction vehicles could occur. Storm water contamination by solid waste could lead to groundwater and surface water pollution.
- In this phase the soil cover as well as the vegetation is removed and storm water over the area could cause erosion as well as siltation of watercourses. Road construction will also increase the possibility of erosion and the siltation/sedimentation of surface water streams, because of increased storm water run-off.

Operational Phase

- Pollution by sanitation leakages, solid waste and erosion may lead to water pollution. Storm water run-off over open areas can cause erosion as well as the washing of soil into the surface water streams.
- Storm water flowing over sealed and/or paved areas could lead to ground and surface water pollution. Chemicals from the vehicle wash area could negatively impact on the quality of surface and groundwater resources.
- Fertilizers, pesticides and herbicides used at the project during operation can create pollution if not handled and applied correctly.

Project Phase	Impact: Groundwater and Surface water Pollution								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Spillage of fuel and lubricants from construction vehicles	Water Pollution	Medium	Medium-high	Low-medium	Medium-high	Medium-high	Low	Medium
	Clearing of vegetation	Erosion & siltation of streams	Low-medium	Medium-high	Low-medium	Medium	Medium-high	Low-medium	Medium
	Solid waste disposal freshwater resources	Pollution of freshwater resources	Low	Medium-high	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Sanitation seepage from chemical toiletsand/or from the temporary sanitation system	Water Pollution	Medium	Medium-high	Low-medium	Medium	Medium	Low	Medium
Operation	Spillage of fuel and lubricants from vehicles	Water Pollution	Medium	High	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Solid waste disposal- freshwater resources	Water Pollution	Low	High	Low-medium	Medium-high	Medium-high	Low-medium	Medium
	Leakage from the permanent Sanitation system	Water Pollution	Medium-high	High	Medium	Medium	Medium-high	Low-medium	Medium-high
	Use of fertilizers, insecticides and herbicides	Pollution of streams & rivers	Low-Medium	High	Low-medium	Medium	Medium	Low-medium	Medium
	Storm water runoff	Erosion & siltation of streams	Low-medium	Medium-high	Low-medium	Medium	Medium-high	Low	Medium

Mitigation measures - construction phase

The following precautionary measures are recommended to prevent surface/groundwater pollution:

- The high sensitivity area located on the Farm Enkeldraai 314 LQ along the corridor of the new access road should remain undeveloped - providing a buffer zone 32m wide - in compliance with requirements highlighted in the Ecological Impact Assessment (Annexure D) and Wetland Delineation Study (Annexure G).
- Cleared areas should be rehabilitated by reintroducing a grass layer as soon as possible to limit the occurrence of erosion.
- Berms to limit the flow of water over cleared areas will limit erosion and the siltation of surface streams. Preference should be given to plant species indigenous to the area.
- Drip pans should be used during re-fuelling and servicing of construction vehicles. Used parts like filters should be contained and disposed of at a site licensed for dumping of these waste products.

- Oil traps must be installed in the vehicle wash bay to prevent pollution. Oil traps must be serviced on a regular basis by an approved service agent.
- Diesel storage must not exceed 30,000 litres at construction camps. Diesel tanks and other harmful chemicals and oils must be within a bunded area.
- The vehicle maintenance yard and construction storage area should be placed 100 m away from watercourses / wetland areas. This area should have bund walls and lined with impermeable material to prevent ground and surface water pollution.
- The proposed gravel roads should be developed at ground level so as not to disturb the natural flow of storm water.
- Chemical sanitation facilities and the temporary sanitation system in the construction site should be regularly serviced by appropriate companies to ensure that no spills or leaks to surface and groundwater take place. Chemical toilets and the temporary sanitation system should not be placed within 100 m from any watercourse / wetland area.
- Solid waste must be kept in adequate waste bins. Building rubble and various waste should be removed on a regular basis to a licensed landfill site.

Mitigation measures - operational phase

- Solid waste must be kept in adequate waste bins and removed on a weekly basis to a waste disposal site.
- The use of eco-friendly products e.g. Organic Compost, herbicides and insecticides should be promoted.
- The permanent sanitation system should be regularly inspected to ensure that no spills or leaks from sanitation system to groundwater take place.

9.4.1.3. Water use / water quantity

Construction phase

During this phase, water consumption will be the highest because it will be utilized for gravel roads and building constructions. The water needed for the construction activities will be provided from new on-site boreholes, or from existing boreholes on the adjacent farm portions.

