



DRAFT SCOPING REPORT

for

‘RE CAPITAL 10 SOLAR DEVELOPMENT’

on

A portion of Remainder of Farm 436 Kapstewel, Postmasburg, Northern Cape

In terms of the

**National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended &
Environmental Impact Regulations 2010**



Prepared for Applicant: RE Capital 10 (Pty) Ltd.

By: Cape EAPrac

Report Reference: TSA309/08

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Case Officer: To be confirmed

Date: 25 August 2014

APPOINTED ENVIRONMENTAL ASSESSMENT PRACTITIONER:***Cape EAPrac Environmental Assessment Practitioners***

PO Box 2070

George

6530

Tel: 044-874 0365Fax: 044-874 0432

Report written & compiled by: **Siân Holder** (MEd Environmental Education, Btech & Nat.Diploma Nature Conservation), who has 6 years' experience as an environmental practitioner.

Report reviewed by: **Dale Holder** (Nat.Diploma Nature Conservation), who has 12 years' experience as an environmental practitioner.

Director: Registered Environmental Assessment Practitioner with the Interim Certification Board for Environmental Assessment Practitioners of South Africa, EAPSA); Chairperson of the Southern Cape International Association for Impact Assessments (IAIA).

PURPOSE OF THIS REPORT:

Public Review & Comment

APPLICANT:

RE Capital 10 (Pty) Ltd.

CAPE EAPRAC REFERENCE NO:

TSA309/08

DEPARTMENT REFERENCE:

14/12/16/3/3/2/698

SUBMISSION DATE

25 August 2014

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National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended &
Environmental Impact Regulations 2010

RE Capital 10 Solar Development

A portion of Remainder of Farm 436 Kapstewel, Postmasburg, Northern Cape

Submitted for:

Stakeholder Review & Comment

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Report Issued by:

Cape Environmental Assessment Practitioners

Tel: 044 874 0365

PO Box 2070

Fax: 044 874 0432

5 Progress Street

Web: www.cape-eaprac.co.za

George 6530

REPORT DETAILS

Title:	DRAFT SCOPING REPORT for proposed 'RE Capital 10 Solar Development'
Purpose of this report:	<p>This Draft Scoping Report forms part of a series of reports and information sources that are being provided during the Environmental Impact Assessment (EIA) for the proposed RE Capital 10 Solar Development, near Postmasburg, in the Northern Cape Province. In accordance with the EIA Regulations, the purpose of the Scoping Report is to:</p> <ul style="list-style-type: none"> • Provide a description of the proposed project, including a sufficient level of detail to enable stakeholders to identify relevant issues and concerns; • Describe the local environmental and developmental context within which the project is proposed, to assist further identifying issues and concerns; • Provide an overview of the process being followed in the Scoping Phase, in particular the public participation process, as well as present the Plan of Study for EIA that would be followed in the subsequent EIA phase; • Present the issues and concerns identified to date from the baseline specialist studies and the initial stakeholder engagement process, as well as an explanation of how these issues will be addressed through the EIA process. <p>This Draft Scoping Report is made available to all stakeholders for a 40 day review & comment period, 25 August to 4 October 2014.</p>
Prepared for:	RE Capital 10 (Pty) Ltd.
Published by:	<i>Cape Environmental Assessment Practitioners (Pty) Ltd. (Cape EAPrac)</i>
Authors:	Mrs. Siân Holder
Reviewed by:	Mr. Dale Holder
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ABBREVIATIONS

AC	Alternating Current	Km	Kilometre
AIA	Archaeological Impact Assessment	Lt	Litre
BGIS	Biodiversity Geographic Information System	LU DS	Land Use Decision Support
°C	Degree Centigrade	LUPO	Land Use Planning Ordinance
CARA	Conservation of Agricultural Resources Act (43 of 1983)	M	Metre
CBA	Critical Biodiversity Area	m²	Metres squared
DAFF	Department of Agriculture, Forestry & Fisheries	m³	Metres cubed
DC	Direct Current	MW	Mega Watt
DEA	Department of Environmental Affairs (national)	NCHRA	Northern Cape Heritage Resources Authority
DEANC	Department of Environmental Affairs & Nature Conservation (Northern Cape)	NCNCA	Northern Cape Nature Conservation Act (9 of 2009)
DEIR	Draft Environmental Impact Report	NEMA	National Environmental Management Act (107 of 1998, as amended in 2006)
DME	Department of Minerals and Energy	NEMBA	National Environmental Management: Biodiversity Act (10 of 2004)
DMR	Department of Mineral Resources	NERSA	National Energy Regulator of South Africa
DoE	Department of Energy	NFA	National Forest Act (84 of 1998)
DSR	Draft Scoping Report	NFEPA	National Freshwater Ecosystem Priority Act
DWA	Department of Water Affairs	NHRA	National Heritage Resources Act (25 of 1999)
EA	Environmental Authorisation	NPAES	National Protected Area Expansion Strategy
EAP	Environmental Impact Practitioner	NSBA	National Spatial Biodiversity Assessment
ECO	Environmental Control Officer	NVFFA	National Veld and Forest Fire Act (101 of 1998)
EHS	Environmental, Health & Safety	NWA	National Water Act (36 of 1998)
EIA	Environmental Impact Assessment	PIA	Paleontological Impact Assessment
EIR	Environmental Impact Report	PM	Post Meridiem; "Afternoon"
EMF	Environmental Management Framework	PSDF	Provincial Spatial Development Framework
EMPr	Environmental Management Programme	PV	Photovoltaic
FEIR	Final Environmental Impact Report	PVC	Polyvinyl Chloride (piping)
FPA	Fire Protection Association	SA	South Africa
FSR	Final Scoping Report	SACAA	South African Civil Aviation Authority
GPS	Global Positioning System	SAHRA	South African National Heritage Resources Agency
GWh	Giga Watt hour	SANBI	South Africa National Biodiversity Institute
Ha	Hectare	SANS	South Africa National Standards
HIA	Heritage Impact Assessment	SDF	Spatial Development Framework
I&APs	Interested and Affected Parties	S&EIR	Scoping & Environmental Impact Reporting

IDP	Integrated Development Plan	TIA	Transport / Traffic Impact Assessment
IPP	Independent Power Producer	TOPS	Threatened and Protected Species
ISO	International Organisation for Standardisation (ISO 9001)	VIA	Visual Impact Assessment
KI / Klt	Kilo Litre		

EXECUTIVE SUMMARY

1 PROJECT OVERVIEW

Cape EAPrac has been appointed by **RE Capital 10 (Pty) Ltd.**, hereafter referred to as the Applicant, as independent environmental practitioner responsible for facilitating the Scoping & Environmental Impact Assessment (EIA) process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998, as amended) for the proposed **RE Capital 10 Solar Development**, near Postmasburg, Northern Cape.

RE Capital 10 (Pty) Ltd. has sub-leased a portion of Remainder of Farm 436 Kapstewel from the landowner, Mr. Schalk Victor, for the purposes of developing the proposed solar facility.

The project involves the development of a solar-energy facility with a total generation capacity of approximately **75MW renewable electricity** to be supplied to the national Eskom grid via the existing Manganore Substation, adjacent to the site. The project infrastructure covers an area of approximately **225ha**. The necessary associated infrastructure, including access roads, overhead electric lines, substation and control building(s) form part of this application.

2 NEED AND DESIRABILITY

The supply of electricity in South Africa has become constrained, primarily because of insufficient generation capacity, but also due to constraints on the transmission and distribution of electricity. Considering this situation and the impact that carbon emissions from existing (and future) coal-fired power stations have on the environment (Climate Change), this **renewable energy project** will contribute to the generation of 'clean' or so-called 'green' electricity for input into the national grid to augment Eskom's power supply.

The South African Government has set a 10 year cumulative target for renewable energy of 10 000GWh renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro power (White Paper on Renewable Energy Policy, 2003). This amounts to approximately 4% (1667MW) of the total estimated electricity demand (41 539MW) by 2013. The majority of this power will be generated by Eskom. However, in order to meet the increasing power demand within the country, Eskom has set a target of 30% of all new power generation to be derived from **independent power producers** (IPPs).

RE Capital 10 (Pty) Ltd is one such IPP which intends to generate electricity from the proposed **RE Capital 10 Solar Development**. This will contribute to South Africa's commitment to the Convention on Climate Change through emission-free generation of electricity and working towards an investor-friendly climate in the energy sector.

3 NEMA REQUIREMENTS

The proposed solar energy facility project is subject to the requirements of the Environmental Impact Assessment Regulations (2010 EIA Regulations) in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998, as amended)¹. This Act makes provision for the

¹ On 18 June 2010 the Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2010. These regulations came into effect on 02 August 2010 and replace the EIA regulations promulgated in 2006.

identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an EIA. An application for authorisation has been accepted by the DEA (under the Application Reference number 14/12/16/3/3/2/698).

A Scoping and Environmental Impact Assessment process is required in terms of NEMA, 2010. The listed activities associated with the proposed development, as stipulation under Regulations 544, 545 and 546, are as follows:

Regulation 544 (Basic Assessment): 10(i), 11(x)&(xi), 18(i) & 22(i)&(ii);

Regulation 545 (Scoping & EIA): 1 & 15;

Regulation 546 (Basic Assessment): 4(a)(ii), 14(3)(a)(i); 16(iii)&(iv)(a)(ii) & 19(a)(ii).

Before any of the above mentioned listed activities may be undertaken, authorisation must be obtained from the relevant competent authority, in this case, the **National Department of Environmental Affairs** (DEA).

4 BROAD CONTEXT

The target property, Remainder of Farm 436 Kapstewel, is located in the ZF Mcgawu District of the Northern Cape Province, within the jurisdiction area of the Tsantsabane Local Municipality. The property is approximately 1070ha in extent and is located approximately 21km north of the town of Postmasburg.

The proposed solar development site is situated east of the R325 Provincial Road, directly adjacent and north-west of the existing Eskom Manganore Substation.

5 SITE DESCRIPTION

The area of land designated for the proposed RE Capital 10 Solar Development, associated with the lease agreement with the landowner, is approximately 450ha in size and located in the northern half / portion of Farm RE/436. This northern area consists of relatively flat plains with low hills to the north-east, while the southern portion of the property is covered with high hills, historically mined for manganese and iron ore. The target northern half of the property is conveniently separated from the southern portion by an existing 132kV overhead powerline and access road, aligned east-west, to the Manganore Substation.

The 450ha study area will be assessed by the various specialists to identify sensitive areas which may pose as site constraints to the proposed solar development. These site constraints will be considered and avoided as far as possible in the design of the proposed development site.

6 DEVELOPMENT PROPOSAL & ALTERNATIVES

The proposed RE Capital 10 Solar Development is to consist of solar photovoltaic (PV) and/or concentrated PV with fixed, single or double axis tracking technology, with a generation capacity of 75MW_{AC} (MegaWatts - Alternating Current) (86.25MW_{DC} Direct Current), as well as associated infrastructure, which will include:

- On-site switching-station / substation

- Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.)
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Laydown area;
- Overhead electrical transmission line / grid connection (connect to existing Manganore Substation);
- Rainwater tanks; and
- Parameter fencing

Various alternatives, in terms of technology of the solar arrays, as well as layout for the solar arrays and associated infrastructure on the development site, will be considered and informed by the environmental constraints identified and assessed by the various specialist as part of the on-going environmental process.

The following conceptual and preliminary layout alternatives, as well as the no-go option, are currently being considered for the RE Capital 10 Solar Development:

- **Alternative 1 – Conceptual / Uniform Layout**, which proposes the development of the entire study site (450ha northern portion of the property). As this initial uniform layout does not consider any of the existing infrastructure located on and adjacent to the site (existing access / internal roads, transmission lines, dwelling & reservoirs etc.), nor any potential site constraints / environmental sensitive areas (to be identified by the various specialist studies), it has been **excluded from the on-going environmental process and will therefore not be assessed further**.
- **Alternative 2 – Preliminary Layout**, considers a layout of approximately 225ha in size and concentrated to the western portion of the abovementioned 450ha study area, close to the Manganore Substation. This preliminary layout has **taken the existing infrastructure on and adjacent to the site into account** (transmission line servitudes, existing structures etc.) and **avoids potential preliminary site constraints** (possible watercourse, the slopes / hills and potential wooded area etc.). As with Alternative 1, Alternative 2 does not consider potential site constraints / environmental sensitive areas which are to be identified by the various specialists during the remainder of this scoping phase, and the environmental impact assessment phase to follow. It is thus likely that this preliminary layout **will be further refined and adjusted to develop a further Alternative**, which considers the sensitivity and/or significance of the identified features and the appropriate avoidance / mitigation / management measures recommended in relation to them.
- **NO-GO / Status-Quo Alternative**, which proposes that the RE Capital 10 Solar Development not go ahead and that the farm remain undeveloped as it is currently. This alternative will serve as the baseline against which all development alternatives will be assessed.

In the event that the scoping/impact assessment process identify any other feasible/reasonable alternatives other than the above, such will be considered and incorporated as additional alternatives.

7 SPECIALIST STUDIES

The following aspects have been considered by specialists in order determine the current status of the target development site, as well as to identify potential risks and constraints associated with the development of the renewable energy facility. Further studies / assessment are to take place

as part of the impact assessment phase to follow (refer to sections 11 & 12 of the Main Report for details of the studies to be undertaken).

The baseline studies undertaken to date are described in greater detail in Sections 4, 5, 6, 7 and 8 of the Main Report, while the full specialist reports are attached in **Appendix E**.

The following baseline specialist studies have been undertaken and used to inform this Draft Scoping Report, as well as the project layout and concept:

Agriculture Potential - the farm has a **very low grazing capacity at 16 to 25 hectares per large stock unit (LSU)**. The combination of extreme climatic conditions and poor soil properties combination makes the site largely **unsuitable for cultivation**. Due to the low agricultural potential there will be **few possible impacts** on agricultural activities during construction and operation of the proposed PV power plant. The loss of the small area of grazing land is negligible. The proposed solar power plant will have minimal impacts on agriculture, locally and on site, and will have **very little influence on the current commercial farming of the area**. (Lubbe, 2014).

Biophysical – Although there are some sensitive features present in the vicinity of the RE Capital 10 site, in particular the **rocky hills**, these have been excluded from the development footprint. Although there are a number of listed fauna which may be present at the site, these are widespread species and the extent of habitat loss for these species would be considered low. At this point, the major uncertainty that would need to be clarified with a site visit at the EIA stage is the distribution and abundance of **protected tree species, *Acacia erioloba* and *Boscia albitrunca***, at the site. Besides the possible occurrence of these protected trees, and possible watercourse/s, the **site does not appear to be inherently sensitive** and is broadly suitable for the development of the RE Capital 10 Solar Energy Facility.

Heritage / Archaeological - It is not anticipated that there will be any impacts to the Built Environment. Historic structures and graveyards are sensitive to physical damage such as demolition, as well as neglect. Based on the archaeology of the adjoining areas, the terrain on which the proposed RE Capital 10 Solar Development will be located is unlikely to be rich in heritage remains. Indications are that in terms of archaeological heritage and built environment the proposed activity is viable and impacts are expected to be limited and controllable. In terms of the information available at this time, **no fatal flaws are anticipated**. The presence / significance of any historic structures and graveyards, as well as archaeological occurrences, will be confirmed and assessed through site inspection, to inform the impact assessment phase.

The issues and concerns identified through the baseline studies will be further investigated and assessed through detailed specialist impact assessments to follow in order to determine the significance of potential impacts possibly associated with the proposed project.

8 PLANNING CONTEXT

A Town and Regional Planner will be appointed to facilitate the necessary Planning Application process for the proposed RE Capital 10 Solar Development, which will likely include a land use change application for the rezoning of 450ha, from Agricultural Zone I to Special Zone, will be lodged at the Tsantsabane Local Municipality, in accordance with the Northern Cape Planning and Development Act (Act 7 of 1998), to allow for the development of the proposed RE Capital 10 Solar Development.

Parallel to the rezoning application, a long term lease application will be lodged at the National Department of Agriculture, in accordance with the Subdivision of Agricultural Land Act (Act 70 of 1970) to allow for the development of the proposed RE Capital 10 Solar Development.

9 POTENTIAL CONSTRAINTS

The following site-specific constraints were identified by various specialists during this scoping / baseline phase of the environmental process. These site constraints will be used to further refine the proposed solar facility layout, as the potential impacts associated with them are assessed and recommendations to avoid and/or mitigate impacts are provided during the on-going environmental process.

FLORA: Sensitive vegetation associated with hills and slopes. The distribution and abundance of **protected tree species**, *Acacia erioloba* and *Boscia albitrunca*, as well as special habitats at the site. Presence of watercourses to be confirmed.

