

**PROPOSED DEVELOPMENT OF A
PHOTO-VOLTAIC SOLAR POWER
GENERATION FACILITY ON THE
FARM KONKOONSIES CLOSE TO
POFADDER IN THE NORTHERN
CAPE**



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AMENDED SCOPING REPORT

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AMENDED SCOPING REPORT:
**PROPOSED DEVELOPMENT OF A PHOTO-VOLTAIC SOLAR POWER
GENERATION PLANT ON THE FARM KONKOONSIES NEAR POFADDER
IN THE NORTHERN CAPE**

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INCLUDING FURTHER REVIEW BY PUBLIC AND OTHER STAKEHOLDERS

September 2012

**DEA & LEGAL REQUIREMENTS FOR SOLAR ENERGY FACILITIES:
INFORMATION LIST FOR EIA PROJECTS:**

1. General Site Information		
No.	Information	Reference/Provided
1.1	Description of all affected farm portions	Section 2 & 7.1
1.2	21 Digit Surveyor General Codes of all affected farm portions	Section 2.4
1.3	Copies of deeds of all affected farm portions	Appendix 7
1.4	Photos of areas that give a visual perspective of all parts of the site	Appendix 4
1.5	Photographs from sensitive visual receptors (Tourism routes, tourism facilities, etc.)	Will only be provided once the Visual Impact Assessment (VIA) has been completed as part of the EIA phase of the project
1.6	Solar plant design specifications including: <ul style="list-style-type: none"> • Type of technology • Structure height • Surface area to be covered (including associated infrastructure such as roads. • Structure Orientation • Laydown area dimensions (Construction period and thereafter. Generation capacity of the facility as a whole at delivery points	Section 2.1 & 3 as well Appendix 2

2. Site maps and GIS information		
No.	Information	Reference/Provided
2.1	All maps/information layers must also be provided in ESRI Shapefile format	Contained in the CD version of this report
2.2	All affected farm portions must be indicated	Section 2 & 7.1
2.3	The exact site of the application must be indicated (The areas that will be occupies by the application)	Figure 2-1
2.4	A status quo map/layer must be provided that includes the following: Current use of the land on site including:	Section 7
	2.4.1 Building and other structures	Figure 7.1 - 7.3
	2.4.2 Agricultural fields	Section 7.1.1
	2.4.3 Grazing Areas	Figure 7-1 & Figure 7-2
	2.4.4 Natural vegetation areas (Natural veld not cultivated for the preceding 10 years) with an indication of the vegetation quality as well as fine scale mapping in respect of critical Biodiversity Areas and Ecological Support areas.	Will only be determined once the detailed biodiversity assessment has been completed.
	2.4.5 Critically endangered and endangered vegetation areas that occur on the site	Will only be determined once the detailed biodiversity assessment has

		been completed.
	2.4.6 Bare Areas which may be susceptible to soil erosion	Will only be determined once the detailed soil assessment has been completed.
	2.4.7 Cultural historical sites and elements	Will only be determined once the detailed Heritage assessment has been completed.
	2.4.8 Rivers, Streams and water courses	Section 7.7
	2.4.9 Ridgeline and 20m continuous contours with height references in the GIS database	Will be provided within the Environmental Impact Report (EIR)
	2.4.10 Fountains, boreholes, dams (in-stream as well as off- stream) and reservoirs	None
	2.4.11 High potential agricultural areas as defined by the Department of Agriculture, Forestry & Fisheries	N/A the site does not fall within an area which has high agricultural potential as defined by DAFF.
	2.4.12 Buffer zones (also where it is dictated by elements outside the site): <ul style="list-style-type: none"> • 500m from any irrigated agricultural land • 1km from residential areas • Indicate isolated residential, tourism facilities on or within 1km of the site 	N/A:
	2.4.13 A slope analysis map/layer that include the following slope ranges": <ul style="list-style-type: none"> • Less than 8% slope • Between 8% and 12 % slope • Between 12% and 14% slope • Steeper than 18 % slope 	Will be provided within the Environmental Impact Report (EIR)
	2.4.14 A map/layer that indicate locations of birds and bats including roosting and foraging areas	Will only be determined once the detailed biodiversity assessment has been completed.
2.5	A site development proposal map(s)/layer(s) that indicate:	Figure 2-1 & Appendix 1. Will only be feasibly finalised all environmental aspects have been accurately considered within the EIR.
	2.5.1 Position of solar facility	
	2.5.2 Foundation footprint	
	2.5.3 Permanent laydown area footprint	
	2.5.4 Construction period laydown footprint	
	2.5.5 Internal road indicating width (construction period width and operation period width) and with numbered sections between the other site elements which they serve	
	2.5.6 River, stream and water crossing of roads and cables indicating the type of bridging structures that will be used	
	2.5.7 Substation (s) and /transformer (s) sites including their entire footprint	
	2.5.8 Cable routs and trench dimensions (where they are not along the internal roads)	