Operational phase

Water use will be limited except for short periods (twice per year) when the panels will be cleaned. The water needed for the operational phase will be provided from new on-site boreholes, or from existing boreholes on the adjacent farm portions.

Project Phase	Impact: Water use								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Construction process	Depletion of water resources: Water consumption	Low-medium	Medium-high	Medium-high	High	High	Medium	Medium-high
Operational	Water use & cleaning of panels	Depletion of water resources: Water consumption	Low	High	Medium	High	High	Low-Medium	Medium

Mitigation measures – Construction Phase

- Water should be used sparingly and it should be ensured that no water is wasted.
- Roads should be treated with chemicals to lower the use of water.
- Washing of construction vehicles should be limited to once or twice a month and must be done with high-pressure sprayers to reduce water consumption.

Mitigation measures - Operational Phase

- Cleaning of panels should be done only when necessary, twice per year.
- Roads should be treated with chemicals to lower the use of water.
- Washing of vehicles should be limited to once a week and must be done with high-pressure sprayers to reduce water consumption.
- Care must be taken not to waste any water. In the offices, half-flush systems in the toilets as well as water aerators in all taps must be installed to reduce water consumption.
- The workers should be educated on the value of water and how to use it sparingly.
- Only indigenous trees and plants should be planted in the vegetation buffer zone.

9.4.1.4. Land and soils

Planning phase

The high sensitivity area (*endorheic depression*) located on the Farm Enkeldraai 314 LQ along the corridor of the new access road should remain undeveloped - providing a buffer zone 32 m wide - in compliance with the requirements highlighted in the Ecological Impact Assessment (Annexure D) and in the Wetland Delineation Study (Annexure G).

Construction phase

During construction, the vehicles used have the potential to spill diesel and lubricants that can pollute the soil. The storage of solid waste before it can be disposed of has the potential to pollute the soil and becomes a nuisance.

Operational phase

Solid waste can be a nuisance and has the potential to pollute the soil if not managed correctly. The use of conventional fertilizers, herbicides and insecticides should be limited as far as possible. Wastewater from activities can pollute the soil.

Project Phase	Impact: Land and soils								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Spilling of oil/diesel by construction machines	Contamination of soil	Medium	Medium-high	Low-medium	Medium-high	Medium-high	Low	Medium
	Solid waste disposal	Soil pollution + nuisance	Low	Medium-high	Low-medium	Medium-high	Medium-high	Low-medium	Medium

Project Phase	Impact: Land and soils								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
	Storm water over roads and cleared areas	Erosion	Low-medium	Medium-high	Low-medium	Medium	Medium-high	Low-medium	Medium
	Trenches for electric cables and water and sewerage pipes	Erosion	Low-Medium	Medium-high	Low	Medium	Medium-High	Low-medium	Medium
Operation	Solid waste	Soil pollution + nuisance	Low	High	Low-Medium	Medium-High	High	Low	Medium
	Storm water from paved areas and roofs	Erosion	Low-medium	High	Low-medium	Medium	Medium-high	Low	Medium
	Use of fertilizers, insecticides and herbicides	Pollution	Low-Medium	High	Low-medium	Medium	Medium	Low-medium	Medium

Mitigation measures - Construction Phase

- Clearance of vegetation should be restricted to the planned 160 ha footprint.
- Construction activities should be restricted to the proposed 160 ha footprint.
- Construction vehicles must be well maintained and serviced to minimise leaks and spills.
- Spill trays must be used during refuelling of vehicles on site.
- Diesel storage must not exceed 30,000 litres at construction camp. Diesel tanks and other harmful chemicals and oils must be within a bunded area.
- Solid waste must be kept in containers and disposed of regularly at licensed dumping site.
- Any building rubble must be removed to a licensed disposal site on a regular basis during construction.
- Trenches that are dug for the supply of services and electrical cables must be filled up and compacted well and slightly higher than the areas around it.
- The clearing of the site should be done in phases as the construction progresses.
- Slopes produced by removing soil must be kept to a minimum to reduce the chances of erosion damage to the area.
- The proposed gravel roads should be developed at ground level so as not to disturb the natural flow of storm water.

Mitigation measures - Operational Phase

- Solid waste must be kept in adequate waste bins and removed on a weekly basis to the waste disposal site.
- The maintenance of the roads must be kept up to standard to prevent and reduce the incident of erosion next to the roads.
- The use of eco-friendly products e.g. organic compost, herbicides and insecticides should be promoted.