FAUNA: Disturbance and/or destruction of habitat associated with listed fauna species found to occur on site. Potential collision and/or electrocution of birds on transmission line.

AGRICULTURAL POTENTIAL: **High erosion potential** of soil resources by water and wind.

HERITAGE / ARCHAEOLOGICAL: Potential historical buildings and graves, as well as archaeological occurrences – to be confirmed during the site assessment / impact assessment phase.

VISUAL: None. To be confirmed during the site assessment / impact assessment phase.

10 PROCESS TO DATE

This Draft Scoping Report (DSR) follows the Application Form accepted by the Department of Environmental Affairs on 19 May 2014 (Ref: 14/12/16/3/3/2/698) authorising *Cape EAPrac* to commence with the public participation phase of the environmental process. This project and the environmental process was advertised in the *Kathu GAZETTE* newspaper (issue of 5 July 2014), inviting the public to register as interested and affected parties. This Draft Scoping Report (DSR) (Ref: TSA309/08) has been made available to Stakeholders and Interested and Affected Parties (I&APs) for a review and comment period extending from **Monday 25 August to Saturday 4 October 2014**.

This report reflects the findings of **preliminary specialist investigations** and reports (Agricultural Potential, Biophysical and Heritage / Archaeological). It is also a tool to identify the **need for further specialist investigations and assessments** in the event that issues/impacts cannot be resolved during the scoping phase.

As part of the public participation process various key stakeholders have been identified and notified of the project and their right to participate and comment on the proposal. The project has been advertised and stakeholders that response to the adverts, notices and written notices will be kept informed throughout the remainder of the on-going environmental process. Please see **Section 10** in the main report and **Appendix F** for evidence of the Public Participation process.

Thus far, the following key development aspects and/ concerns have been raised by the project team, stakeholders, authorities and the baseline specialist studies:

- Provision of **labour** and **skills transfer** to the local community.
- Promotion of **Green Energy tourism** and contribution of **Carbon Credits**.

- **Adding value to vacant land** with poor agricultural potential.
- Potential for **soil erosion**, particularly in proximity to the possible watercourse and slopes of hills / koppies, during construction and operation phases of the development.
- Potential impact on **natural resources and habitat**; and
- Potential impact of solar development on the neighbouring prospecting / mining activities, and/or impacts of the mining activity on the solar development.

Where required, the project will **avoid areas of concern** in order to minimise the potential negative impacts and where impacts cannot be avoided completely, effective **mitigation measures** will be investigated through the on-going environmental process.

11 CONCLUSIONS & RECOMMENDATIONS

Renewable energy is considered favourable compared to conventional electricity generation methods, which include coal fired stations. International literature confirms the long-term benefits of the generation of electricity from renewable / alternative energy sources (e.g. solar / wind) to far exceed those associated with fossil fuel energy, and as such it should be supported. The associated impacts of the RE Capital 10 Solar Development, which include mainly biophysical aspects, must be considered within this context.

Members of the public and other key stakeholders and authorities are requested to review this Draft Scoping Report (DSR) in order to familiarise themselves with the project proposal and potential impacts that may be caused by the development. Concerns and issues raised during the scoping phase will be used to inform the more detailed impact assessment phase that will follow the scoping phase.

This DSR is made available for public review and comment for a period of **40 days** extending from **Monday 25 August Saturday 4 October 2014**. Queries and comments must be submitted to *Cape EAPrac* in writing, and within the specified comment period to:

Mrs. Siân Holder

PO Box 2070, George, 6530

Fax: 044-874 0432 Email: sian@cape-eaprac.co.za

DRAFT SCOPING MAIN REPORT

1 INTRODUCTION

Cape EAPrac has been appointed by **RE Capital 10 (Pty) Ltd.**, hereafter referred to as the Applicant, as independent environmental practitioner, to facilitate the Scoping & Environmental Impact Reporting (S&EIR) process required in terms of the National Environmental Management Act (NEMA, Act 107 of 1998) for the proposed '**RE Capital 10 Solar Development**' near Postmasburg, Northern Cape.

RE Capital 10 (Pty) Ltd. has sub-leased a portion of Remainder of Farm 436 Kapstewel from the landowner, Mr. Schalk Victor, for the purposes of developing the proposed solar facility. The total generation capacity of the solar facility will not exceed **75MW** for input into the national Eskom grid.

The purpose of this **Draft Scoping Report** is to describe the environment to be affected, the proposed project, the process followed to date (focussing on the outcome of the initial public participation process and baseline specialist studies), to present the site constraints identified by the various specialist during their initial site assessments, and provide Plan of Study for the Impact Assessment phase of this development.

1.1 WHY RENEWABLE ENERGY? WHY NORTHERN CAPE?

South Africa has for several years been experiencing considerable constraints in the availability and stability of electrical supply. Load shedding procedures have been applied since December 2005 due to multi-technical failures, as well as capacity and transmission constraints.

Eskom generates about 95% of South Africa's electricity supply, and has undertaken to increase capacity to meet growing demands. At the moment, the country's power stations are 90% coal-fired, and two huge new facilities are being built to add to this capacity. However, Eskom's plans to increase its national capacity by 40 000 megawatts in the period to 2025 have had to be scaled down due to the global economic recession (Northern Cape Business website).

International best-practice requires a 15% electricity reserve margin to deal with routine maintenance requirements and unexpected shutdowns in electricity supply systems. South Africa has historically enjoyed a large reserve margin (25% in 2002, 20% in 2004 and 16% in 2006), but that has declined over the recent past to 8% - 10%, as a result of robust economic growth and the associated demand for electricity. The spare power available to provide supply at any time of the day is known as the reserve capacity and the spare plant available when the highest demand of the year is recorded is known as the reserve margin (National Response to South Africa's Electricity Shortage, 2008). This has resulted in limited opportunities for maintenance and necessitated that power stations are run harder. This results in station equipment becoming highly stressed and an increase in unplanned outages and generator trips. The expected demand growth will rapidly erode this margin, as well as Eskom's ability to recover after its already stressed systems shutdown.

This necessitates the additional generation of at least 3 000MW in the shortest possible time, to allow the reserve necessary to bring Eskom's system back into balance (*ibid*). This need can either be addressed from the *supply* or the *demand* side. Where the demand side interventions include short, medium and long term aspects of a national Power Conservation Programme to incentivise the public to use less electricity (as mentioned above), one of the supply side options (besides Eskom building new plants and returning old plants to service) is to allow **Independent Power Producers** (IPPs) to contribute electricity to the national grid (National Response Document, 2008). **RE Capital 10 (Pty) Ltd.** is one such body, which intends generating electricity from a renewable energy resource, namely solar.

In March 2011, the Cabinet approved South Africa's Integrated Resource Plan 2010, in terms of which energy from renewable sources will be expected to make up a substantial 42% of all new electricity generation in the country over the next 20 years. The government's New Growth Path for the economy also envisages up to 300 000 jobs being created in the "green" economy by 2020 (South Africa info website).

The Northern Cape is suggested by many to be the ideal location for various forms of alternative energy. This has resulted in a number of feasibility studies being conducted, not least of which an investigation by the Industrial Development Corporation in 2010 (R33-million spent) into potential for photo-voltaic, thermal, solar and wind power (Northern Cape Business website).

The area of the Northern Cape that borders on the Gariep (Orange) River and Namibia boasts the highest solar radiation intensity anywhere in southern Africa. Solar energy is therefore likely to be the most viable alternative energy source for the Northern Cape, although wind-power potential is generally good along the coast (State of the Environment, S.A.)

South Africa, Lesotho and Swaziland

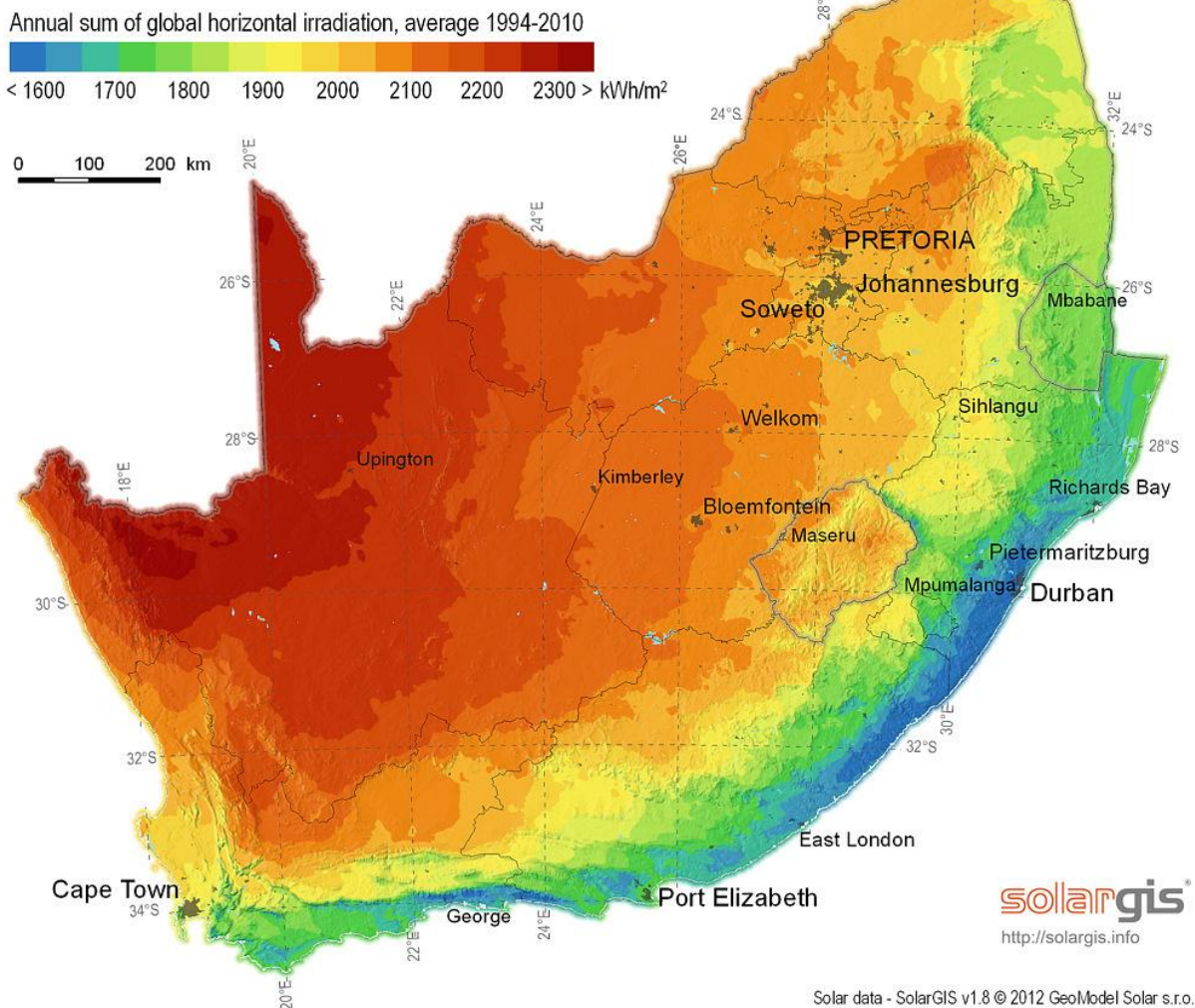


Figure 1: Solar radiation map for South Africa (Source: Solargis/info accessed on 15 August 2012).

The Northern Cape area is considered to have extremely favourable solar radiation levels over the majority of the year, making it ideal for the production of solar-power via Photovoltaic (fixed and tracking panels) and Concentrated (solar thermal) Solar systems. Several solar irradiation maps have been produced for South Africa, all of which indicate that the Northern Cape area **high solar irradiation**.

A solar-investment conference was held in November 2010 at Upington and was attended by 400 delegates from all over the world. Dipuo Peters, the national Minister of Energy, outlined the competitive advantages of the Northern Cape, over and above its extremely high irradiation levels, amongst others:

- relative closeness to the national power grid compared to other areas with comparable sunshine;
- water from the Orange River;
- access to two airports; and
- good major roads and a flat landscape (Northern Cape Business website – solar power).

The Northern Cape is not too dusty, the land is flat and sparsely populated, and there are little to no geological or climate risks, meaning that the sun can be used year-round (BuaNews online). An advantage that the Northern Cape has over the Sahara Desert is the relatively wind-free environment that prevails in the province. A Clinton Climate Initiative (CCI) pre-feasibility study has found that South Africa has one of the best solar resources on the planet (Northern Cape Business website – solar power).

To take advantage of this potential for the Northern Cape to become a national renewable-energy hub, the groundwork is being done on a mega-project that has the capacity to fundamentally change the structure of South Africa's power sector: to build a massive solar park that will generate an eighth of the country's electricity needs – 5 000MW – in the Northern Cape near Upington. Sixteen square kilometres of land (thousands of hectares) have been identified and Eskom is looking for private partners. The park, which will cost more than R150-billion, will generate 1 000MW in its first phase. A full feasibility study will now be conducted with the support of the Central Energy Fund and the Development Bank of Southern Africa (Northern Cape Business website – solar power). Significant job creation, lucrative private-sector investments, local industry development and a cleaner, more secure power supply are among the benefits of a large-scale park such as this (BuaNews online).

Indeed this potential for solar energy generation plants has resulted in the emergence of smaller solar energy projects throughout the Northern Cape. The Energy Minister, Dipuo Peters announced in February 2012 that 16 of the initial 28 preferred projects identified by the Department of Energy (DoE) under the renewable energy independent power producer (IPP) programme were located in the sun-drenched province (Creamer, Feb. 2012). Mining companies in the Northern Cape are looking to concentrating solar power (CSP) to provide power for their operations. Engineering company Group Five announced in 2011 that they were investigating the construction of a 150MW plant near Kathu. The Industrial Development Corporation (IDC) is supporting a number of projects in the province. These include a 100MW plant conceived by Abengoa Solar, a Spanish company with a global presence, and a Solafrica scheme to spend more than R3-billion on a Concentrated Solar Plant at Groblershoop (Northern Cape Business website – solar power).

Not comparable in size with these larger projects, the RE Capital 10 (Pty) Ltd. is one such smaller IPP solar project which intends to generate 75MW of electricity from solar-energy for inclusion into the National grid. The RE Capital 10 development site is considered ideal, primarily due to:

- The flat topography of the proposed development site and it's the availability for use for an alternative energy generation facility;
- The grid connection potential based in proximity to existing transmission & substation infrastructure – existing on-site Manganore Substation.
- The site is located outside the urban edge of Postmasburg, in close proximity to an existing major transport route – the R325;
- The site falls within a high solar radiation area which allows for the maximisation of solar energy received.

- The terrain is flat which allows for optimisation of the layout and minimum interference with respect to shadows between individual solar infrastructure.
- The northern orientation with no obstructions to the north optimises efficiency.
- The fact that the proposed activity falls within an area with low agricultural potential reduces the environmental cost.
- Ground conditions are considered suitable which reduces construction costs.

2 LEGISLATIVE AND POLICY FRAMEWORK

The legislation that is relevant to this study is briefly outlined below. These environmental requirements are not intended to be definitive or exhaustive, but serve to highlight key environmental legislation and responsibilities only.

2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measures are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA)

The current assessment is being undertaken in terms of the **National Environmental Management Act** (NEMA, Act 107 of 1998)². This Act makes provision for the identification and assessment of activities that are potentially detrimental to the environment and which require authorisation from the competent authority (in this case, the national Department of Environmental Affairs, DEA) based on the findings of an Environmental Assessment.

The proposed scheme entails a number of listed activities, which require a **Scoping & Environmental Impact Reporting (S&EIR) process**, which must be conducted by an independent environmental assessment practitioner (EAP). Figure 2 depicts a summary of the S&EIR process.

² On 18 June 2010 the Minister of Water and Environmental Affairs promulgated new regulations in terms of Chapter 5 of the National Environmental Management Act (NEMA, Act 107 of 1998), viz, the Environmental Impact Assessment (EIA) Regulations 2010. These regulations came into effect on 02 August 2010 and replace the EIA regulations promulgated in 2006.