2.5.10	Connection routes to the distribution/transmission network	
2.5.11	Cut and fill areas along roads and at substation/transformer sites indicating the expected volume of each cut and fill	
2.5.12	Borrow pits	
2.5.13	Spoil heaps (Temporary for topsoil & subsoil and permanently for excess material)	
2.5.14	Building including accommodation	

3. Regional map and GIS information

No.	Information	Reference/Provided
3.1	All maps/information layers must also be provided in ESRI Shape file format	Contained in the CD version of this report
3.2	The map/layer must cover an area of 20km around the site	Noted
3.3	<p>Indicate the following:</p> <ul style="list-style-type: none"> • Roads including their types (tared or gravel) • Railway lines and stations • Industrial areas • Harbours and airports • Electricity transmission and distribution lines and substation's • Pipelines • Water sources to be utilized during construction and operational phases • Critical Biodiversity areas and Ecological Support area • Critical Endangered and endangered vegetation areas\Agricultural fields • Irrigated areas • An indication of new road or changes and upgrades that must be done to existing roas in order to get equipment onto the site including cut and fill areas and crossings of rivers and streams 	Figure 7-1 to Figure 7-14

1. EXECUTIVE SUMMARY

BioTherm Energy (Pty) Ltd is proposing to develop a commercial photo-voltaic (PV) solar power plant on the farm Konkoonsies which is approximately 36 km's North-westerly of the town of Pofadder in Northern Cape Province. The facility will be referred to as the Konkoonsies PV Solar Energy Facility and is proposed to be developed in phases starting with an already approved 10 MW facility and increase this capacity to over 100MW to cover the entire feasible area of the site measuring a total of 238 hectares (Figure 2-1). The DOE's IPP programme currently allows for a maximum capacity of 75MW and this is envisaged to be the capacity of the 2nd phase as applied for in this EIA process. The remaining area will be utilised for a 3rd phase if the grid capacity and impact assessment allows. The exact sizing of the project phases may alter based on the IPP programme. The green area in the image below represents areas of sensitivity within the study area identified and which will be avoided by the development. The orange area represents the available feasible area for the proposed development; these areas will however be assessed in detail during the environmental impact assessment phase of development. Only then would a final layout plan be feasibly developed and the exact yielding capacity and thresholds determined

It should be noted that Biotherm energy already conducted a Basic Assessment on this site for the 10MW project which was subsequently awarded preferred bidder status in Dec 2011 and is currently being developed.

As it stands presently it is proposed to develop 238 hectares in special extent for the photo-voltaic (PV) solar power plant with a generation capacity covering the entire feasible area (+/- 119MW). Both the spatial extent and the generation capacities will only be finalised once all environmental aspects have been considered within the identified feasible area (Orange areas in the image). The final capacities also dependent on the development of current photovoltaic technologies as within a few months more efficient modules can be manufactured which would result in a larger electrical capacity being produced from the same land footprint. The choice of technology also influences the total capacity as for example CPV modules require more space than crystalline silicon modules for production of the same capacities (Please refer to appendix 2 for detailed plant description of technology etc).

The Environmental Impact Assessment (EIA) is considered one of the early steps in evaluating the feasibility of a project of this scale. EScience Associates (ESA) has been appointed by BioTherm Energy (Pty) Ltd as independent Environmental Assessment Practitioners (EAP) to conduct the scientific investigations of the EIA, and to facilitate the associated legal and administrative processes on their behalf. The main aim of the EIA is to assess the significance of potential environmental and socio-economic impacts, and to provide this information to the public and relevant Government Authorities who are responsible for making decisions on the environmental approvals that the project would require before it may commence. The key Competent Authority (CA) responsible is the National Department of Environmental Affairs (DEA) - previously the Department of Environmental Affairs and Tourism (DEAT).