9.4.1.5. Archaeological, Cultural and Social Features

Construction phase

The clearing of the site may have a negative impact on the archaeological features of the site. Care must be taken in the excavations and moving of soil to observe any archaeological feature of importance, which must be left and reported to the archaeological consultant for comments and actions.

Operational phase

The operational phase will not have any negative impact on the archaeological features of the site, if the recommendations of the Heritage Impact Assessment (Annexure H) to be undertaken will be adhered to.

Project Phase	Impact: Loss of Archaeological, Cultural and social features								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Earth moving and soil clearance	Destroy archaeological evidence and heritage and graves	Low-medium	Medium-high	Low	Low	Low-medium	Low	Low-medium
Operation	Operational activities of development	Destroy archaeological evidence and heritage and graves	Low-medium	High	Low	Low	Low-medium	Low	Low-medium

Mitigation measures – Construction and operational phases

Care must be taken during the construction process that anything of archaeological value that is unearthed must be recorded. See Phase 1 - Heritage Impact Assessment, Annexure H. The archaeologist or SAHRA must be notified whenever anything of importance is discovered.

9.4.1.6. Impact of the development on the ecology (fauna & flora) of the area

Planning and construction phase

The removal of natural vegetation and destruction of habitat will have a negative effect on the biodiversity. The specific mitigation measures included in the Ecological and Avifauna Impact Assessment (Annexures D & E) should be adhered to.

The high sensitivity area (*endorheic depression*) located on the Farm Enkeldraai 314 LQ along the corridor of the new access road should remain undeveloped - providing a buffer zone 32 m wide - in compliance with the requirements highlighted in the Ecological Impact Assessment (Annexure D) and in the Wetland Delineation Study (Annexure G).

The moderate-high sensitive Marula woodlands on the northern side of the project site should be preserved as corridors for fauna and as a buffer between the development and the neighbouring properties.

Operational phase

The operation of the development can have a negative impact on the bio-diversity if it is not managed correctly. Exotic invasive plant species can have a negative impact on the indigenous vegetation.

Project Phase	Environmental Aspect: Ecology (Fauna and Flora)								
	Activity that causes impact	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Earthworks and vegetation clearance at construction site	Loss of indigenous plant species & disturbance to sensitive habitat	Medium	Medium	Low-Medium	Medium	Medium-High	Low-medium	Medium
	Vegetation clearance and the use of herbicides to control re-growth at the different development areas	The eradication and control of exotic invasive plant species Loss of indigenous plant species	Medium	Medium	Medium	Low-Medium	Medium-High	Low-Medium	Medium
	The occurrence of veldt fires on site	Destruction of flora/habitats Loss of indigenous fauna	Medium-High	Medium	Medium	Medium-High	High	Medium	Medium-high
	Littering (e.g. cans and plastics) along access road and at construction site	Public nuisance and loss/death of indigenous fauna	Low-Medium	Medium	Medium	Medium-High	Medium	Low	Medium
	The control of animals on site Killing, poisoning or hunting of animals	Loss of indigenous fauna to the area	Medium-High	Medium	Medium	Medium	Low-Medium	Low-Medium	Medium
Operation	Rehabilitation of cleared areas	The spreading of exotic invasive plant species Loss of habitat and indigenous flora	Medium	High	Medium	Low-Medium	Medium	Low-Medium	Medium
	The occurrence of veldt fires	The loss of indigenous fauna and flora	Medium-High	Medium	Medium	Low-Medium	High	Medium	Medium-high
	The functioning of the permanent sewage treatment systems – treated sewage outflow	Deterioration in the habitat for avifauna and aquatic life	Medium-High	High	Medium	Medium-High	Medium	Low-Medium	Medium-High
	Disposal and storage of solid waste and littering	The death/loss of indigenous fauna e.g. raptors, mammals and reptiles	Medium-High	High	Medium-High	Medium-High	Medium	Low-Medium	Medium
	The control of pests and vermin	Killing and poisoning of fauna feeding on the poisoned vermin or pest	Low-Medium	High	Low-Medium	Medium-High	Medium	Low	Medium
	The feeding of fauna e.g. birds &small mammals	Disturbance to bio-diversity and the natural movement of the animals through the site The death/loss of indigenous fauna	Low-Medium	High	Low-Medium	Medium-High	Low-Medium	Low	Medium
	Catching of wild animals e.g. reptiles, bids and small mammals as pets	Disturbance to bio-diversity and decline in indigenous faunal numbers	Medium-High	High	Low-Medium	Low-Medium	Low	Low	Medium
	Birds colliding with power line and panels	Electrocution of birds	Medium-High	High	Low-Medium	Low-Medium	Low	Low	Medium
	The erection of fences and the construction of roads with a kerb	The fragmentation of available habitat and the restriction of movement of small mammals, reptiles and amphibians	Low-Medium	High	Low-Medium	High	Medium	Low	Medium