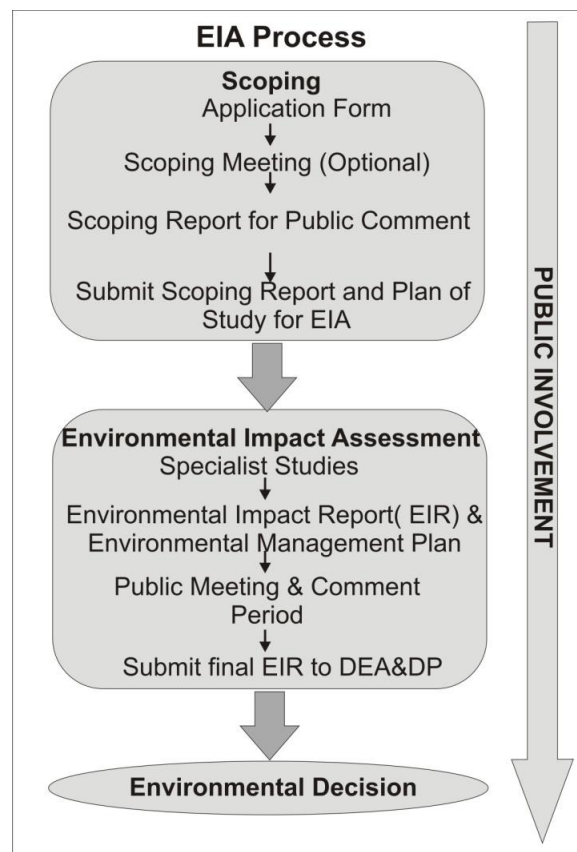


Figure 2: Summary of Scoping & EIR Process

The listed activities associated with the proposed development, as stipulation under 2010 Regulations 544, 545 & 546 are as follows:

Table 1: NEMA 2010 listed activities for the RE Capital 10 Solar Development

R544	Listed Activity	Activity Description
10(i)	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 33kV, but less than 275kV.	New overhead power line linking the proposed on-site substation/operation building to the existing Manganore Substation.
11(x)&(xi)	The construction of (x) buildings exceeding 50m ² in size, or (xi) infrastructure or structures covering 50m ² or more, where such construction occurs within a watercourse or within 32m of a watercourse , measured from the edge of the watercourse, excluding where such construction will occur behind the development line.	The possible construction of roads/tracks & PV arrays across the on-site drainage systems. Stabilisation of stream / drainage line bed & banks may be required.
18(i)	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, pebbles or rock of more than 5 cubic metres from (i) a watercourse .	The possible construction of roads/tracks & PV arrays across the on-site drainage systems. Stabilisation of stream / drainage line bed & banks may be required.
22(i)&(ii)	The construction of a road, outside urban areas, (i) with a reserve wider than 13.5m or, (ii) where no reserve exists where the road is wider than 8m or, (iii) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Notice 545 of 2010.	Construction of access and internal roads for the solar facility for construction and operation phases outside the urban edge of Tsantsabane municipal area.

R545	Listed Activity	Activity Description
1	The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20MW or more .	RE Capital 10 (Pty) Ltd. will have a maximum capacity of 75MW .
15	Physical alteration of undeveloped, vacant or derelict land to (ii) residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20ha or more .	Development of the RE Capital 8 Solar Development of approximately 225ha on vacant land, outside of the Postmasburg urban edge.
R546	Listed Activity	Activity Description
4(a)(ii)	The construction of a road wider than 4m with a reserve less than 13.5m. (a) In the Northern Cape. (ii) All areas outside urban areas.	Construction of access and internal roads wider than 4 metres for solar facility, outside the Postmasburg urban edge.
14(3)(a)(i)	The clearance of an area of 5ha or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation; (3) for a linear activity. (a) In the Northern Cape. (i) All areas outside urban areas.	Vegetation clearing for the Solar Panels and associated infrastructure: access roads, cable trenches and on-site substation & axillary buildings etc. outside of the Postmasburg urban edge . Solar Energy Plant to be constructed over an area approximately 225ha on private land. Intact vegetation to be avoided by solar facility as far as possible.
16(iii)&(iv) (a)(ii)	The construction of (iii) buildings or (iv) infrastructure covering 10m ² or more where such construction occurs within a watercourse or within 32m of a watercourse, measured from the edge of a watercourse. (a) In the Northern Cape. (ii) Outside urban areas.	The possible construction of roads/tracks & PV arrays across the on-site drainage systems. Stabilisation of stream / drainage line bed & banks may be required.
19(a)(ii)	The widening of a road by more than 4 metres or the lengthening of a road by more than 1km. (a) In the Northern Cape. (ii) All areas outside urban areas.	Construction of access and internal roads wider than 4 metres for solar facility, outside the Postmasburg urban edge.

Before any of the above mentioned listed activities can be undertaken, authorisation must be obtained from the relevant authority, in this case the National Department of Environmental Affairs (DEA). Should the Department approve the proposed activity, the Environmental Authorisation does not exclude the need for obtaining relevant approvals from other Authorities who has a legal mandate.

2.3 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY (ACT 10 OF 2004)

This Act controls the management and conservation of South African biodiversity within the framework of NEMA. Amongst others, it deals with the protection of species and ecosystems that warrant national protection, as well as the sustainable use of indigenous biological resources. Sections 52 & 53 of this Act specifically make provision for the protection of critically endangered, endangered, vulnerable and protected ecosystems that have undergone, or have a risk of undergoing significant degradation of ecological structure, function or composition as a result of human intervention through threatening processes.

Unfortunately, **no broad- or fine-scale spatial biodiversity planning have been conducted for the region**, thus no Critical Biodiversity Areas or Ecological Support Areas have been defined for

the study area. This is major limitation as without a systematic conservation plan for the region, evaluating the significance of the development site within the broader context and broad-scale impacts, are difficult.

In terms of other broad-scale planning studies, the site does not fall within a National Protected Areas Expansion Strategy Focus Area (NPAES), indicating that the area has not been identified as an area of exceptional biodiversity or of significance for the long-term maintenance of broad-scale ecological processes and climate change buffering within the region (Todd, 2014).

In terms of the National Spatial Biodiversity Assessment (NSBA), the Terrestrial Ecosystem Status of the entire development area is classified as **Least Threatened** (see **Appendix B** for biodiversity maps).

No features of very high sensitivity were identified within the RE Capital 10 development area itself, but the **rocky hills at the site are considered sensitive** on account of the high faunal diversity likely to be present in these areas as well as the likely presence of a variety of plant species of conservation concern. The hills have however been excluded from the potential development footprint at the screening stage and would not be directly impacted by the development. At this point, the major uncertainty that will need to be clarified with a site visit at the EIA stage is the **distribution and abundance of protected tree species**, *Acacia erioloba* and *Boscia albitrunca* at the site (Todd, 2014), as well as the occurrence of any watercourses.

2.3.1 National Protected Area Expansion Strategy (NPAES) for S.A. 2008 (2010)

Considering that South Africa's protected area network currently falls far short of sustaining biodiversity and ecological processes, the NPAES aims to achieve cost-effective protected area expansion for ecological sustainability and increased resilience to Climate Change. Protected areas, recognised by the National Environmental Management: Protected Areas Act (Act 57 of 2003), are considered formal protected areas in the NPAES. The NPAES sets targets for expansion of these protected areas, provides maps of the most important protected area expansion, and makes recommendations on mechanisms for protected area expansion. The NPAES has set a 20-year protected area target for each vegetation type in each biome, adding up to the overall land-based 20-year protected area target of 12% of South Africa's total land area.

The NPAES identifies 42 focus areas for land-based protected area expansion in South Africa. These are large intact and unfragmented areas suitable for the creation or expansion of large protected areas. Focus Area Number **10: Eastern Kalahari Bushveld**, falls within the Savanna biome and is located approximately 5km north-west of the proposed solar site (see Location & Topographical Maps in **Appendix A** and NPAES map in **Appendix B**).

The NPAES does not deal with the site-scale planning on exactly which sites should be included in the protected area network, nor with detailed implementation planning for expanding protected areas. This responsibility lies with protected area agencies, such as provincial conservation authorities, South African National Parks (SANParks) and World Heritage Site Authorities.

The South African Heritage Resource Agency (SAHRA) and the Northern Cape Heritage Resource Agency are registered as key stakeholders for this environmental process and have been provided with the opportunity to provide comment on this solar energy development in relation to the NPAES for the Postmasburg area. South African National Parks (SANParks) head office confirmed that they had no interest in this area. **No issues** in this regard have been raised to date.

2.3.2 Municipal Biodiversity Summary Project (SANBI BGIS)

According to the information provided by the South African National Biodiversity Institute (SANBI) through their Biodiversity GIS (BGIS) system, the environment in Tsantsabane Local Municipality is mostly untransformed (99% natural areas remaining), none of which is formally protected within land-based protected areas. Two biomes occur within the municipality, the Nama-Karoo (+/-

26526.6ha) and the Savanna (562187.6ha), which support ten (10) vegetation types, none of which are classified as critically endangered, endangered or vulnerable. The proposed solar development site falls within the Kuruman Thornveld vegetation type, which has an ecosystem status of Least Threatened, and covers approximately 19% of the municipality. The municipality falls with two Water Management Areas: the Lower Orange and the Lower Vaal. Only three rivers traverse the Tsantsabane Municipality, the Ga-Mogara, the Skeifonteinspruit and Unknown, none of which traverse the proposed RE Capital 10 Solar site. Approximately 1852 wetlands have been identified to occur within the Municipality, none of which have Ramsar Wetland status, and none are located in proximity to the proposed solar site.

2.4 NATIONAL FORESTS ACT (NO. 84 OF 1998):

The National Forests Act provides for the protection of forests as well as specific tree species, quoting directly from the Act: “*no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated*”.

The distribution and abundance of two national protected tree species, *Acacia erioloba* and *Boscia albitrunca*, will have to be determined during the site visit and impact assessment phase. Please refer to Section 4.3 of this report and in full in the Ecological Scoping Report in Appendix E, Annexure E1 for further description of the plant species found to occur in the area.

2.5 CONSERVATION OF AGRICULTURAL RESOURCES ACT – CARA (ACT 43 OF 1983):

CARA provides for the regulation of control over the utilisation of the natural agricultural resources in order to promote the conservation of soil, water and vegetation and provides for combating weeds and invader plant species. The Conservation of Agricultural Resources Act defines different categories of alien plants:

- Category 1 - prohibited and must be controlled;
- Category 2 – must be grown within a demarcated area under permit; and
- Category 3 - ornamental plants that may no longer be planted, but existing plants may remain provided that all reasonable steps are taken to prevent the spreading thereof, except within the floodlines of water courses and wetlands.

A **potential drainage line / watercourse** was identified by the EAP during an initial site visit, the extent and significance of which, will have to be confirmed by the specialists during their site assessments as part of the impact assessment phase.

As part of the Agricultural Potential study undertaken, it has been confirmed that the **soils present on the proposed development site are highly prone to both water and wind erosion**. Measures in terms of avoidance of sensitive areas, erosion and stormwater control and management and facility technological / layout design will be consider in the impact assessment phase to follow.

2.6 NORTHERN CAPE NATURE CONSERVATION ACT (NO. 9 OF 2009):

The Northern Cape Nature Conservation Act provides inter alia for the sustainable utilisation of wild animals, aquatic biota and plants as well as permitting and trade regulations regarding wild fauna and flora within the province. In terms of this act the following section may be relevant with regards to any security fencing the solar development may require.

Manipulation of boundary fences: 19. No Person may –

- (a) erect, alter, remove or partly remove or cause to be erected, altered, removed or partly removed, any fence, whether on a common boundary or on such person's own property, in such a manner that any wild animal which as a result thereof gains access or may gain access to the property or a camp on the property, cannot escape or is likely not to be able to escape therefrom.

The perimeter fencing of the RE Capital 10 Solar Development Site will be constructed in a manner which allows for the passage of small and medium sized mammals: i.e. steel palisade fencing (20 cm gaps min), alternatively the lowest strand or bottom of the fence will be elevated to 15 cm above the ground at least at strategic places to allow for fauna to pass under the fence. The most appropriate method will be confirmed during the final design phase in collaboration with the biodiversity specialist. No electrified strands will be placed within 20 cm of the ground – to allow free movement of tortoises and reptiles in particular. During operation, all gates will be kept closed to ensure that no larger fauna enter and become trapped within the fenced-off area.

The Act also lists protected fauna and flora under 3 schedules ranging from Endangered (Schedule 1), Protected (Schedule 2) to Common (Schedule 3). The majority of mammals, reptiles and amphibians are listed under Schedule 2 (common), except for listed species which are under Schedule 1. A permit is required for any activities which involve species listed under schedule 1 or 2.

The following listed plant species are known to occur in the broad vicinity of the proposed RE Capital 10 Solar Development study area (Todd, 2014):

Table 2: Listed plant species known from the broad area.

Family	Species	Status
AMARYLLIDACEAE	<i>Boophone disticha</i>	Declining
ASPARAGACEAE	<i>Asparagus stipulaceus</i>	NT
ASTERACEAE	<i>Gnaphalium declinatum</i>	NT
MESEMBRYANTHEMACEAE	<i>Antimima lawsonii</i>	Rare

Five listed terrestrial mammal species potentially occur in the area; these are: the Brown Hyaena *Hyaena brunnea* (Near Threatened), Honey Badger *Mellivora capensis* (IUCN LC and SARDB Endangered), Black-footed Cat *Felis nigripes* (Vulnerable), Ground Pangolin *Smutsia temminckii* (Vulnerable) and South African Hedgehog *Atelerix frontalis*. There are also **four Near Threatened bat species present in the area**. Given the extensive national ranges of these species, the impact of the development on habitat loss for these species would be minimal and a long-term impact on these species would be unlikely (Todd, 2014).

Of the 217 bird species recorded for the area, **eleven listed bird species are known from the area**, all of which are classified as Vulnerable or Near Threatened. The **site does not fall within or near any of the Important Bird Areas** defined by Birdlife South Africa. Direct habitat loss is not likely to be a highly significant impact for most species and the major potential source of impact would come from electrocution and collisions with the power lines. Given the proximity of the site to the Eskom Manganore Substation, these impacts are likely to be very low and a significant impact would be highly unlikely (Todd, 2014).

No reptile species of conservation concern are known to occur in the area. The only amphibian species of conservation concern which may occur at the site is the **Giant Bullfrog** *Pyxicephalus adspersus*. The site lies at the margin of the known distribution of this species and it has not been

recorded from any of the quarter degree squares around the site, suggesting that it is unlikely to occur at the site (Todd, 2014).

2.7 NATURE & ENVIRONMENTAL CONSERVATION ORDINANCE (19 OF 1974)

This legislation was developed to protect both animal and plant species within the various provinces of the country which warrant protection. These may be species which are under threat or which are already considered to be endangered. The provincial environmental authorities are responsible for implementing the provisions of this legislation, which includes the issuing of permits etc. In the Northern Cape, the Department of Environment and Nature Conservation fulfils this mandate.

Several protected / listed flora and fauna species are known to occur in the broad area of the proposed solar development site. The occurrence of these species, as well as the potential impact on their habitats and populations will be confirmed by the ecological specialist during the impact assessment phase of the on-going environmental process (see Ecological Scoping Report in Appendix E, Annexure E1 attached).

2.8 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (NHRA) (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority in the Northern Cape, and is registered as a Stakeholder for this environmental process.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will comment on the detailed Integrated Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process.

The National Heritage Resources Act requires relevant authorities to be notified regarding this proposed development, as the following activities are relevant:

- *the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- *any development or other activity which will change the character of a site exceeding 5 000 m² in extent;*
- *the re-zoning of a site exceeding 10 000m² in extent.*

The NHRA provides protection for the following categories of heritage resources:

- Landscapes, cultural or natural (Section 3 (3))
- Buildings or structures older than 60 years (Section 34);
- Archaeological Sites, palaeontological material and meteorites (Section 35);
- Burial grounds and graves (Section 36);
- Public monuments and memorials (Section 37);
- Living heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships).

Refer Section 8 below and Annexure E3 for the Heritage / Archaeological Baseline Report.

In terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority. **Although there does not appear to be any buildings or structures on the property,**

surveys conducted on adjoining properties, the presence of historical buildings / structures (particularly 20th century associated with farming and mining) will need to be assessed through site investigation (Webley, 2014).

Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3). **Based on surveys conducted on adjoining properties, the presence of unmarked graves will need to be assessed through site investigation (Webley, 2014).**

In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority. **Based on the surveys conducted on adjoining properties, the following impacts may occur and will need assessed through site investigation:**

- **Ephemeral scatters of Middle Stone Age and Later Stone Age material may occur around pans and on the slopes of small koppies;**
- **Evidence for the pre-colonial mining of specularite;**
- **Buried pre-colonial graves may occur (Webley, 2014).**

The on-going environmental process will be informed by inputs from heritage, archaeological and palaeontological specialists. Sites that are considered to be sensitive will be identified and mapped with appropriate buffers. The layout for the Solar Facility itself has been informed by these constraints and **avoids select features.**

The Integrated Heritage Impact Assessment (including the above studies) will be submitted to SAHRA for further input, comment and decision-making. The Final Comment / Decision from SAHRA will be included in the EIR phase of the environmental process.