The activity involves the construction of a solar power (Photovoltaic) facility. With populations in South Africa growing rapidly, and due to the need for "green" energy (such as solar power) is becoming more prevalent, the project will provide a sustainable, green energy, resource for present and future generations. The positive aspects of using solar

power far outweigh the negative. This proposed site will aid the new generation capacity to the national grid from renewable energy and share a part of the 42% share targeted by the Department of Energy for renewable energy (Integrated resource plan, 2010-2030). According to the above strategy 8.4GW of the share is proposed to be generated by PV solar sources over the next thirty years.

The activity will provide local communities in the Khai Ma Municipal area with several benefits including job creation, socio-economic development and a reliable and clean source of energy for many years. Society in general will be benefited, as this project will create electricity without any emissions to air i.e. zero carbon emission to the atmosphere. This is in contrast to coal-fired power stations, which have huge carbon emissions. Society will thus be benefited as less carbon emissions means less global warming, which evidently means healthier and better functioning environmental ecosystems on the planet. Further to this, and as described by de Jong 2011, *"the project has the potential to create sustainable employment in the Northern Cape while addressing some of the fundamental drivers of Climate Change. Being one of the pioneers of solar power in South Africa the project has the inherent role of developing solar power technology for the region. The viability and success of this project is strategic to paving the way for sustainable power technologies in this region. This is a project of strategic and national importance and capable of enhancing South Africa's position in the global technology arena while aligning the commitments made by South Africa in Copenhagen."*

Photovoltaic's (PVs) are materials that convert solar radiation directly into electricity. Photovoltaic solar cells they are divided into two distinct groups: Traditional crystalline silicon solar cells and thin film solar cells. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as photovoltaic effect. The crystalline silicon solar cells are made from monocrystalline silicon or polycrystalline silicon. The thin film technologies comprise of thinner layers of semiconductor material which are produced using a splutter process. The proposed project will also consist of a component Concentrated Photo-voltaic (CPV) panels to be developed in combination with the PV panels. CPV systems are very unique because they concentrate sunlight through a lens onto high performance solar cells and by doing so increases the electricity generated. These CPV panels are mounted on tracking systems as to maximise collection of energy from the sun.

The concentrated light improves the efficiency of the cells and reduce amount of expensive solar cell material needed to produce a certain amount of electricity required. Some of these CPV panels can generate twice as much power per hectare in comparison with conventional solar panel technology. In comparison to normal PV panels certain designs of CPV uses 23.5 meter wide panels with more than 1000 pairs of lenses and solar cells on each (See Figure 4-1). These panels are all mounted on a single axis installed with tracking systems to maintain 0.8 degree angles with the sun throughout the day (Bullis, 2011). Due to the growing demand for renewable energy sources, the manufacture of solar cells and photo-voltaic modules has advanced dramatically in recent years. Due to the growing demand for renewable energy sources, the manufacture of solar cells and photo-voltaic modules has advanced dramatically in recent years.

Based on the independent evaluation and assessment of the proposed project during the Scoping Phase by the Environmental Assessment Practitioner (EAP), a Plan of Study for Environmental Impact Assessment (PoSEIA) has been developed (See Section 9 of this report). The PoSEIA includes the scope of further specialist studies to be conducted, which would inform the accurate assessment and mitigation of potential environmental impacts

that may arise from the proposed project. This would result in the compilation of a detailed EIA Report, which would allow the competent authorities (DEA) to make an informed decision regarding the authorisations needed for the proposed Photo-voltaic Solar Power generation project and components thereof.

In conclusion, it is felt that the scoping study has highlighted numerous areas that will need to be properly evaluated during the EIA phase due to the sensitivity of the site that will need to be addressed at EIA phase. It is felt that the scoping study has been undertaken thoroughly and that authorization be granted to continue with the full Environmental Impact assessment to adequately quantify and assess the impacts of the proposed Solar Facility on the receiving environment.