Mitigation measures – Construction phase

- Care must be taken that unnecessary clearance of vegetation does not take place. Where possible, natural vegetation must be retained.
- Clearance of vegetation should be restricted to 160 ha footprint.
- Construction activities should be restricted to the proposed 160 ha footprint.
- Salt pan (endorheic depression) located on the Farm Enkeldraai 314 LQ along the corridor of new access road should be avoided and road should run outside 32m buffer zone of the pan.
- Moderate-high sensitive Marula woodlands on northern side of project site to be preserved as corridors for fauna and as buffer between development and neighbouring properties.
- Protected trees and protected plant species can only be removed once the necessary permits have been obtained (DAFF and LEDET).
- Isolated individuals of the protected tree species *Boscia albitrunca* and *Sclerocarya birrea* were found across the proposed 160 ha footprint and access road corridor. No protected trees should be removed without authorisation from DAFF.
- The project should comply with the Limpopo Environmental Management Act, 2003 (LEMA).
- Some encroachment of silver cluster leaf and shrub species occur in the area and should be controlled as stipulated in the CARA regulations.
- The herbicides used to control the invasive plant species should be chosen in consultation with an ecologist, as some of the agents might be detrimental to the surrounding indigenous fauna and flora e.g. Roundup is for example extremely toxic to frogs.
- Poisons for the control of problem animals should be avoided since the wrong use thereof can have disastrous consequences for raptors 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.
- Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.
- Fires should only be allowed in designated places within the construction camp and extra care should be taken to prevent veldt fires of occurring.
- Firebreaks should comply with the National Veldt and Forest Fire Act, 1998 (Chapter 4: Duty to Prepare and maintain firebreaks).
- Cleared areas to be rehabilitated by reintroducing grass layer to limit occurrence of erosion.
- The cleared vegetation should not be burned on site. The cleared vegetation should be stockpiled and taken to the closest available landfill site.
- Solid waste must be kept in adequate animal proof waste bins at the construction camp and construction sites. Building rubble and various wastes should be removed on a regular basis to the closest available landfill site.
- Regular clean-up programs should be put into effect along the access road and throughout the premises to limit the impact of littering caused by construction activities.
- Stockpiled topsoil and construction material should be managed in such a way that material is not transported by wind or rain. This can be done by restricting the height of the stockpiles, sandbagging and avoiding steep slopes.
- No animals may be killed, captured or hunted on site by construction workers. Do not feed any wild animals on site.
- Where trenches pose a risk to animal safety, they should be adequately cordoned off to prevent animals falling in and being trapped and/or injured. This could be prevented by the constant excavating and backfilling of trenches during construction process.
- Existing game on the developed area will be relocated when the proposed solar park is developed. The relocation of the game will be executed according to the relevant legislation.

Mitigation measures – Operational phase

- An ecologist should be consulted on the use of herbicides/eco-friendly products to control exotic tree and shrub species.
- Poisons for control of problem animals should be avoided since wrong use thereof can have disastrous consequences for the raptors 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.
- Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications.
- The high-risk sections of the power line should be marked with a suitable anti-collision marking device on the earth wire as per the Eskom guidelines.
- Solid waste must be kept in animal proof waste bins.
- A monitoring program should be compiled and implemented to ensure that the sewage treatment system is functioning properly and that the treated wastewater conforms to the standards set by the Department of Water Affairs.
- Staff members should be discouraged from attempting to catch or kill any wildlife for use as food, pets or to feed any wild animals.
- Firebreaks should comply with the National Veldt and Forest Fire Act, 1998.
- The impact on the flying invertebrates will be minimized through the use of sodium vapour (yellow) lights as outside lighting.
- The use of eco-friendly products e.g. Organic Compost and/or Effective Microorganisms (EM), which reduces the frequency of application of conventional fertilizers, herbicides and insecticides, should be promoted.