2.9 NATIONAL WATER ACT, NO 36 OF 1998

Section 21 of the National Water Act (NWA) requires that authorisation be applied for from the Department of Water Affairs (DWA) for any water use / activity in, or on the banks, of any watercourse. Water use activities listed in Section 21 are as follows:

- (c) impeding or diverting the flow of water in a watercourse;*
- (i) altering the bed, banks, course or characteristics of a watercourse.*

The EAP identified a possible watercourse / stormwater drainage line traversing the proposed solar development site, during an initial site visit. Confirmation of the delineation and extent of this potential watercourse will be confirmed by the various specialists during the impact assessment phase of the on-going environmental process.

This Act also controls / regulates the utilization of natural water resources and provides provisions to safe-guard the integrity of these water resources.

The proposed RE Capital 10 Solar Development is likely to require approximately 10 000m³ of water during the +/- 18 month construction period, as well as approximately 5 000m³ per annum for the +/- 20 year operational lifespan of the solar energy facility.

Water required for the construction and operation of the RE Capital 10 Solar Development is to be sourced via **three possible options**, listed in order of preference:

- Trucked in from the Local Municipality (via water-tanker), or made available in Postmasburg or surrounds via a metered standpipe. Confirmation of availability and specific

arrangements in this regard will be sought from the Tsantsabane Municipality and recorded in a Service Level Agreement (SLA);

- Sedibeng Water (Northern Cape) – from a metered supply point off the nearby water pipeline operated by Sedibeng Water (a registered Water Services Provider); and
- Borehole collection on site.

A rainwater collection and storage system (off the on-site substation and axillary building roofs), will be installed to supplement that abovementioned water source option/s.

Should the option to install on-site boreholes be selected, an Application will be submitted to the Northern Cape Department of Water Affairs (DWA) for the registration of such boreholes, as well as a Water Use Licence Application (WULA) for the use of the borehole water for the purposes of the solar facility, along with confirmation that sufficient water is available.

In terms of the National Freshwater Ecosystem Priority Area (NFEPA) mapping no rivers or wetland occur on the solar development property.

DWA and the Department of Agriculture have been registered as key stakeholders and requested to provide input in this regard.

2.10 ASTRONOMY GEOGRAPHIC ADVANTAGE ACT, 2007 (ACT NO 21 OF 2007)

The purpose of the Act is to preserve the geographic advantage areas that attract investment in astronomy. The entire Northern Cape Province, including the Tsantsabane Municipality, has been declared an astronomy advantage area. The Northern Cape optical and radio telescope sites were declared core astronomy advantage areas. The Act allowed for the declaration of the Southern Africa Large Telescope (SALT), Meerkat and Square Kilometre Array (SKA) as astronomy and related scientific endeavours that has to be protected.

A high level risk assessment has been conducted at the **South African SKA Project Office** to determine the potential impact of the RE Capital 10 Solar Facility on the Square Kilometre Array. This assessment confirmed that the nearest SKA station has been identified as Rem-Opt-08, at approximately 98km from the proposed installation. Therefore, based on the distance to the nearest SKA station, this facility poses a **low risk of detrimental impact on the SKA**, and **no mitigation measures would be required** at this stage

2.11 SUSTAINABILITY IMPERATIVE

The norm implicit to our environmental law is the notion of sustainable development (“SD”). SD and sustainable use and exploitation of natural resources are at the core of the protection of the environment. SD is generally accepted to mean development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs. The evolving elements of the concept of SD *inter alia* include the right to develop; the pursuit of equity in the use and allocation of natural resources (the principle of intra-generational equity) and the need to preserve natural resources for the benefit of present and future generations. Economic development, social development and the protection of the environment are considered the pillars of SD (the triple bottom line).

“Man-land relationships require a holistic perspective, an ability to appreciate the many aspects that make up the real problems. Sustainable planning has to confront the physical, social, environmental and economic challenges and conflicting aspirations of local communities. The imperative of sustainable planning translates into notions of striking a balance between the many competing interests in the ecological, economic and social fields in a planned manner. The ‘triple bottom line’ objectives of sustainable planning and development should be understood in terms of

economic efficiency (employment and economic growth), social equity (human needs) and ecological integrity (ecological capital)."

As was pointed out by the Constitutional Court, SD does not require the cessation of socio-economic development but seeks to regulate the manner in which it takes place. The idea that developmental and environmental protection must be reconciled is central to the concept of SD - it implies the accommodation, reconciliation and (in some instances) integration between economic development, social development and environmental protection. It is regarded as providing a "conceptual bridge" between the right to social and economic development, and the need to protect the environment.

Our Constitutional Court has pointed out that the requirement that environmental authorities must place people and their needs at the forefront of their concern so that environmental management can serve their developmental, cultural and social interests, can be achieved if a development is sustainable. *"The very idea of sustainability implies continuity. It reflects the concern for social and developmental equity between generations, a concern that must logically be extended to equity within each generation. This concern is reflected in the principles of inter-generational and intra-generational equity which are embodied in both section 24 of the Constitution and the principles of environmental management contained in NEMA."* [Emphasis added.]

In terms of NEMA sustainable development requires the integration of the relevant factors, the purpose of which is *to ensure that development serves present and future generations.*³

It is believed that the proposed 75MW RE Capital 10 Solar Development supports the notion of sustainable development by presenting a reasonable and feasible alternative to the existing vacant land use type, which has limited agricultural potential due the poor soil properties, extreme climatic conditions and low grazing capacity. Furthermore the proposed alternative energy project (reliant on a natural renewable resource – solar energy) is in line with the national and global goal of reducing reliance on fossil fuels, thereby providing long-term benefits to future generations in a sustainable manner.

³ See definition of "sustainable development" in section 1 of NEMA.

3 ACTIVITY

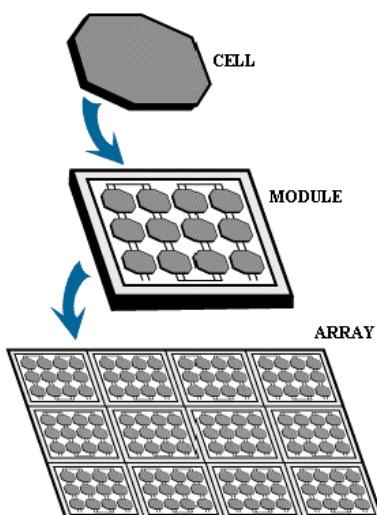
The Applicant, RE Capital 10 (Pty) Ltd., intends to develop a **solar energy facility** on a portion of the Remainder of the Farm 436 Kapstewel, Postmasburg, Northern Cape.

The proposed **photovoltaic (PV) solar facility** will have a **net generation capacity of 75 MW AC** (86.25 MW DC installed) and will the **development footprint will be approximately 225ha**. The solar technology will be PV and/or concentrated PV with fixed-tilt, single- or double- axis tracking. The infrastructure associated with this PV development will include the following:

- **Solar field** of PV modules/panel arrays with **maximum structure height of +/- 3.5 metres**;
- Approximately **60 x inverter stations / mini-substations** (including MV distribution transformers) at a height of 3m;
- **On-site Switching Station / Substation** of approx. 120m x 70m in size (including a transformer to allow the generated power to be connected to Eskom's electricity grid);
- **Overhead 132kV transmission power line** to distribute the generated electricity from the on-site substation to the existing Eskom Manganore 132/11kV Distribution Substation (located directly adjacent to & south east of the site). Transmission line will be a single circuit line, approx. **800m to 1km in length**, with a **maximum height of 32m**, within a **servitude width of 31m – 40m**;
- **Auxiliary buildings**, including:
 - Control Centre (+/- 31m x 8m);
 - Office (+/- 22m x 11m);
 - Warehouses (x2) (+/- 50m x 20m)
 - Canteen & Visitors Centre (+/- 30m x 10m)
 - Staff Lockers & Ablution (22m x 11m); and
 - Gate house / security offices (+/- 6m x 6m),
- **Internal electrical reticulation network** (underground cabling);
- **Access road and internal road / track network**;
- **Laydown areas**, required for material & equipment (+/- 200m x 150m);
- **Rainwater tanks**; and
- **Parameter fencing & lighting** around the solar facility.

3.1 TECHNOLOGICAL OVERVIEW

Photovoltaic (PV) solar power technology has been identified as the preferred technology to generate electricity in this project.



A solar 'array / rack' consists of a number of 'panels / modules' that in turn are made up of hundreds of small individual 'cells'. Individual arrays / racks are then grouped into various rows that make up most of what one sees as a solar plant / field. Arrays are mounted on aluminium frames that are rammed into the soil to keep them in an upright and stable position.

Figure 3: Diagrammatic representation of typical PV panel array

Photovoltaic (PV) panels convert the energy delivered by the sun into direct current (DC) electric energy. The PV arrays are connected to inverters by means of a network of underground cables, which in turn invert the direct current (DC) to alternating current (AC). The power generated is then stepped-up to the required voltage and frequency of the national grid, by using the transformer within the on-site switching station / substation. The generated electricity is then distributed from the on-site transformer/s via an overhead transmission/distribution power line to the nearest Eskom Substation (Manganore). From the Eskom substation, the electricity is fed into the national Eskom grid.

Several alternatives / options in terms of the photovoltaic solar technology will be considered. These alternatives will include layout, technological and operational. The following section provides an overview of the technological options to be considered.

3.1.1 Fixed & Tracking Options

Fixed-tilt / stationary solar technology comprises the PV modules being fixed to the ground in a specific north facing angle and consist of no moving parts.

Single axis tracking systems are designed to follow the path of the sun across the sky every day, allowing the modules to be exposed to typically 25% more radiation than fixed PV systems. Single-axis tracking systems contain only a few moving parts and have more or less the same footprint and infrastructure requirements than that of fixed-tilt designs.



Figure 4: Examples of single / horizontal axis PV tracking systems.

Double axis tracking systems are very effective as they track the sun in more than one axis. This allows for maximum radiation over the entire solar module.



Figure 5: Examples of double axis PV tracking systems.

3.1.2 Founding / Mounting Options

The most common foundation used for anchoring PV solar frames is concrete cast foundations. This type of foundation requires a foundation trench, shuttered aboveground, filled with concrete and reinforcing steel. Once the concrete has cured, the solar frame is then welded or bolted to protruding reinforcing steel (or could have been left to cure within the concrete). This mounting technology is much more suited to European conditions and not for the extremely hard surfaces of the proposed site, unless the concrete is cast onto the surface using shutters



Figure 6: Examples single axis & fixed solar cast foundations.

Another alternative considered for the mounting of the solar frames is pre-cast concrete footing. The pre-cast concrete feet could be manufactured off site, reducing the risk of concrete spillages and the need for exorbitant amounts of water during the construction phase of the project. Drawbacks associated with pre-cast footing include the large physical footprint required to keep the structures stable, in addition to the possible need for them to be bolted or grouted to the ground surface for stability.

Considering the above, it has been recommended that the RE Capital 10 Solar Development be installed by means of driven/rammed piers, earth-screws or rock anchors, as these will have a significantly reduced impact on the environment. The figures below show the equipment required for the ramming process.

This installation technology eliminates the need for the use of cement or polymeric products, and as a result of the very small mounting footprint, has minimal disturbance of the ground cover, substrate or natural stormwater run-off / flow (which could have significant long term effects on the ecology of the surrounding area).



Figure 7: Typical rammed or screwed method of installation.

3.1.3 Cell / Film Options

There are a multitude of different Photovoltaic (PV) film technologies available today. These include concentrated PV cells, thin-film (amorphous silicon or cadmium telluride) or multi-crystalline (thick-film) cells, selected depending on the space and irradiance conditions, with the electricity yield and application being the deciding factors. Concentrated photovoltaic (CPV) technology uses optics - lenses or curved mirrors to concentrate a large amount of sunlight onto a small area of solar photovoltaic (PV) cells to generate electricity.



Figure 8: Examples of Concentrated PV cells.

With ambient temperatures regularly exceeding 40 °C in the area, thin-film technology may not be suited to the conditions of the Northern Cape Province, due to its inferior performance at high temperatures. **CPV or Multi-crystalline or thick-film technology** may be better suited to the climatic conditions of the site.

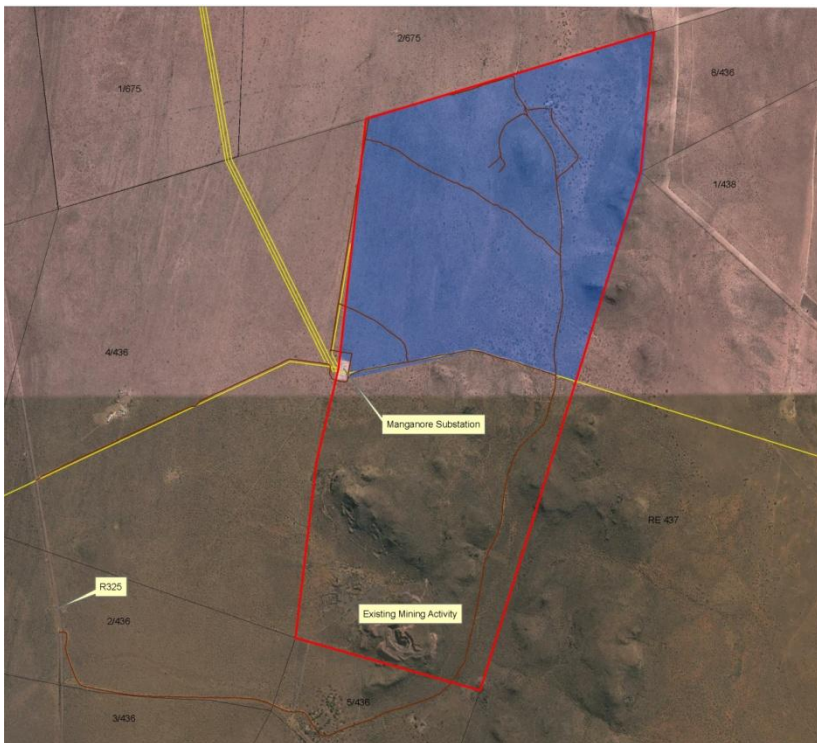
The type of film technology will not change the environmental impact of the facility and as such all film technologies are under consideration.

3.2 SOLAR LAYOUT ALTERNATIVES

3.2.1 Alternative 1 – Uniform Layout

A conceptual / uniform layout has been designed to make use of the entire approx. 450ha study area identified for the RE Capital 10 Solar Development (the northern portion of cadastral unit RE/436, north of the Manganore Substation).

As this initial uniform layout does not consider any of the existing infrastructure located on and adjacent to the site (existing access / internal roads, transmission lines, dwelling & reservoirs etc.), nor any potential site constraints / environmental sensitive areas (to be identified by the various specialist studies), it has been **excluded from the on-going environmental process and will therefore not be assessed further.**



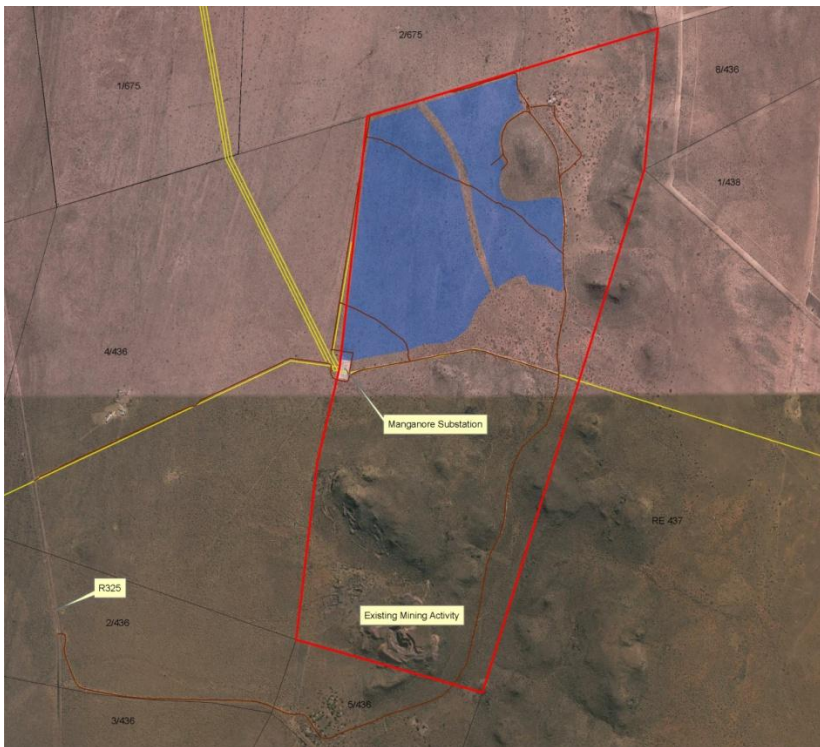
Uniform / Conceptual Layout highlighted in blue, over the entire extent of the approx. 450ha study area. Property boundary / cadastral unit of RE/436 indicated as red line. Yellow lines indicate existing powerlines to the Manganore Substation, while brown lines indicate existing access & farm roads / tracks.