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ABBREVIATIONS

BID: Background Information Document

BTE: Biotherm Energy (Pty)Ltd

DAFF: Department of Agriculture, Forestry and Fisheries

CO₂: Carbon dioxide

DEA: Department of Environmental Affairs

DENC: Department of Environment and Nature Conservation

DoE: Department of Energy

DWA: Department of Water Affairs

EAP: Environmental Assessment Practitioner

EIA: Environmental Impact Assessment

EMP: Environmental Management Plan

Ha: Hectare

IAPs: Interested and Affected Parties

IPP: Independent Power Producer

Km²: Square Kilometres

kV: Kilovolt

MAR: Mean Annual Rainfall

m²: Square meters

m/s: Meters per second

MW: Mega Watt

NEMA: National Environmental Management Act, No. 107 of 1998

NERSA: National Energy Regulator of South Africa

NEMA EIA Regulations: Regulations GN R.543, R.544, 545 and R.546 (18 June 2010), as amended. promulgated in terms of Section 24(5) read with Section 44, and Sections 24 and 24D of the National Environmental Management Act, 1998

NGOs: Non-governmental Organisations

NWA: National Water Act

POSEIA: Plan of Study for EIA

PV: Photovoltaic (refers to both normal PV and concentrated PV (CPV) in this document)

SAHRA: South African Heritage Resources Agency

SANBI: South Africa National Biodiversity Institute

SR: Scoping Report

2. INTRODUCTION AND PURPOSE

2.1 INTRODUCTION

BioTherm Energy (Pty) Ltd is proposing to develop a commercial photo-voltaic (PV) solar power plant on the farm Konkoonsies which is approximately 36 km's North-westerly of the town of Pofadder in Northern Cape Province. The facility will be referred to as the Konkoonsies PV Solar Energy Facility and is proposed to be developed in phases starting with an already approved 10 MW facility and increase this capacity to over 100MW to cover the entire feasible area of the site measuring a total of 238 hectares (Figure 2-1). The DOE's IPP programme currently allows for a maximum capacity of 75MW and this is envisaged to be the capacity of the 2nd phase as applied for in this EIA process. The remaining area will be utilised for a 3rd phase if the grid capacity and impact assessment allows. The exact sizing of the project phases may alter based on the IPP programme. The green area in the image below represents areas of sensitivity within the study area identified and which will be avoided by the development. The orange area represents the available feasible area for the proposed development; these areas will however be assessed in detail during the environmental impact assessment phase of development. Only then would a final layout plan be feasibly developed and the exact yielding capacity and thresholds determined.

It should be noted that Biotherm energy already conducted a basic assessment on this site for the 10MW project which was subsequently awarded preferred bidder status in Dec 2011 and is currently being developed.