9.4.1.7. Visual impacts

Construction phase

The natural aesthetic character of the site will be changed. A railway and several Eskom 132 kV and 400 kV power lines crossing the project site has already changed the visual characteristics of the site.

Operational phase

Buildings and the solar modules have a *visual impact* and lights at night can be a *nuisance.*

Project Phase	Impact: Visual disturbance								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Buildings & panels	Visual	Low	High	Low-Medium	High	High	Low-Medium	Medium
	Lights	Visual	Low	Medium	Low-medium	Medium-high	High	Low-Medium	Medium
Operation	Buildings and panels	Visual	Low	High	Low-Medium	High	High	Low-Medium	Medium
	Lights	Nuisance	Low	High	Low-medium	Medium-High	High	Low-Medium	Medium
	Electrical lines	Visual	Low	High	Low	High	High	Low-Medium	Low-Medium

Mitigation measures

- Earth works should be executed in such a way that only the footprint and a small 'construction buffer zone' around the proposed components are exposed. In all other areas, the natural occurring vegetation, more importantly the indigenous vegetation should be retained.
- Where possible retain a visual screen (vegetation buffer zone) of existing vegetation around the proposed project components to reduce the negative visual impact.
- Install light fixtures that provide precisely directed illumination to reduce light "spillage" beyond the immediate surrounds of the project site.
- Minimise the amount of light fixtures to the bare minimum and connecting these lights to motion sensors can also considered in reducing light pollution.
- A video-surveillance system using infrared or microwave video cameras, which do not need a switched on lighting system, is recommended.

9.4.1.8. Safety, security and fire hazards

Construction phase

Construction activities such as excavating of foundations and trenches, movement of construction vehicles, the use of equipment and the congregation of workers and staff on site further increases the risk of injury. The activities of construction personnel on site may contribute to an increase in the level of crime in the area and may also contribute to an increase in the risk for fires.

Operational phase

Fires and criminal activities pose a significant risk during the operation of the development.

Project phase	Impact: Safety, security and fire hazards								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Construction	Construction activities – excavation of foundations, trenches etc.	Loss or injury to human life	Low-medium	Medium-high	Low	High	Medium	Low	Medium
	Security	Crime	Medium	Medium-high	Low-medium	Medium	Medium-high	Low - medium	Medium
	Fire hazards	Loss of human life and construction equipment etc.	High	Medium-high	Medium	Low	Low-Medium	Low-Medium	Medium
Operation	Security	Crime	Medium	High	Medium	Medium	Medium-high	Medium	Medium-high
	Fire hazards	Loss of human life, bio-diversity, buildings, infrastructure etc.	High	Medium	Medium -High	Low	Low	Low	Medium

Mitigation measures

- The Contractor shall conform to the stipulations of the Occupational Health and Safety act (Act 85 of 1993) and regulations applicable. The Act requires the designation of a Health and Safety representative when more than 20 employees are employed.
- Open trenches or excavations must be marked with danger tape.
- The number of construction workers to stay on site should be limited to the minimum.
- Proper access control (I.D. cards) should be enforced to ensure that no authorised persons enter the site.
- No solid waste or vegetation may be burnt on the premises or surrounding areas.
- Firebreaks should comply with the National Veldt and Forest Fire Act, 1998 (Chapter 4: Duty to prepare and maintain firebreaks).
- Fire extinguishers and fire fighting equipment must be available.
- A fence should be constructed along the boundary of the development.

9.4.1.9. Socio-economic impact

Construction phase

The construction and operation phases of the development will have a positive impact on the socio-economic environment of beneficiary communities through employment opportunities and training and skills development.

Operational phase

A number of permanent jobs will be created for local people during this phase.
Sole Energy should identify a local Community for the purpose of entering into a partnership for the project, as required by the rules of the REIPP Procurement programme.

Project phase	Impact: Job creation								
	Activity/Aspect	Specific impact	Severity	Duration	Extent	Frequency	Probability	Significance	
								With Mitigation	Without Mitigation
Operation	Job creation	Job Creation	High +	High +	Medium-high +	High +	High +	N/A	High +
Operation	Local Community development	Local Community development	High +	High +	high +	High +	High +	N/A	High +

Mitigation measures

- During the construction and operational phases, jobs must be created for unemployed local people and skills must be transferred to them.
- Where viable, the work must be executed in a labour intensive manner to create as many jobs possible.