Figure 9: Alternative 1 - Uniform Layout

3.2.2 Alternative 2 – Preliminary Layout

Alternative 2 is approximately 225ha in size and concentrated to the western portion of the abovementioned 450ha study site, close to the Manganore Substation. This preliminary layout has **taken the existing infrastructure on and adjacent to the site into account**: the layout extends west of the eastern access road and considers the Eskom servitude / buffer area, delineated along the existing 132kV transmission line aligned along the southern boundary of the site. In addition, this preliminary layout has been designed to **avoid a potential preliminary site constraints**, which include the following: a potential watercourse traversing the middle of the site south-east to north-west, the slopes / hills in the eastern portion of the study area and potential wooded area in the south-eastern corner of the study area (the sensitivity / significance of these potential constraints will be determined / confirmed by the specialists during the impact assessment phase).

As with Alternative 1, Alternative 2 does not consider potential site constraints / environmental sensitive areas which are to be identified by the various specialists during the remainder of this scoping phase and the environmental impact assessment phase to follow. It is thus likely that this preliminary layout will be further refined and adjusted to develop a further Alternative, which considers the sensitivity and/or significance of the identified features and the appropriate avoidance / mitigation / management measures recommended in relation to them. These adjustments will aim to achieve the least possible environmental impact, while maintaining the economic viability of the project. The potential impacts (negative and positive) associated with this layout, as well as any further alternatives, will be assessed as part of the forthcoming Environmental Impact Assessment / Reporting phase (EIR) of the on-going environmental process. Recommendations / measures focused on the construction, operation and decommissioning phases of the development, will also be provided in impact assessment phase to follow (and be described in the Environmental Management Programme to be compiled).



Proposed Preliminary Layout highlighted in blue, designed to avoid hills, potential drainage line and wooded areas. Property boundary / cadastral unit of RE/436 indicated as red line. Yellow lines indicate existing powerlines to the Manganore Substation, while brown lines indicate existing access & farm roads / tracks.

Figure 10: Alternative 2 - Preliminary Layout

3.3 NO-GO ALTERNATIVE

The **Status Quo Alternative** proposes that the RE Capital 10 Solar Development not go ahead and that the area in proximity to the Manganore Substation and R325 remain undeveloped as it is currently. The land on which the proposed project is proposed is currently vacant. It is currently used for limited cattle grazing activities, however due to a combination of poor soil quality, water scarcity and extreme climatic conditions; it has no potential for irrigated crop cultivation. The area in question is also considered too small to generate noteworthy financial benefit from agricultural activities due to its low carrying capacity.

The solar-power generation potential of the Postmasburg area, particularly in proximity to the Manganore Substation, is significant and will persist should the no-go option be taken. The 'No-go/Status Quo' alternative will limit the potential associated with the land and the area as a whole for ensuring energy security locally, as well as the meeting of renewable energy targets on a provincial and national scale. Should the 'do-nothing' alternative be considered, the positive impacts associated with the solar facility (increased revenue for the farmer, local employment and generation of electricity from a renewable resource) will not be realised.

The no-go alternative is thus not considered a favourable option in light of the benefits associated with the proposed solar facility development; however it will be used as a baseline from which to determine the level and significance of potential impacts associated with the proposed solar development during the Impact Assessment phase of the on-going environmental process.

3.4 ASSOCIATED INFRASTRUCTURE OPTIONS

3.4.1 Electrical Infrastructure

Approximately **60 inverting stations** will convert the power generated by the PV panel arrays into a form which can be fed into the step-up on-site switching station. These inverter stations will typically be about 3m in height and may be built into a transportable containers measuring 10 x 2.5m, having an approximate footprint of 25 square meters. The PV arrays will be connected to

the inverter-stations, and the inverter-stations connected to the on-site switching station/substation, via **underground electrical** cabling, which will be aligned alongside / within the internal service roads and pathways between the arrays as far as possible to allow for quick and easy access.

The interconnecting cables will be trenched where practically possible, but in areas of high sensitivity (if any), cables will be mounted onto the mounting structures to avoid excessive excavation works and clearing of vegetation.

The **step-up on-site switching station / substation** and its associated infrastructure (transformer etc.) will have a footprint of approximately 0.84ha (120m x 70m). The electric current generated by the solar panels is stepped up to the required voltage and frequency of the national grid by transformers.

Electricity from the on-site switching station / substation will be transmitted via a **132kV overhead power line**, of 800m – 1km in length, to the existing Eskom Manganore Substation, located on the south-eastern corner of the site. This powerline will be supported by pylons of approx. 32m in height, within a servitude of 31m – 40m wide, aligned along the western boundary of the development site.

This grid connection, and any other identified alternative routes, will be considered by specialists and the project team during the impact assessment phase, in order to select the most practical and least environmentally sensitive option.

3.4.2 Auxiliary Buildings

The total foot print of the auxiliary buildings (gate house, offices, control centre, warehouse, canteen, visitor centre & staff lockers) is likely to occupy approximately 2068m² or 0.2068ha (excluding the switching station). Please refer to the description of the activity at the beginning of Section 3 for the approximate dimensions of these buildings.

The Preliminary Layout indicated the positioning of this buildings mid-way along the western boundary of the development site, extending towards the Manganore Substation. The final detailed design and position of these buildings will be determined and finalised during the environmental impact assessment / reporting (EIR) phase of this environmental process, as well as the final design phase of the project (should the facility be approved and awarded a tender as an IPP). The auxiliary buildings mentioned above are typical of projects, however may deviate due to engineering requirements, new technologies and regulatory changes from the government's tender process.

3.4.3 Access & Internal Road Network

At this early stage in the project design process, **two possible access routes, from the R325** to the development, are under consideration. These are aligned along the existing access roads: one which crosses Portion 4 of Farm 436 parallel to the 132kV powerline from the west (approx. 2450m in length), and the other which crosses Portions 2 and 5 of Farm 436, entering the property from the south (approx. 5980m in length) (refer to Section 4.1 below for images). The required access road would be gravel and approximately 5m in width. The most appropriate access route, in terms of the least environment impacts, viability and consent from relevant parties, will be confirmed during the impact assessment phase.

The **internal road network** of the solar facility will be gravelled roads (less than 4m wide around the solar array periphery) and un-surfaced tracks (in-between the solar modules) to be used for maintenance and cleaning of solar cells. The layout and alignment of these access and internal roads/tracks will be informed by recommendations made by the specialists, as well as input from the relevant stakeholders.

3.4.4 Water Requirements

A typical solar development of this size is likely to require **approximately 10 000m³ of water during the +/- 18 month construction period**, as well as **approximately 5 000m³ per annum for the +/- 20 year operational lifespan** of the solar energy facility to clean the PV panels. The volume required during operation to clean the panels may need to be increased in the case of the RE Capital 10 Solar Development site, due to the proximity of numerous mining activities in the surrounding area generating dust. This will be confirmed later in the process.

It is likely that no water will be used for cooling purposes as the electricity transformers will make use of dry cooling. This also reduces the threat of environmental risks associated with alternative oil cooled transformers.

Weather conditions, traffic and general dustiness of the site play a role in the exact amount of ground water required to wash the Solar PV panels. At present, it is assumed that each panel should be washed twice a month. This will be confirmed during the EIR phase of the development.

Possible water sourced identified at this stage include the following, listed in order of preference:

- **Tsantsabane Municipality** – Water to be trucked in from the Local Municipality (via water-tanker), or made available in Postmasburg or surrounds via a metered standpipe. Confirmation of availability and specific arrangements in this regard will be sought from the Tsantsabane Municipality and recorded in a Service Level Agreement (SLA);
- **Sedibeng Water** (Northern Cape) – from a metered supply point off the nearby water pipeline operated by Sedibeng Water (a registered Water Services Provider); and
- **Borehole** water collection on-site.

A **rainwater collection** and storage system (off the on-site substation and axillary building roofs), can be installed to supplement that abovementioned water source option/s.

3.4.5 Transportation of Solar Equipment

All solar plant components and equipment are to be transported to the solar development site by road via container trucks. Construction is likely to extend over a period of approx. 18 months, during which time the majority of the solar PV panels and construction components will be transported by utilising approx. **2 x 40ft container trucks**.

Less than 30 containers are required per installed MW, which typically includes all solar PV components and additional construction equipment. **Over the period of 18 months, approximately 2250 containers will therefore be transported to the proposed site.** Normal construction traffic will also need to be taken into account. The usual civil engineering construction equipment will need to be transported to the site (e.g. excavators, trucks, graders, compaction equipment, cement trucks, etc.), as well as components required for the establishment of the on-site switching station and power line. Some of this station equipment may be defined as abnormal loads in terms of the Road Traffic Act (Act No.29 of 1989). Input and approval are to be sought from the relevant road authorities in this regard.

Transport to the site will be along appropriate national, provincial and local roads. The most practical road route to the site will be via the R325 (from Postmasburg and/or Kathu). This is a tarred provincial road and no alterations should be necessary to handle construction traffic and traffic involved in the operation phase.

Maintenance and possible upgrades may to necessary for the access roads to the site off the R325. This will be confirmed once the preferred access route has been determined.

3.4.6 Temporary Laydown Area

A temporary laydown area, of approx. 200m x 150m, will be required for the **temporary placement/storage and assembly of the PV panels and associated equipment** during construction. The laydown area for the construction period will be determined by the recommendations from the environmental specialists to avoid all sensitive areas in the positioning of the facility.

3.4.7 Waste / Effluent Management

- **Solid Waste**

During the construction phase, an estimated amount of **less than 5m³ non-hazardous solid construction waste will be produced per month**, for the expected 18 month construction period. All construction waste will be safely stored in containers and be removed from site on an ad-hoc basis by the appointed construction contractor, as and when deemed necessary. The construction waste will be **disposed of at an appropriately licenced Municipal landfill site**. Management measures for the appropriate storage of all construction-related waste will be included in the Environmental Management Programme (EMPr) to be developed during the EIR phase.

No solid wastes will be generated during the operational phase.

- **Sewerage**

Chemical toilets will be used by construction staff during the 18-month construction phase. This sewage will be collected by sealed containers/tank trucks (honey-suckers), removed from site and treated by a service provider (the Tsantsabane Local Municipality) at an approved facility off site.

During operation, sewage generated from the on-site ablution facility is to be treated on-site by means of a **septic tank system**. Should the Local Municipality not permit the use of septic tanks, sewage will be stored in an underground conservancy tank, to be collected (via a honey-sucker) by a service provider (likely the Municipality) and treated at an approved facility off site.

Confirmation of service capacity will be sought from the Local Municipality during the environmental process.

3.4.8 Construction, Operation & Decommissioning Phases

- **Construction Phase**

The construction phase typically follows the following stages:

- Site clearance;
- Layout determination and pegging;
- Trenching for cabling;
- Ground screws, hammered /piled foundations or concrete (unlikely) foundations;
- Erection of PV structures;
- Installation of PV modules;
- Connection of modules to the string boxes;
- Erection of invertors;
- Medium voltage infrastructure connection; and
- Switching station erection.

This process is likely to take 15 to 18 months to complete, during which time **+/- 400 construction employment opportunities** will be created at peak, with **+/- 65 direct employment opportunities** created. It is recommended that local labour be used as far as possible during the construction phase.

- **Operation Phase**

The solar facility will be operational during daylight hours, except during maintenance, poor weather conditions or breakdowns. Regular maintenance will typically include periodic cleaning, greasing of bearings and inspection. The solar panels will be cleaned with water or compressed air.

An estimated total of **six full-time staff members** will typically be required during the operation phase of the project, which includes technicians, maintenance and security personnel. Approximately **three unskilled labourers will be needed for maintenance purposes and two security personnel will be deployed on a shift basis. One skilled staff member will be needed to manage and oversee the operations.** From time to time additional contract staff may be required for ad-hoc ground cleaning or special panel cleaning. Staff can be transported around the site using utility vehicles and a typical mini-bus will transport staff to and from nearby towns of Postmasburg and surrounding community.

- **Project Decommissioning / Upgrade**

The proposed solar energy facility is expected to have a **lifespan of approximately 20 years** if the specified periodic maintenance is performed. Once the facility has reached the end of its economic life, the infrastructure is to be disassembled and replaced with appropriate or more advanced technology. Should replacement not be deemed necessary, then the facility would be completely decommissioned i.e. all infrastructure will be disassembled and removed from site. Site decommissioning activities will ensure integrity of access to the site, as well as rehabilitation as necessary.

The components would be disassembled, reused and recycled where possible, or disposed of in accordance with regulatory requirements. Functional components could be donated to and installed at local schools and clinics to benefit the local community.

4 SITE DESCRIPTION AND ATTRIBUTES

The following sections provide a description of the environmental and built context of Remainder of Farm 426 Kapstewel, with particular focus of the proposed RE Capital 10 Solar Development site.

4.1 LOCATION & BUILT ENVIRONMENT

The target property, the **Remaining Extent of Farm 436 Kapstewel (RE/436)**, is located within the ZF MCGawu District of the Northern Cape Province, within the jurisdiction area of the Tsantsabane Local Municipality. The property is approximately 1070ha in size and is located approximately 21km north of the nearest town of Postmasburg, and south of Kathu. RE/436 is located approx. 2.5km inland and east of the R325 provincial highway.

The existing Eskom 132/11kV Manganore Substation is located at the mid-way point of, and within, the western property boundary. A number of 132kV overhead powerlines connect to this Substation. Three applicable lines include:

- A wooden lattice line which crosses the property from the east (and forms the southern boundary of the development site);
- A steel lattice line which crosses the R325 highway and the neighbouring property (4/436) from the west; and
- A wooden lattice line which extends from the old open-cast mine, south of the property, along the property western boundary to the Manganore Substation.



Figure 12: Manganore Substation



Figure 11: 132kV wooden-lattice power line from west, forming the southern boundary of the proposed solar site.



Figure 13: Steel-lattice powerline extending from east, across 4/436.



Figure 14: Wooden-lattice powerline extending from south of site.

The proposed RE Capital 10 Solar Development study-site is approximately 450ha in size and forms the northern portion of the property (north-east of the Manganore Substation). Besides the Manganore substation, the only other buildings on proposed study-site are located in the north-eastern corner of property among low hills. These structures include an unoccupied house and outbuilding, as well as handling and watering facilities for cattle. Internal fencing for cattle only occurs close to the house, while old fences have been removed. Water reservoirs and troughs connected to a borehole and solar pump are located in close proximity to the abovementioned vacant buildings, for use by the cattle.



Figure 15: Vacant house in north-eastern portion of property & development property.



Figure 16: Back of vacant house on site.



Figure 17: One of two water reservoirs connected to borehole / solar pump.

Figure 18: Solar pump and borehole.

An old opencast iron and manganese ore mine is located against the southern boundary of the farm property, for which Autumn Skies 128 CC has prospecting rights. The ‘manganese’ railway line, associated with the mining activities on the property and surrounding area, is located directly to the south-west aligned between the farms Portions 2 and 3 and ends at the ‘Manganore’ load-out station on Portion 5 of Farm 436. Besides the surrounding mining activities, the development site is isolated by cattle farms to the west, north and east.

Vehicular access to the site from the R325 is via two existing gravel roads, associated with the maintenance of the existing electrical powerlines, the mining activities and livestock farming activities on the property and surrounding the farm properties. One of these roads is aligned parallel to the 132kV powerline traversing the neighbouring property to the west (Portion 4 of 436), from the R325 to the Manganore Substation, while the other aligns from the R325, parallel to the abovementioned railway line onto 5/436, entering the target property on its southern boundary before traversing the entire extent of the property (past the mine and proposed solar site) to exit on the northern property boundary.



Figure 19: Access off R325 onto Portion 4 of Farm 436 Kapstewel (previously Vaalkop). Note access road aligned parallel to the steel-lattice powerline to Manganore Substation.



Figure 20: Access off R325 onto Portion 2 of Farm 436. Note old open-cast mine on hills in background.



Figure 21: Access road from southern portion of RE/436 onto solar study site.

4.2 GEOLOGY & TOPOGRAPHY

A range of north-south striking hills extend from and onto the south of the property towards the north-east. The majority of these hills are located on the southern portion of the property towards the south (south of the solar development site). One small hill / koppie is located in the north-eastern sector of the proposed solar development site, while a further three are location across or just outside of the property eastern border.