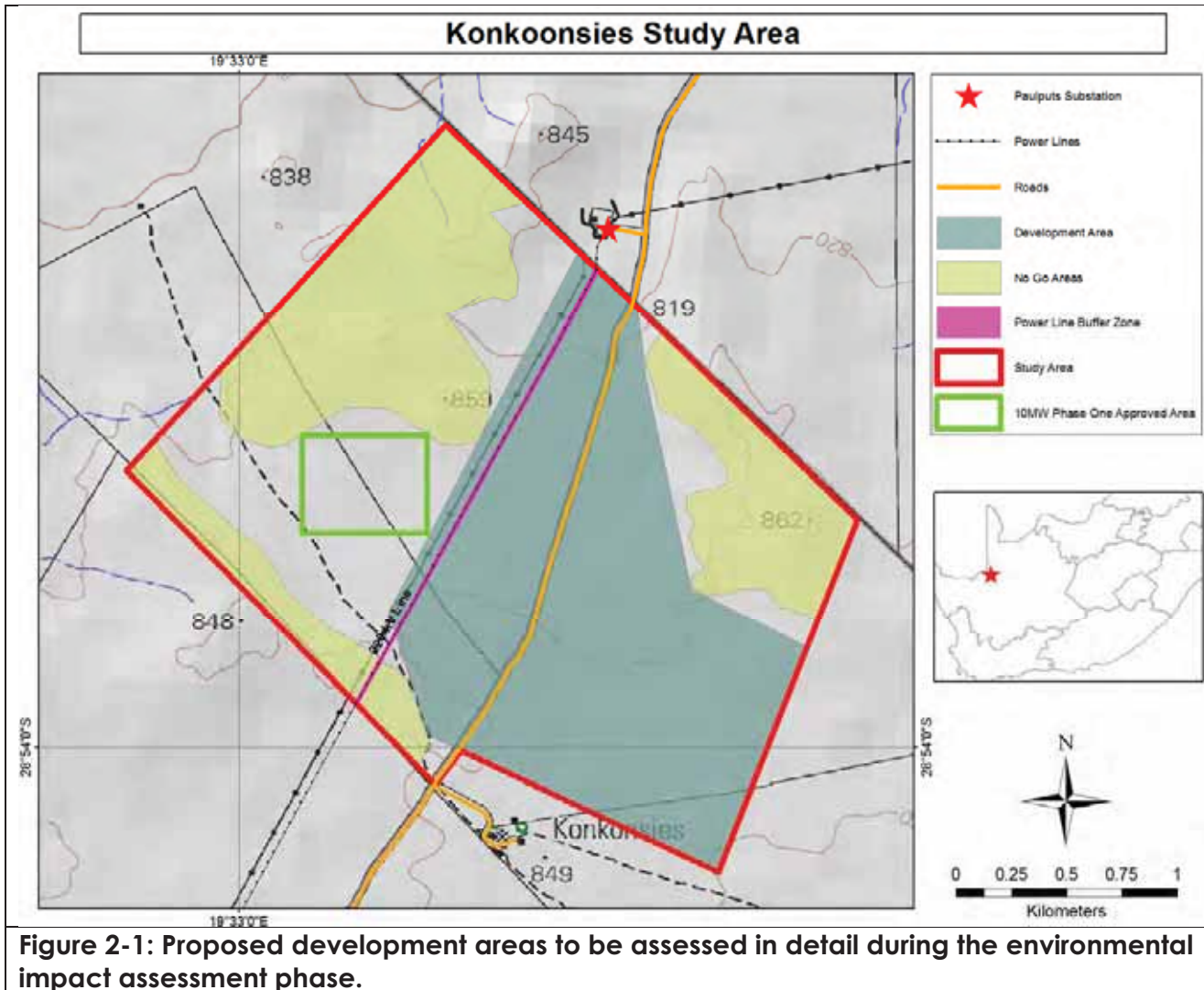
As it stands presently it is proposed to develop 238 hectares in special extent for the photo-voltaic (PV) solar power plant with a generation capacity covering the entire feasible area (+/- 119MW). Both the spatial extent and the generation capacities will only be finalised once all environmental aspects have been considered within the identified feasible area (Orange areas in the image). The final capacities also dependent on the development of current photovoltaic technologies as within a few months more efficient modules can be manufactured which would result in a larger electrical capacity being produced from the same land footprint. The choice of technology also influences the total capacity as for example CPV modules require more space than crystalline silicon modules for production of the same capacities (Please refer to appendix 2 for detailed plant description of technology etc).

Power plants in South Africa are few and far between, but the potential for the development of more plants, specifically in the Northern Cape, is huge. As one can see from the map below (Figure 2-2), the levels of Solar radiation in the north-western extent of the Northern Cape are very high (>9001 MJ/m²/annum). This potential for electricity generation via a renewable energy source is massive, and must be sustainably used.

The EIA is considered one of the early steps in evaluating the feasibility of a project of this scale. EScience Associates (ESA) has been appointed by Biotherm Energy (Pty) Ltd as independent Environmental Assessment Practitioners (EAP) to conduct the scientific investigations of the EIA, and to facilitate the associated legal and administrative processes on their behalf. The main aim of the EIA is to assess the significance of potential environmental and socio-economic impacts, and to provide this information to the public and relevant Government Authorities who are responsible for making decisions on the environmental approvals that the project would require before it may commence. The

key Competent Authority (CA) responsible is the National Department of Environmental Affairs (DEA) - previously the Department of Environmental Affairs and Tourism (DEAT).

The proposed project would entail so-called 'listed activities', which may not commence prior to obtaining an Environmental Authorisation, in terms of Section 24 of the National Environmental Management Act, 1998 (Act No. 107 of 1998)[NEMA]. An application for Environmental Authorisation, in terms of NEMA, for activities listed in Government Notices R.544 and R.545 of 18 June 2010, was submitted to the CA (DEA), on 17 November 2011, which this authority acknowledged on 23 November 2011(Appendix 2). The reference number **12/12/20/2443** has been issued by DEA for this project.



Due to the nature and/or scale of some of the activities that would be associated with the proposed project, NEMA requires that the potential environmental impacts must be considered, investigated, assessed and reported on to the CA through a Scoping and detailed Environmental Impact Assessment process, described in Regulations 26–35 of Government Notice R.543 (the so-called NEMA EIA 2010 amendment Regulations), promulgated in terms of Section 24(5) of NEMA.