9.5. POTENTIALLY SIGNIFICANT IMPACTS

Impacts with a rating of Medium-high or High are impacts which are regarded as potentially significant, rated without any mitigation measures. In this impact assessment, the following impacts were regarded as potentially significant impacts:

Water pollution by the inadequate functioning of the sanitation system.

i. Water consumption and depletion during construction phase.
ii. The occurrence of veldt fires.

These impacts (i-iii) will now briefly be discussed.

9.5.1. Cumulative impacts

i. The effect of water pollution (surface and groundwater) by a malfunctioning of the sanitation system will have a cumulative effect only if it is not detected by a regular monitoring and if it takes place on a regular basis.
i. This effect is cumulative only if care is not taken to conserve water and if water usage and the water levels of boreholes are not monitored regularly.
ii. This can have a cumulative effect if preventative measures are not followed.

9.5.2. Nature of impact

i. This is pollution of a renewable resource.
ii. This is a negative impact that affects water quantity available for use in the area.
iii. Damage to property, ecology and safety of people.

9.5.3. Extent and duration of impact

i. The extent could potentially be within the farm of the proposed development and the surrounding farms.
ii. The extent could potentially be within the area of the proposed development and the surrounding farms. The duration is only during construction.
iii. The extent is potentially on the development area as well as surrounding properties and even regional. The duration is for the life of the development.

9.5.4. Probability of occurrence

i. The probability is unlikely.
ii. The probability is possible.
iii. The probability is infrequent or seldom.

9.5.5. Degree to which impact can be reversed

i. Impact is reversible if mitigated in time.
ii. This impact is reversible because the higher abstraction will only be during the construction period.
iii. If the development is not continuing there will be no guarantee that veldt fires will not occur on the property. This impact must therefore be managed accordingly.

9.5.6. Degree to which impact can cause irreplaceable loss of resource

i. If this impact takes place over a very long time and there is gross negligence, the water resource can be damaged to a point where it will take very long to recover and where it could almost be seen as being irreplaceable.
ii. The recovery of the water resource is linked to rainfall and will recover accordingly. The negative impact is during the construction period.
iii. Veldt fires can create such damage that it will take a long time for the veldt to recover but the fact is that the vegetation has been subjected to veldt fires ever since. Loss of property (buildings) can be replaced.

9.5.7. Degree to which impact can be mitigated

i. Successful mitigation is possible
ii. Successful mitigation is possible
iii. Successful mitigation is possible

10. DECOMMISSIONING PHASE

Decommissioning activities of the PV plant mainly include removal of project infrastructure and restoring of the site's *status quo ante*.

The decommissioning phase will start at the end of the PV power plant lifetime (25 - 30 years) and will last approximately 6 months, involving a team of 50 workers.

Decommission will be subject to a decommissioning plan once the project is nearing its operational life (25-30 years). Decommissioning will also be subject to an environmental authorization (Activity 27 of R544 of 18 June 2010).

10.1. SITE PREPARATION

In order to ensure a correct decommissioning of the site, the first step of the process will include adequate site preparation. Integrity of access points and of laydown areas will be confirmed and eventually re-established in order to accommodate equipment and to load vehicles.

10.2. DISASSEMBLE AND REPLACEMENT OF EXISTING COMPONENTS

All components will be disassembled. Silicon of the PV modules will be recycled, as well as mounting structures (aluminium or zinced steel frames and piles) and cables (copper and/or aluminium conductor).

Non-recyclable components of inverter, transformers and electrical devices will be disposed in appropriate way, in compliance with applicable laws and international standards.

10.3. RESTORATION OF THE SITE

Adequate measures will be undertaken in order to restore the site by re-planting of indigenous plant species.

10.4. ALTERNATIVE OPTION: UPGRADING THE SOLAR PARK

At the end of the PV power plant lifetime (25 ÷ 30 years), as alternative option to the decommissioning, it will be evaluated the feasibility of upgrading the solar park with the most appropriate technology/infrastructure available at that time.

11. CONCLUSIONS AND RECOMMENDATIONS

The EIA Report describes the activities undertaken for the development of the Delta Solar Park.

The purpose of this report is to provide the relevant authorities and interested and affected parties with sufficient information regarding the potential impacts of the development to render meaningful comments. Potential impacts were identified in consultation with I&AP's and technical specialists (where applicable) and were assessed using a matrix and by applying professional knowledge.