Figure 22: View north-east across proposed solar development site towards hills along eastern boundary.



Figure 23: View south onto southern boundary of proposed solar site (note overhead powerline cables) and hills covering the majority of the area to the south.

The solar development site and surrounding plains are flat at an average height of ± 1450 masl, while the abovementioned hills / koppies to the south rise to a maximum height of 1587masl (see topographical maps attached in Appendix A).



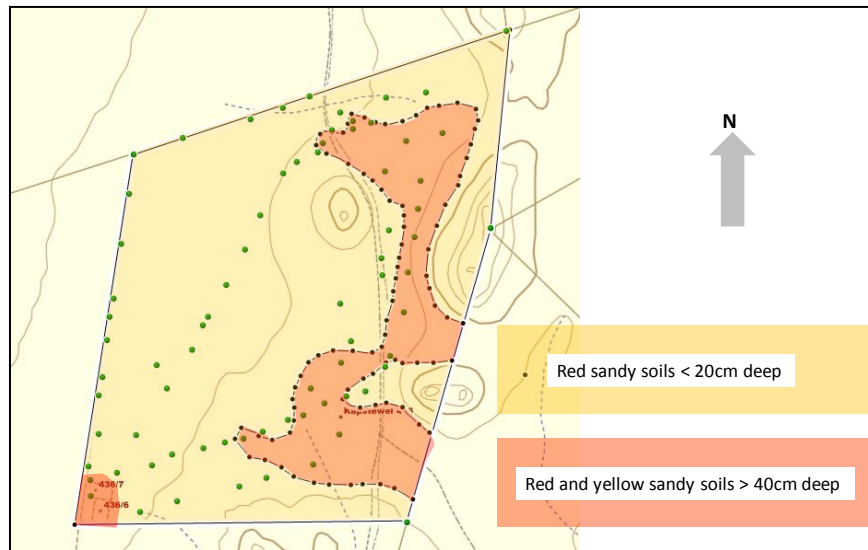
The hills and koppies on the southern portion of target property, as well as those of the surrounding Kapstewel properties, have been subject to extensive historical mining activities. Evidence of these historical mining activities is still highly visible on the southern portion of the property in the form of tailings dumps and open excavations (both in the valley areas, as well as on the ridges).

Figure 24: Old open-cast manganese / iron ore mine in hills on southern portion of RE/436.

The geology of the area falls within the Kaapvaal Craton, although close to its western margin. The rocks are Palaeoproterozoic metasediments of the Transvaal Supergroup. Postmasburg lies at the southern end of a domal structure termed the Maremane Anticline in which dolomites of the Campbell Rand Group are exposed. These are overlain by the Kuruman Banded Iron Formation - the Kuruman Member of the Asbesheuwel formation. The dolomite palaeosurface is karsted, leading to collapse structures where iron and manganese formation has fallen into karst cavities. The iron of this area can be subdivided into an eastern and western belt that extends from Postmasburg northwards for 65km to Sishen. The area lies near the eastern Klipheuwel belt. The targeted ore bodies of this belt are in-situ banded ironstone with bands of amphibolite and lenses of flat pebble conglomerate, ferruginised brecciated banded ironstone (Blinkklip breccia) and detrital iron ore, which have been derived from pre-existing iron ore (thick- or thinly laminated or breccia) by processes of weathering and/or erosion (Sehunelo, undated).

Two soil forms were identified to occur on site, **Hutton** (red, sandy, structureless, limited by rock) and **Clovelly** (strong brown, sandy, structureless, limited by rock) (Lubbe, 2014).

Figure 25: Location / extent of soil types on study site.



4.3 VEGETATION

Mr. Simon Todd, of Simon Todd Consulting, conducted an Ecological Desktop Scoping of the proposed RE Capital 10 Solar Development site (see **Appendix E, Annexure E1** for full scoping report), from which the following is drawn.

According to the national vegetation map (Mucina & Rutherford 2006), two vegetation types, **Kuruman Thornveld** and **Kuruman Mountain Bushveld** occur within the site. The rocky hills at the site consist of Kuruman Mountain Bushveld, but the vegetation map does not reflect this well as the Vegmap has not been mapped at a very fine scale. Kuruman Mountain Bushveld is not widely distributed and has a total mapped extent of 4360 km² which is a narrow range for an arid vegetation type. It is distributed in the Northern Cape and North-West Provinces from Asbestos Mountains southwest and northwest of Griekwastad, along the Kuruman Hills north of Danielskuil,

passing west of Kuruman and re-emerging as isolated hills at Makhubung and around Pomfret. This vegetation unit is associated with rolling hills with gentle to moderate slopes and hill pediment areas and typically consists of an open shrubveld.

Kuruman Mountain Bushveld has been little impacted by transformation and is classified as **Least Threatened**, but is not currently conserved within any formal conservation areas. One vegetation-type endemic species *Euphorbia planiceps* is known from Kuruman Mountain Bushveld. Within the area, this vegetation unit usually consists of an open to dense bushveld, dominated by low trees and large shrubs, typically dominated by *Olea europea* subsp. *africana*, *Diospyros austro-africana*, *Euclea crispa* subsp. *crispa*, *Euclea undulata*, *Searsia tridactyla*, *Searsia ciliata*, *Lantana rugosa* and *Lebeckia macrantha*. Due to the rocky habitat and the presence of a variety of protected species, this is considered to be a broadly sensitive vegetation type.

The plains of the site which also comprises the majority of the proposed development areas consist of the Kuruman Thornveld vegetation type. This is also a restricted vegetation type which occupies 5794 km² of the Northern Cape and North West Provinces from the vicinity of Postmasburg and Danielskuil in the south, extending via Kuruman to Tsineng and Dewar in the North. It has been little impacted by transformation and more than 98% of the original extent is still intact and it is classified as **Least Threatened**. This vegetation unit occupies flat rocky plains and sloping hills with a very well developed, closed shrub layer and well-developed tree stratum usually consisting of *Acacia erioloba*.

The only endemic taxon known from this vegetation type is *Gnaphalium englerianum*. The **protected tree species *Acacia erioloba* and *Boscia albitrunca*** may be common in some areas, but within the study area, the tree layer is generally not well developed and the vegetation consists rather of a scrubland dominated by *Tarchonanthus camphoratus*, *Grewia flava* and *Acacia mellifera*. This may be the result of frequent fires which have eliminated the taller tree layer or just the natural sparsity of trees in the area. Other species common in the area include *Olea europea* subsp. *africana*, *Searsia tridactyla* and *Ziziphus mucronata* subsp. *mucronata*. The grass layer is fairly dense and is composed of species such as *Themeda triandra*, *Cymbopogon pospischilii*, *Eragrostis lehmanniana* var. *lehmanniana*, *Schmidtia pappophoroides*, *Fingerhuthia africana*, *Eustachys paspaloides*, *Heteropogon contortus*, *Aristida adscensionis* and *Cenchrus ciliaris*. Shrubs present include *Selago densiflorus*, *Eriocephalus microcephalus*, *Melolobium candicans*, *Rhigozum trichotomum*, *Exomis microphylla*, and *Lycium cinereum*.

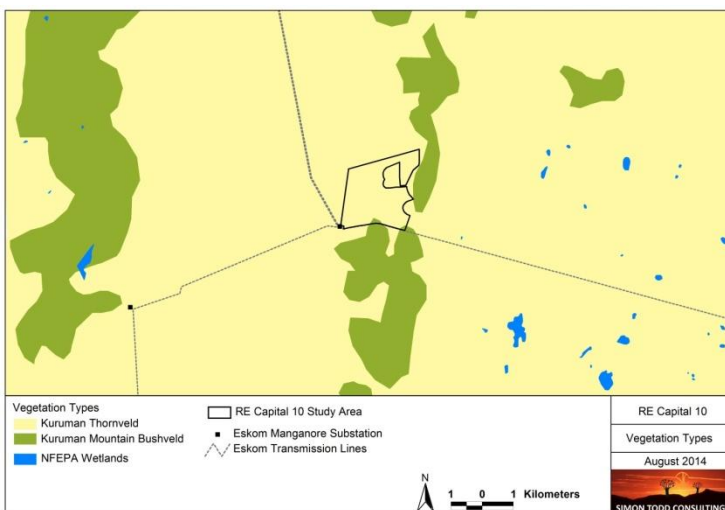


Figure 26: Broad-scale overview of the vegetation in and around the RE Capital 10 site.

The vegetation map is an extract of the national vegetation map as produced by Mucina & Rutherford (2006), and also includes wetlands delineated by the National Freshwater Ecosystem Priority Areas assessment (Nel et al. 2011). There are no mapped drainage lines within the site.



Figure 27: View from near the R325 towards the site.

The plains represent Kuruman Thornveld, while the rocky hills are Kuruman Mountain Bushveld. The vegetation has been recently burnt and is dominated by the grey shrub *Tarchonanthus camphoratus*, with other scattered trees visible in the distance.

4.3.1 Plant Species of Conservation Concern

According to the SANBI SIBIS database, **only four listed species are known from the area**, and at least one of these, *Asparagus stipulaceus*, does not actually occur in the area and is on the list as a result of the outdated taxonomy of historical species lists for the area. It is likely that *Boophone disticha* is present within the rocky hills while it is unlikely that the other species are present as they have not been observed in the area by the consultant on other sites near the current study.

In terms of protected species, some **nationally protected tree species such as *Boscia albitrunca* and *Acacia erioloba*** are likely to be present at the site. The preliminary investigation suggests that these are however not likely to be common at the site. Other nationally or provincially protected species that were observed in the area during other studies in the immediate area include *Olea europea* subsp. *africana*, *Harpagophytum procumbens*, *Pachypodium succulentum*, *Euphorbia clavarioides* var. *clavarioides*, *Brunsvigia radulosa* and *Adenia repanda*. Other provincially protected species which are likely to be present but which have not been observed in the immediate area, include *Ammocharis coranica*, and *Nerine laticoma*.

4.4 FAUNA

Mr. Simon Todd, of Simon Todd Consulting, conducted an Ecological Desktop Scoping of the proposed RE Capital 10 Solar Development site (see **Appendix E, Annexure E1** for full scoping report), from which the following is drawn.

4.4.1 Mammals

The mammalian community at the site is likely to be of moderate diversity, as many as **44 terrestrial mammals and 9 bat species potentially occur in the area**. It is likely that the rocky hills are the most significant habitats for mammals within the study area. Species observed in the vicinity of the site include Aardvark, Cape Porcupine, Springhare, Steenbok, South African Ground Squirrel, Yellow Mongoose, Slender Mongoose and Springbok which are not free-ranging. **Five listed terrestrial mammal species potentially occur** in the area; these are: the Brown Hyaena *Hyaena brunnea* (Near Threatened), Honey Badger *Mellivora capensis* (IUCN LC and SARDB Endangered), Black-footed Cat *Felis nigripes* (Vulnerable), Ground Pangolin *Smutsia temminckii* (Vulnerable) and South African Hedgehog *Atelerix frontalis*. There are also **four Near Threatened bat species present in the area**. The Brown Hyaena is not likely to occur in the area on account of the agricultural land-use in the area, which is not usually conducive to the persistence of large carnivores. The Black-footed Cat is a secretive species which would probably also occur at the site given that it occurs within arid, open country. Similarly the Honey Badger may also occur at the site, while the Ground Pangolin may also occur in the area at typically low density. Given the extensive national ranges of these species, the impact of the development on habitat loss for these species would be minimal and a long-term impact on these species would be unlikely.

4.4.2 Reptiles

The RE Capital 10 site lies in or near the **distribution range of at least 37 reptile species**. This is a comparatively low total suggesting that the site has relatively low reptile species richness. Based on distribution maps and habitat requirements, the composition of the reptile fauna is likely to comprise 1 terrapin, 2 tortoises, 15 snakes, 13 lizards and skinks and 5 geckos. **No species of conservation concern are known to occur in the area**. The habitat diversity within the wider study area is relatively high and includes rocky hills, some areas of more open grassland, as well as relatively dense or sparse bushveld. Species observed in the area in the past include, Striped Skaapsteker *Psammophylax tritaeniatus*, Boomslang *Dispholidus typus typus* and Namaqua Sand Lizard *Pedioplanis namaquensis*. The only species of potential conservation concern which may occur at the site is the Namaqua Plated Lizard *Gerrhosaurus typicus* which was classified as Near Threatened (IUCN 2009), but has since been downgraded to Least Concern by SARCA (Bates *et al.*). **The rocky hills would be the most important habitat for reptiles** at the site, but these have been excluded from the possible development footprint and as a result, impacts on reptiles are likely to be relatively low and would represent some habitat loss of local significance only.

4.4.3 Amphibians

The site lies **within or near the range of 11 amphibian species**, indicating that the site potentially has a moderately diverse frog community for an arid area. There is **no apparent natural permanent water or artificial earth dams** within the site that would represent suitable breeding habitat for most of these species. As a result, only those species which are relatively independent of water are likely to occur in the area. **The only species of conservation concern which may occur at the site is the Giant Bullfrog *Pyxicephalus adspersus***. The site lies at the margin of the known distribution of this species and it has not been recorded from any of the quarter degree squares around the site, suggesting that it is unlikely to occur at the site. Impacts on amphibians are however likely to be low and restricted largely to habitat loss during construction.

4.4.4 Birds

According to the SABAP 1 and 2 databases, **217 bird species have been recorded from the area**. This total results from 135 species recorded from 39 cards from SABAP 2 and 164 species from 76 cards from SABAP 1. This suggests that the area has been reasonably well sampled and that the species list is likely to be fairly comprehensive. **Eleven listed bird species are known from the area**, all of which are classified as Vulnerable or Near Threatened (Table 2 below). **The site does not fall within or near any of the Important Bird Areas** defined by Birdlife South Africa. A number of the listed species are associated with water and are not likely to be resident at the site, but may occasionally pass over the site, but are unlikely to be directly impacted by any habitat loss. Direct habitat loss is not likely to be a highly significant impact for most species and the major potential source of impact would come from electrocution and collisions with the power lines. Although not all species are vulnerable to these impacts, flamingos, bustards and storks are highly vulnerable to collisions with power lines, while many of the raptors are susceptible to electrocution as well as collision. Given the proximity of the site to the Eskom Manganore Substation, these impacts are likely to be very low and a significant impact would be highly unlikely.

5 PLANNING CONTEXT

The target property, Remainder of Farm 436 Kapstewel, is currently zoned Agriculture 1, with limited cattle grazing activities taking place.

A **land use change application** for the rezoning of approx. 300ha, from **Agricultural Zone I to Special Zone**, may be lodged at the Tsantsabane Local Municipality, in accordance with the Northern Cape Planning and Development Act (Act 7 of 1998).

Where applicable, the consent of SANRAL, Civil Aviation Authority (CAA) and the bondholder will be obtained as part of the rezoning application.

If there are restrictive Title Deed conditions burdening the proposed development, an application for the removal thereof will be lodged at the Government of the Northern Cape Province, Department: Corporate Governance and Traditional Affairs, in accordance with the Removal of Title Deed Restriction Act (Act 84 of 1967).

Parallel to the rezoning application, a **long term lease application will be lodged at the National Department of Agriculture**, in accordance with the Subdivision of Agricultural Land Act (Act 70 of 1970).

Relevant planning documents, on all spheres of Government, will be evaluated before any land use change application is launched. These documents include, but are not limited to the following: **NSDP** (National Spatial Development Perspective); **PGDS NC** (Provincial Growth and Development Strategy), Northern Cape Province; and the Tsantsabane Municipal **IDP** (Integrated Development Plan) and **SDF** (Spatial Development Framework).

The following sections discuss the potential site constraints possible impacts associated with development of the 425ha solar site as a whole.

6 AGRICULTURAL POTENTIAL STATEMENT

Mr. Christo Lubbe, an agricultural specialist, compiled an Agricultural Potential report for the proposed RE Capital 10 Development site, based on a site investigation, as well as his knowledge and experience of farming in the Northern Cape (see **Appendix E, Annexure E2** for full report), from which the following is drawn:

6.1.1 Agricultural Potential Context

Structures on the site include an unoccupied house and handling facilities for cattle. Internal fencing for cattle only occurs close to the house, while old fences have been removed. There are two small water reservoirs and troughs connected to a borehole and solar pump, in the north-eastern sector of the development site, used to water livestock.



Figure 28: Cattle camp adjacent to existing house on study site.



Figure 29: View south along farm access road to existing house and cattle camps. Note hill to the east.

The geology is that of the Transvaal sequence. Sedimentary and Volcanic rocks of this sequence include dolomite, limestone and chert. More than 75% of the area can be classified as lithosols (shallow stony soils), where the surface is mainly dolomite outcrop or very shallow soil on rock. The hills are included in this group. **Cultivation on this portion is prevented by the lack of soil.**

Soil characteristics on the remainder of the area:

- Effective depth: 40cm to 120cm,
- Texture of the top and subsoil : sandy
- Sand grade : very fine
- Colour : red
- Water holding capacity: <20mm/m
- Carbon content: low natural fertility
- Consistency : loose to very loose

In terms of climate, the region is classified as a **semi-arid zone**. The following specific parameters are applicable:

Table 3: Climatic Parameters for Site

Annual rainfall	201-400 mm
Mean maximum temperature	31 to 33°C
Mean minimum temperature	Minus 2°C
First frost expected	11 to 20 May
Last frost expected	01 to 10 September
Hours of sunshine	>80%
Evaporation	2200 - 2400 mm

The site falls in the Savanna-type Bushveld biome within the Kuruman Thornveld vegetation type.

The Bushveld region consists of open plains with trees such as Camel thorn, Umbrella Acacia and Campher bush in scattered stands with sweet veld grasses like *Themeda triandra*, *Cymbopogon plurinodus* and *Digitaria eriantha*.

The **grazing capacity is low at 16 to 25 hectares per large stock unit (LSU)**. The Normalised Difference Vegetation Index (NDVI) is moderate.⁴

The site is utilised for extensive cattle farming, and there is no evidence of past or current cultivation.

6.1.2 Veld Condition, Land Capacity & Suitability for Agriculture

Although the veld was heavily grazed, climax grasses could still be identified. The Camphor bush tends to be invasive. A medium to light invasion of Black-thorn (*Acacia mellifera*) was noted. The basal cover of the grass is low, on both the deeper and the shallow soils.

The plant cover is very sparse with some bare areas, with grasses of moderate and poor grazing value mixed. There are moderate levels of topsoil loss and medium to light bush encroachment present.

The land surveyed falls in capability Class VI, generally not suited for cultivation. Very severe limitations restrict land use to grazing, woodlands or wildlife.

Limiting factors for crop production:

- Soil with low water holding capacity, shallow rooting zone and severe erosion potential; and
- Severe climate.

⁴ NDVI refers to a mathematical formula applied to satellite imagery to provide information on plant activity or vigour. It is an indicator of active vegetation cover.

These factors indicate a suitability rate of **Very-low** (77% of study area) to **Low** (23% of study area).

Factors limiting land capacity and suitability for grazing:

- Soils with very shallow rooting depth and low clay content;
- Low rainfall; and
- Low carrying capacity area (16-25ha/LSU).

These factors indicate a suitability rate of **Low** (100% of 480ha study area).

In addition to the above, it is confirmed that the erosion potential of the soils present of the development site is considered to be **highly susceptible to both wind and water erosion**.

6.1.3 Summary of Findings & Conclusion

The combination of extreme climatic conditions and poor soil properties combination makes the site largely **unsuitable for cultivation**. Although the area could be utilised as grazing, the **grazing potential is very low**. Due to the low agricultural potential there are **few possible impacts** on agricultural activities during construction and operation of the proposed PV power plant. The loss of the small area of grazing land is negligible.

The method of anchoring the structures with **hammered piled foundations**, avoids the use of blasting which would have large impact on the area identified as lithosols. On the deeper soils, normal foundations would have no effect after rehabilitation.

The proposed solar power plant will have minimal impacts on agriculture, locally and on site, and will have **very little influence on the current commercial farming of the area**.

7 ECOLOGICAL SENSITIVITY ANALYSIS

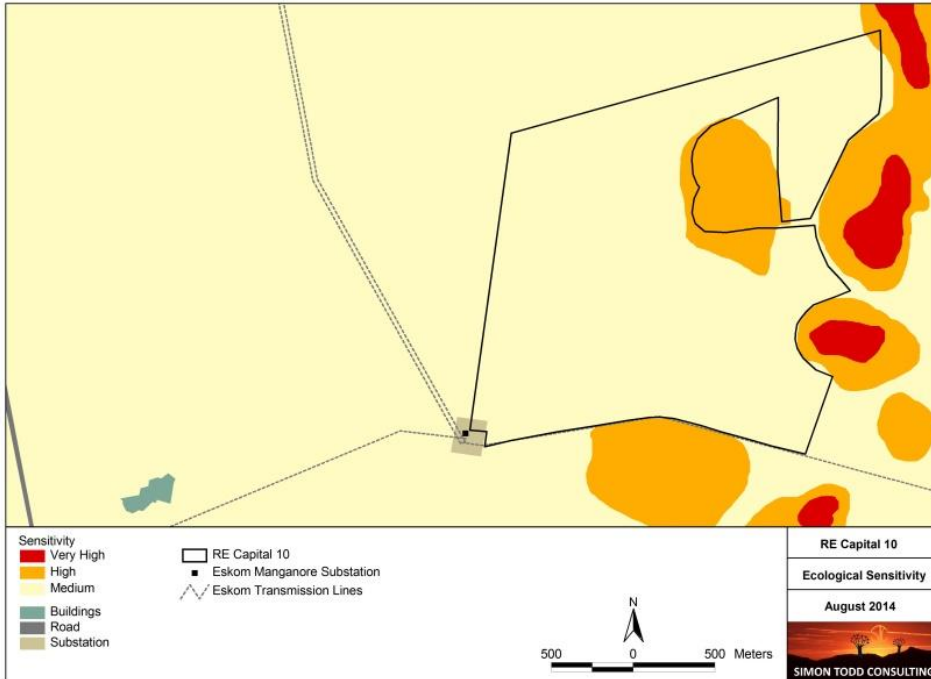
Mr. Simon Todd, of Simon Todd Consulting, conducted an Ecological Sensitivity Analysis of the proposed RE Capital 10 Solar Development site (see **Appendix E, Annexure E1** for full report), from which the following is drawn:

The following potential impacts have been identified as part of the Ecological Desktop Scoping exercise:

- Impacts on vegetation and protected plant species;
- Soil erosion and associated degradation of ecosystems;
- Direct faunal impacts;
- Impacts on Avifauna;
- Alien Plant Invasion;
- Reduced ability to meet conservation obligations & targets; and
- Impact on broad-scale ecological processes.

These potential impacts will be explored in more detail during ecological site assessment / ground-truthing, and the nature, extent, significance and likelihood of each impact will be assessed based on the features and characteristics of the site and the extent and nature of the development. Impacts associated with the Pre-construction, Construction, Operation and Decommissioning Phases of the proposed solar development will be considered and assessed, with due cognisance of the associated cumulative impacts.

7.1 ECOLOGICAL SENSITIVITY SUMMARY & PRELIMINARY RECOMMENDATIONS



The rocky hills, which are not within the proposed development area are the only significant feature which has been identified at the site at this stage.

Figure 30: Ecological sensitivity map of the RE Capital 10 site.

No features of very high sensitivity were identified within the RE Capital 10 development area itself but the **rocky hills at the site are considered sensitive** on account of the high faunal diversity likely to be present in these areas, as well as the likely presence of a variety of plant species of conservation concern. The hills have however been excluded from the potential development footprint at the screening stage and would not be directly impacted by the development. In addition, there do not appear to be any pans or other aquatic features present within the site.

There are a number of listed fauna which may be present at the site, however these are widespread species and the extent of habitat loss for these species would be considered low.

At this point, the major uncertainty that will need to be clarified with a site visit during the EIA stage is the distribution and abundance of protected tree species at the site. *Acacia erioloba* and *Boscia albitrunca* are common in the area and some individuals of these species are likely to be present in the development area. The assessed impact of the development will depend to a large degree on the distribution and abundance of such protected species at the site and the degree to which areas of high density can be avoided. This potential obstacle aside, the site does not appear to be inherently sensitive and is broadly suitable for the development of the RE Capital 10 Solar Energy Facility. Factors which contribute to the overall suitability of the site include the proximity of the site to the Manganore substation, the existing mining-related disturbance at the site and the relatively proximity of the site to the R325 (Todd, 2014).

8 ARCHAEOLOGICAL / HERITAGE ANALYSIS

Lita Webley, of ACO Associates CC, scoping / desktop assessment of the proposed RE Capital 10 Solar Development site (see **Appendix E, Annexure E3** for full report), from which the following is drawn. This assessment attempts to predict the possible range of heritage-related impacts and identify issues in terms of accumulated knowledge of the area. It sets out the methodology for full Phase 1 Integrated Heritage Impact Assessment to be undertaken as part of the Environmental Impact Reporting (EIR) phase.

A number of heritage impact assessments have been conducted in close vicinity to the study area during the last decade. None of these reports have identified sites of high significance. Surveys by

David Morris of McGregor Museum and ACO Associates cc confirms that artefact densities tend to be low on the plains, but concentrations of MSA and LSA material may be found around pans, along the banks of perennial streams and on the slopes of small rocky outcrops. The construction of a solar facility on the Farm Kapstewel will result in direct, physical disturbance of any archaeological material (and its context) on the property.

Since heritage sites, including archaeological sites, are non-renewable, it is important that they are identified and their significance assessed prior to development.

8.1 ANTICIPATED IMPACTS

Nature of Impacts

The main cause of impacts to archaeological sites is direct, physical disturbance of the material itself and its context. The heritage and scientific potential of an archaeological site is highly dependent on its geological and spatial context. This means that even though, for example a deep excavation may expose buried archaeological sites and artefacts, the artefacts are relatively meaningless once removed from the area in which they were found. Large scale excavations will damage archaeological sites, construction of roads and laydown areas, injudicious use of off-road vehicles can contribute to high levels of impact. The impacts are likely to be most severe during the construction period although indirect impacts may occur during the operational phase of the project.

It is **not anticipated that there will be any impacts to the Built Environment**. Historic structures and graveyards are sensitive to physical damage such as demolition as well as neglect. They are also context sensitive, in that changes to the surrounding landscape will affect their significance. The presence of any **historic structures and graveyards will need to be assessed** through site inspection.

Extent of Impacts

In the case of the proposed solar facility, it is expected that impacts will be extensive. The clearance and levelling of the ground surface to install the PV units will result in the destruction of all surface material. Similarly, the clearing of access roads could impact material that lies buried in the surface sand.

Potential impacts caused by a 132 kV power line and the power line access roads are likely to be limited and local, however these will need to be physically searched and assessed during the EIA phase and the routes adjusted where necessary. Morris (2013) points out that the access road required for a 132 kV powerline is likely to be a 'two-track' which generally only requires limited physical disturbance of the ground surface.

8.2 IMPACTS ON PRE-COLONIAL ARCHAEOLOGY

Archaeological surveys on the adjoining properties (Morris 2005) suggest that with the exception of small pan depression, the archaeological visibility on the landscape was virtually zero in many areas. However, "almost without exception, the small pan depressions contained stone artefacts, and certain features on the hill slopes attracted occupation/activity in the Stone Age" (Morris 2005). This observation was supported by Webley & Halkett (2010a, b, c & d). Webley and Halkett (2010c) assessed the farm Driehoekspan, on the opposite side of the road from Kapstewel, and reported a single ESA artifact, some LSA flakes and a small roughly packed stone enclosure. Morris (2005b) reported that farms in the vicinity contained a very low density of artefacts on the plains, but higher concentrations were found in the vicinity of rocky outcrops which may have provided some protection from the elements. Morris (2005b:9) did however, ask for surface collections to be made at two localities 'in order to characterise the material observed in higher

density occurrences and to salvage a representative sample of these as part of the South African National Estate”.

In the Webley & Halkett (2010) surveys, special attention was paid to the possibility of specularite mining, but none were observed. This was borne out by Morris (2005). No rock engravings have been reported from this area.

Based on the surveys conducted on adjoining properties, the following impacts may occur:

- It is expected that ephemeral scatters of Middle Stone Age and Later Stone Age material may occur around pans and on the slopes of small koppies;
- There may be evidence for the pre-colonial mining of specularite;
- Buried pre-colonial graves may occur.

8.3 IMPACTS ON COLONIAL PERIOD HERITAGE

The farms between Olifantshoek and Postmasburg generally date to the late 19th century and there are very few buildings or structures which have high heritage value.

In his survey of a number of farms between Postmasburg and Kathu, Morris (2005b) reported at least four cemeteries, three being on a single farm. Beaumont (2007b) observed some graves on the outskirts of the Olifantshoek township.

While there is a possibility that colonial period heritage may occur, the likelihood of this occurring is low.

Based on the surveys conducted on adjoining properties, the following impacts may occur:

- 20th century buildings and structures associated with farming and mining;
- Unmarked graves.

8.4 LIVING HERITAGE

Living or intangible heritage (defined in the Act as including cultural tradition, oral history, performance, ritual, popular memory, skills and techniques, indigenous knowledge systems and the holistic approach to nature, society and social relationships) is given also protection under the National Heritage Resources Act, No 25 of 1999.

Close association with the land, such as that experienced by farm owners and farm workers, may result in certain features on the landscape enjoying particular social or ritual significance. This information is difficult to obtain unless there is a possibility of conducting oral interviews with the inhabitants of the property. However, it is not thought likely that any significant intangible heritage values would be attached to the particular terrain in question.

It is not anticipated that there will be any impacts to the Built Environment. There do not appear to be any structures on the property. Historic structures and graveyards are sensitive to physical damage such as demolition as well as neglect. The presence of any historic structures and graveyards will need to be assessed through site inspection.

The aim of the EIA would be to identify and assess the significance of all heritage resources on the property, to determine the potential impacts on the resources, and where appropriate to recommend “no-go” areas and to propose mitigation if avoidance is not possible.

Based on the archaeology of the adjoining areas, the terrain on which the proposed RE Capital 10 Solar Development will be located is unlikely to be rich in heritage remains.

Indications are that in terms of archaeological heritage and built environment the proposed activity is viable and impacts are expected to be limited and controllable. In terms of the information available at this time, no fatal flaws are anticipated.

9 PROCESS TO DATE

As part of the public participation process the following steps were taken to ensure compliance with the legislation and to allow ample opportunity for members of the public and key stakeholders to be involved and participate in the environmental process. Please see **Appendix F** for evidence of this Public Participation process. The Public Participation Process has been undertaken according to the requirements of the new NEMA EIA regulations. The following requirements i.t.o the scoping process have been undertaken and complied with in terms of Regulation 56:

Table 4: Summary of Initial Public Participation Process to date.

CHRONOLOGY OF EVENTS	
DATE	ACTION
29 April 2014	Notification was sent to the Landowner of Remainder of Farm 436 Kapstewel informing him of the development proposal and the environmental process to be followed.
27 May 2014	Department of Environmental Affairs accepted the Application for Authorisation, confirming that the public participation process of the environmental process may proceed.
11 June 2014	Site Notices (English & Afrikaans) were placed on the boundary fence of Remainder of Farm 436 Kapstewel. Notice Boards (English & Afrikaans) were placed at the post office in Postmasburg.
30 June 2014	A Stakeholder Register was opened and the details of all registered stakeholders entered for future correspondence.
5 July 2014	An Advertisement were placed in a regional newspaper (<i>Kathu Gazette</i>), calling for stakeholders to register as Interested & Affected Parties
17 July 2014	Background Information Documents (BID) (English & Afrikaans) were placed at the Postmasburg Library and Tsantsabane Municipal offices in Postmasburg for public review.
25 July 2014	Notifications were sent to neighbouring landowners informing them of the development proposal and the environmental process, and inviting them to register as I&APs.
25 July 2014	The ZF Mgcawu District Municipality and the Tsantsabane Local Municipality (which have jurisdiction over the area), as well as State Departments and other organs of state (including SANParks, Northern Cape Nature Conservation, Department of Agriculture, Forestry & Fisheries, Department of Minerals and Energy, Department of Water Affairs, SAHRA, Eskom, Civil Aviation Authority etc.), were notified and registered as key stakeholders.
August 2014	Hard copies of the Draft Scoping Report (DSR) have been placed at the Tsantsabane Municipality offices (Postmasburg) and the Postmasburg Library, for public review. The DSR has also been made available on the <i>Cape EAPrac</i> website: www.cape-eaprac.co.za
August 2014	Registered Stakeholders and I&APs were sent notifications informing that of the availability of the DSR for a review and comment period of 40-days, extending from Monday 25 August to Saturday 4 October 2014 .

No issues or concerns have been raised by Interested and Affected Parties thus far in the environmental process. Comments received in response to the Draft Scoping Report will be included in the Final Scoping Report, to be submitted to the Department of Environmental Affairs (DEA) for consideration.