The potentially significant negative impacts that have been identified should be mitigated through the implementation of the mitigation measures highlighted in this report. It is submitted that the proposed mitigation measures, will effectively diminish the impacts to acceptable levels. Given the socio-economic imperatives of the development, the residual impacts are not of sufficient importance to thwart the development.

The Delta Solar Park has been chosen on the basis of several elements which indicates the energetic vocation of the site and the fact that the natural profile of the site has been already subject to changes to infrastructure:

- the site is ideal since it is located inside the area earmarked for industrial uses within the **"*industrial corridor - major infrastructure corridor areas*" of the *Spatial Development Framework of the Waterberg District Municipality***. The industrial corridor runs from the town or Lephalale to the town of Steenbokpan;
- six Eskom 400 kV power lines, coming from the Eskom Medupi and Mateba coal power plants, are crossing the property along the east-west direction, in the corridor between the railway and the existing **Eskom** "**Thabazimbi Combined – Waterberg 1" 132kV power line**;
- the proposed Eskom transmission substation, named "Delta" or "Masa", will be located on the Remainder of the farm Zandnek 358 LQ, adjacent to the selected project site;
- further high-voltage power lines, already planned by Eskom, will be linked to the new Delta / Massa substation.

In terms of the land use rights, **the Council of the Lephalale Local Municipality has approved a "*Special Consent*" application on 19 April 2011**. The approved land use rights will apply to the northern portion only and reads as follows: ***Agriculture IV (iv): Industrial purposes: Agro-industry*** for a Renewable Energy Generation project (Photovoltaic Solar Power Plant) and ancillary land uses, subject to specific conditions.

The development of clean, green and renewable energy has been qualified as a priority by the Government of South Africa. The **Renewable Energy IPP Procurement Programme (REIPPPP)**, issued on 3rd August 2011 by the Department of Energy, envisages the commissioning of 3725 MW of renewable projects (1450 MW with solar photovoltaic technology) capable of beginning commercial operation before the end of 2017. The Department of Energy has already announced the intention to procure an additional **3,600 MW** of renewable energy projects by **2020** (DOE Media Statement of 12 December 2014).

The development of photovoltaic power plants will represent a key feature in the fulfilment of the proposed goals and the reduction of CO_2 emissions.

The purpose of the Delta Solar Park is to add new capacity for the generation of renewable electric energy to the national electricity supply in compliance with the REIPP Procurement Programme and in order to meet the "sustainable growth" of the Limpopo Province.

Thanks to the Delta Solar Park:

- the **avoided CO_2 emissions** will be from approximately **162,000 to 193,000 tons of CO_2 per year**;
- the **coal saved** is estimated from approximately **43,000 to 51,000 tons of coal** / **year**.

The following socio-economic benefits were found in the Socio-economic Impact Assessment:

- The national and local economies will benefit from civil contractor work, labour and building materials that will be required on site. On the whole, a share approximately **40% of total CAPEX (investment costs)** will be sourced locally. This share is likely to increase once there will be a specific and competitive industry in the Republic of South Africa able to supply PV modules and other technological components.
- After approval, each project will take approximately **15 months** to be built and will have a lifetime of 25-30 years. For each project, approximately **100 people** are expected to be employed during the construction period, although this number can increase to 150 for short spaces of time during peak periods.
- During operational phase, each power plant will require a permanent staff approximately **35**/**40 people**. That impact will be positive, also in consideration of the slowing down of the recruitment rate due to mining stabilization activities.
- Approximately **50% of the operation costs** will have a local economic return (mostly for maintenance works by local sub-contractors), then the impact will also be positive during the operational phase (25÷30 years).
- The project will comply with the Economic Development Requirements, as requested by the REIPP Procurement Programme, issued on 3rd August by the DoE. This economic development programme identifies needs of the surrounding communities in order to have a positive socio-economic impact. In particular, Sole Energy is required to identify a **Local Community** for the purpose of entering into a partnership for the project.

It is the professional opinion of AGES that the proposed development is **highly desirable** and **does not present any fatal flaws in terms of negative impacts to the environment** and therefore will not have any significant detrimental impacts to render the project unfeasible.

It is proposed that the following conditions must be included in the Record of Decision if the project is authorised:

- The mitigation measures contained in this report must be implemented.
- The management and or mitigation measures contained in the Environmental Management Plan must be implemented.
- The responsibilities to obtain any further authorisations and/or licenses will rest on the proponent of the project, PRIOR to any activities on site.