NOTE: The environmental Regulations make provision that as there are no substantive changes between the *Draft Scoping Report (DSR)* and *Final Scoping Report (FSR)*, the Final SR can be submitted to the Department (DEA) without a further public comment period of 21-days (subject to

approval by the delegated Authority). The FSR will then be made available to the public for information purposes whilst the Department considers the report

10 ASSUMPTIONS & LIMITATIONS

This section provides a brief overview of *specific assumptions and limitations* having an impact on this environmental application process:

10.1 GENERAL ASSUMPTIONS & LIMITATIONS

- It is assumed that the information on which this report is based (specialist studies and project information, as well as existing information) is **correct, factual and truthful**.
- The proposed development is **in line** with the statutory planning vision for the area (namely the local Spatial Development Plan), and thus it is assumed that issues such as the cumulative impact of development in terms of character of the area and its resources, have been taken into account during the strategic planning for the area.
- It is assumed that all the relevant **mitigation measures** and agreements specified in this report will be implemented in order to ensure minimal negative impacts and maximum environmental benefits.
- It is assumed that due consideration will be given to the **discrepancies in the digital mapping** (PV panel array layouts against possible constraints), caused by differing software programs, and that it is understood that the ultimate/final positioning of solar array will only be confirmed on-site with the relevant specialist/s.
- The Department of Water Affairs **may consider the submission of a water use application** necessary for allowing the use of water from the farm boreholes and possible the crossing of the on-site drainage lines by the infrastructure associated with the solar facility. The assumption is made that on review of this Draft Scoping Report the Department of Water Affairs will provide prompt confirmation and recommendations in this regard.
- It is assumed that Stakeholders and Interested and Affected Parties notified during the initial public participation process will submit all relevant **comments within the designated 40-days** review and comment period, so that these can included in the Final Scoping Report can be timeously submitted to the delegated Authority, the Department Environmental Affairs for consideration.

10.2 SPECIALIST SPECIFIC ASSUMPTIONS & LIMITATIONS

The following specialists have listed the following specific assumptions & limitations as part of their Scoping / Baseline Assessments:

AGRICULTURAL POTENTIAL:

A desktop-based study was undertaken as far as **regional** information is concerned: Climatic conditions, land uses, land type and terrain are readily available from literature, GIS information and satellite imagery. Notwithstanding these limitations, the **site-specific** field studies confirmed most of the desktop findings and the specialist is confident that the findings provide sufficient detail for the agricultural potential study reported in this document.

ECOLOGICAL / BIOPHYSICAL:

The scoping study is based on largely a desktop analysis, with some input from previous site visit/s to the general area. As such, there are a number of inherent assumptions and limitations associated with the study. The study relies on existing information as available in the various available spatial databases and coverages. In many cases, these databases are not intended for

fine-scale use and the reliability and adequacy of these data sources relies heavily on the extent to which an area has been sampled in the past. Many remote areas have not been well sampled with the result that the species lists obtained for the site are likely to imperfectly reflect the actual fauna and flora present at the site. Furthermore, the condition of the vegetation and the impact of land use on the site cannot always be adequately judged from satellite imagery or aerial photography. Such influences can have a large impact on the sensitivity and composition of the fauna and flora present. The species lists derived for the site were obtained from an area significantly larger than the study area and are likely to include a much wider array of species than actually occur at the site. This is a cautious and conservative approach which takes the study limitations into account.

HERITAGE / ARCHAEOLOGY / PALEONTOLOGY:

It is assumed that, given the sparse vegetation of the study area, the presence of archaeological resources should be readily apparent from a surface survey and that test pit excavations will not be necessary to establish the potential of sub-surface archaeology.

If however, archaeological features or sites (such as burials, ostrich eggshell water flasks, high stone artefact concentrations) are uncovered during construction, then work will have to cease in that area and SAHRA must be notified. These provisions should be included in the EMP

PLANNING:

Due to the fact that **no applicable zoning** currently exists for alternative / renewable energy facilities or their ancillary facilities in the Northern Cape Province, it was necessary to apply for rezoning from Agriculture 1 to Special zone, as well as for a long-term lease on Agricultural land for the purposes of the renewable energy facility.

This scoping process was undertaken with full knowledge of the above assumptions and cognisance was taken of the limitations as specified.

11 PLAN OF STUDY FOR ENVIRONMENTAL IMPACT REPORT

This section outlines the assessment methodology and legal context for specialist studies. Based on the issues raised by the project team, specific impact assessments are required to address issues that may result in significant impacts. For these specialist impact assessments, the specialists have been provided with a set of criteria for undertaking their assessments, to allow for comparative assessment of all issues. These criteria are detailed in the Terms of Reference to each specialist and summarised below.

11.1 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS

These criteria are based on the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989, as well as the Specialist Guidelines drawn up in terms of the NEMA Regulations.

All possible impacts need to be assessed – the **direct, in-direct as well as cumulative impacts**. Impact criteria should include the following:

- **Nature of the impact**

This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.

- **Extent of the impact**

Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.

- **Duration of the impact**

The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.

- **Intensity**

The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.

- **Probability of occurrence**

The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**

The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Cumulative impact**

Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments planned and already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

- **Degree of confidence in predictions**

The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

Based on a synthesis of the information contained in the above-described procedure, the specialists are required to assess the potential impacts in terms of the following significance criteria:

- **No significance:** The impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** The impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance:** The impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance:** The impacts will have a major influence on the proposed development and/or environment.

The final impact assessment report should as a minimum include the following sections:

- Executive Summary
- Introduction And Description Of Study
- Methodology

- Results
- Assessment of Impacts (Direct, In-direct & Cumulative, including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables)
- Comparative Assessment between project Alternatives
- Discussion and Recommendation for Preferred Alternative
- Specialist recommendation for Pre-Construction, Construction and Operational Phases)
- Conclusion

11.2 **BRIEF FOR SPECIALIST STUDIES TO BE UNDERTAKEN AS PART OF THE EIA**

- Each specialist is required to consider the project in as much detail as is required to inform his/her impact assessment.
- Specialists must ensure that they are aware of the necessary **planning, environmental and service requirements** associated with the proposal.
- Specialists must ensure that they **liaise with other relevant specialists** (via the EAP) if it seems necessary to use information from another discipline.
- Impact Assessments must **consider all the identified alternatives** in order to provide a comparative assessment of impacts, using the **no-go option** as a baseline.
- Specialists should consider **national and international guidelines and standards** relevant to their respective focus area. For example: *The Environmental, Health and Safety Guidelines (2007) IFC, World Bank Group etc.*
- Any **assumptions** made and any uncertainties or **gaps in knowledge**, as well as **limitations** regarding the specialist studies, must be clearly described and explained.
- The proximity of the site in relation to **key features** such as the existing Manganore Substation, the Autumn Skies mine, transmission lines and access routes, must be considered.
- The draft impact assessment report of each specialist are subject to public/stakeholder review and comment – all comments received will be considered by each specialist, responded to and the final impact assessment report updated accordingly.

12 TERMS OF REFERENCE FOR SPECIALIST STUDIES

The following section provides an overview of the investigations / studies / assessments which are required for the Environmental Impact Reporting (EIR) phase.

Table 5: Terms of Reference for Specialist Studies

Specialist Study	Aim of the Study / Input	Terms of Reference
Ecological / Biophysical (Simon Todd)	Determine the impacts that the construction, operation and decommissioning of the proposed 75MW RE Capital 10 Solar Development and associated infrastructure will have on vegetation and fauna and recommend mitigation measures. The above assessment must include the NO-GO option as a baseline.	Undertake a field assessment of the site (including transmission line route etc.) in order to validate and refine the findings of the desktop scoping report. This must include the following studies and activities: <ul style="list-style-type: none"> • Ground-truth and refine the ecological sensitivity map of the site. Apply special attention to the possible presence of drainage lines / watercourse, as well as significant wooded areas. • Characterise the vegetation and plant communities present within the site in greater detail. Conduct on-site surveys to generate a species list for the site, as well as identify and, where necessary, map different plant communities present at the site if

		<p>they are associated with different sensitivity classes.</p> <ul style="list-style-type: none"> • Locate, identify and map the location of significant populations of species of conservation concern, so that the final development footprint can be adjusted so as to avoid and reduce the impact on such species. Establish distribution of species of concern (widespread and localised). Particular attention must be given to the presence of <i>Acacia erioloba</i> and <i>Boscia albitrunca</i> at the site as these species are common in the area. • Evaluate the likely presence of listed faunal species at the site and identify associated habitats that should be avoided to prevent impact to such species. • Based on the site attributes, recommend the most applicable avoidance, mitigation and management measures required to reduce any negative impacts of the development on flora and fauna on the site and determine whether there are any areas where specific precautions or mitigation measures should be implemented. <p>Assess the impacts identified above in light of the site-specific findings and the final layout to be provided by the developer.</p>
<p>Heritage (Stefan de Kock – Perception Environmental Planning)</p>	<p>Assess the proposed RE Capital 10 Solar Development and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Heritage Resources and the Cultural Landscape and provide recommendations for avoidance &/ mitigation.</p>	<p>Fulfill the requirements of Integrated Heritage Impact Assessment as defined in Section 38 of the NHRA, by considering the full range of potential cultural heritage resources as defined in the National Heritage Resources Act 25 of 1999.</p> <p>Identify and assess the significance of all heritage resources on the property, to determine the potential impacts on the resources, and where appropriate to recommend “no-go’ areas and to propose mitigation if avoidance is not possible.</p> <ul style="list-style-type: none"> • On the basis of the public participation process for the Scoping phase, conclude the Heritage Impact Assessment, which includes: • Analysis of Cultural Landscape, Visual – Spatial and Cumulative Impacts; • Liaison with other specialists regarding the Archaeological and/ Paleontological Impact Assessments.
<p>Archaeological (ACO Associates CC)</p>	<p>Assess the proposed RE Capital 10 Solar Development and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Archaeological Resources and provide recommendations for avoidance &/ mitigation.</p>	<ul style="list-style-type: none"> • Undertake a detailed survey of proposed study area, including proposed routes of linear infrastructure (access roads, underground services, power lines) by means of a pattern of transects over the site recording details and locations of any heritage material found; • Assess the significance of each find along with the impacts of the proposed activity; • Recommend mitigation measures, which include the “No-Go” alternative, avoidance, archaeological excavations or monitoring during earthworks.
<p>Visual (VRM Africa)</p>	<p>Assess the proposed RE Capital 10 Solar Development and associated infrastructure (on-site substation, auxiliary buildings, transmission line, roads etc.) during construction, operation and decommissioning on Visual Heritage Resources and the Aesthetic Landscape and</p>	<ul style="list-style-type: none"> • Undertake a desktop assessment which identifies the core visual elements within the proposed project site, and how the proposed landscape modifications relate spatially to the surrounding landuse and communities (GIS mapping & a viewshed analysis). • Undertake a field study from which the nature of the landscape character of the site and surrounds and the receptor significance are defined. • Evaluate the landscape character in terms of land

	<p>provide recommendations for avoidance &/ mitigation.</p>	<p>cover, topography and prominence. Undertake a survey of specific locations to verify the visibility, the scenic quality of the location (sense of place) and the sensitivity of the receptors. Specify the visual absorption capacity of the landscape and potential visual intrusion. Indicate the significance of the landscape character, whether further visual impact assessment is required and which significant receptor locations (Key Observation Points) the proposed landscape modification should be assessed for visual impacts.</p> <ul style="list-style-type: none"> • Create Photo Montages (photographic representation of a proposed landscape modification). Provide recommendations based on real time visualisation, to reduce visual impacts from Key Observations Points, ensuring a greater predictability to the outcome. Portray the final outcomes of the landscape modifications, including mitigation, as strong model proof to be provided for review by I&APs and Stakeholders. • Define impacts for all the proposed landscape modifications according to the criteria are specified in the DEA&DP visual guidelines. <ul style="list-style-type: none"> ○ Distribution of Impacts: Advantages and disadvantages ○ Extent: The spatial or geographic area of influence of the visual impact ○ Duration: The predicted life-span of the visual impact. ○ Intensity: The magnitude of the impact on views, scenic or cultural resources. ○ Probability: The degree of possibility of the landscape modification occurring. ○ Significance: A synthesis of the above. • Define specific management actions to avoid or reduce the levels visual impacts based on the DEA&DP Guideline for involving visual and aesthetic specialists in EIA processes: Avoidance, Mitigation, Compensation and Offsets, Rehabilitation and Enhancement.
<p>Planning</p>	<p>Re-zoning and Long-term Lease Applications.</p>	<ul style="list-style-type: none"> • Start preparing Re-zoning & Lease Applications based on preferred, mitigated layout of the solar facility. • Follow-up with Tsantsabane Municipality and Department of Agriculture regarding progress of the Re-zoning & Lease Applications for the RE Capital 10 Solar Development on Agricultural land.

13 PROCESS TO BE FOLLOWED

The following process is to be followed for the remainder of the environmental process:

- This Draft Scoping Report is made available for public review and comment for a period of 40 days. Comments received on this document will be responded to and included in the Final Scoping Report. Should there be substantial changes between the Draft and Final Scoping Report, this Report will be made available for review and comment for a further 21-day period. Should there be no substantial changes between the draft and final documents the Final Scoping Report will be submitted directly to the Department of Environmental Affairs (DEA) without a further 21-day public review and comment period. Registered Interested and

Affected Parties will be notified when the Final Report is available on the *Cape EAPrac* website and/or be provided with digital copies of the FSR for information purposes

- Once the DEA accepts the Final Scoping Report and Plan of Study for Environmental Impact Report, the relevant specialists will undertake and complete their respective impact assessments;
- Discussions will be held with the various specialists and project team members in order to determine how best the development concept should be amended / refined to avoid significant impacts;
- In the event that amendments to the development plan are not required, the Draft Environmental Impact Report (DEIR) can be concluded;
- However, if an amendment becomes necessary, changes can be made to the layout plan to form another development alternative that will address and/or avoid any significantly detrimental impacts;
- Such an alternative will be circulated to all the relevant specialists in order for them to complete their comparative assessments and final impact assessment reports;
- The DEIR will be made available for public review and comment period of 40-days;
- All comments and inputs received during the comment & review period will be included with the Final EIR;
- The Final EIR will be submitted to the DEA for consideration and decision-making;
- The DEA's decision (Environmental Authorisation) on the FEIR will be communicated with all registered I&APs.

The competent Authority will be involved through continuous email and report **updates** on the process, in particular, when the **draft and final Environmental Impact Reports** have been completed. Should any unforeseen problems occur during the course of the impact assessment phase the competent authority will also be **contacted** for an **update and/or advice**.

14 CONCLUSION & RECOMMENDATIONS

This scoping exercise is currently being undertaken to present concept proposals to the public and potential Interested & Affected Parties and to identify potential environmental issues and concerns raised as a result of the proposed development alternatives to date. This will allow Interested & Affected Parties (I&APs), authorities, the project team, as well as specialists to provide input and raise issues and concerns, based on baseline / scoping studies undertaken. The RE Capital 10 Solar Development site has been analysed from Ecological, Agricultural Potential and Archaeological perspectives, and potential site constraints and possible impacts identified.

This Draft Scoping Report (DSR) summarises the process to date, reports on the findings of relevant baseline studies.

Cape EAPrac is of the opinion that the information contained in this Draft Scoping Report and the documentation attached hereto is sufficient to allow the general public and key stakeholders to apply their minds to the potential negative and/or positive impacts associated with the development, in respect of the activities applied for. We believe that the proposed RE Capital 10 Solar Development will be sustainable in the long term and that the proposed development will be an asset to the Postmasburg area, Northern Cape region and the broader South African society through supplementing the electricity supply for the National Eskom Grid.

This Draft Scoping Report (DSR) is made available for stakeholder review and comment for a period of 40-days, extending from **Monday 25 August to Saturday 4 October 2014**. All comments received, will be considered and addressed, and feedback will be provided to registered stakeholders.

Following this comment period, the Final Scoping Report will be prepared. Should the Final Scoping Report include significant amendments to this Draft report, it will once again be made available to registered Interested and Affected Parties (I&APs) for comment, for a further 21 day period. Should the amendments include only minor changes to this Draft Scoping Report; the Final Scoping Report will be submitted directly to the Department of Environmental Affairs (DEA) and only be made available for stakeholder information purposes. Whatever the case, all registered stakeholders will be kept informed throughout the remainder of the environmental process.

All stakeholders are requested to review this Draft Scoping Report and the associated appendices, and provide comment, or raise issues of concern, directly to *Cape EAPrac* within the specified 40-day comment period.

Comments must be submitted, in writing, to the following address no later than 4 October 2014

Cape Environmental Assessment Practitioners

Att: **Mrs. Siân Holder**

PO Box 2070, George, 6530

Fax: 044-874 0432 or Email: sian@cape-eaprac.co.za

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