The nature and extent of the solar facility as well the potential environmental impacts associated with the proposed development (Construction, Operation and decommissioning phases) are investigated in the Scoping Report.

Further to the above, the site investigated for the proposed PV power plant has been selected for its proximity to an existing electrical substation, the location in terms of annual average direct irradiation and topography. Figure 2-3 below shows (in shaded black) the ideal position of solar power plants in the Northern Cape, taking into consideration annual average direct normal irradiation > 7.0 kWh/m²/d, slope < 1%, distance to high-voltage transmission lines < 20 km, no environmentally sensitive areas. The proposed site indicated by the red dot on the map.

Although the map below indicates suitability for the installation of large concentrating solar thermal power plants, it can be concluded that the site for the proposed photovoltaic solar power plant is in an excellent position to take advantage of the right environmental conditions for sustainable renewable electricity generation.

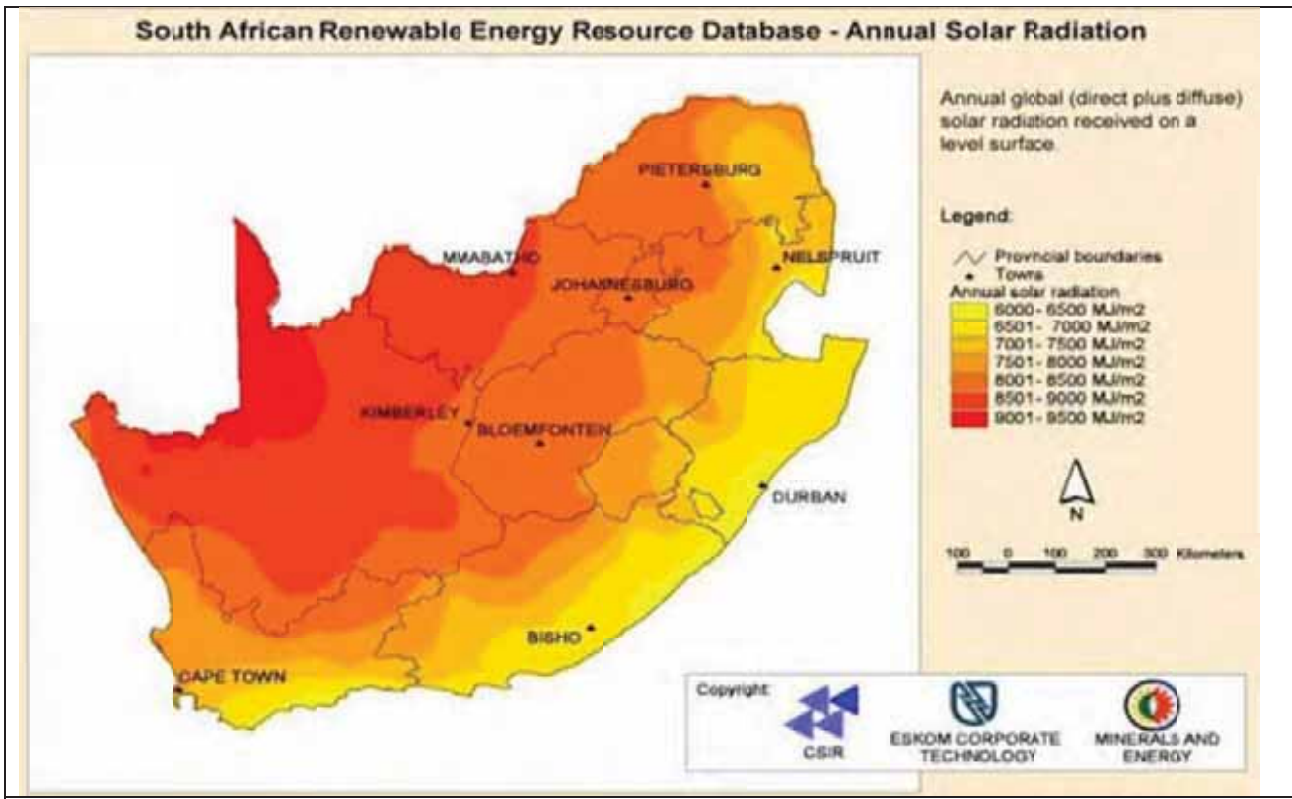


Figure 2-2: Annual Solar Radiation map (Source: CSIR, ESKOM and the DME)

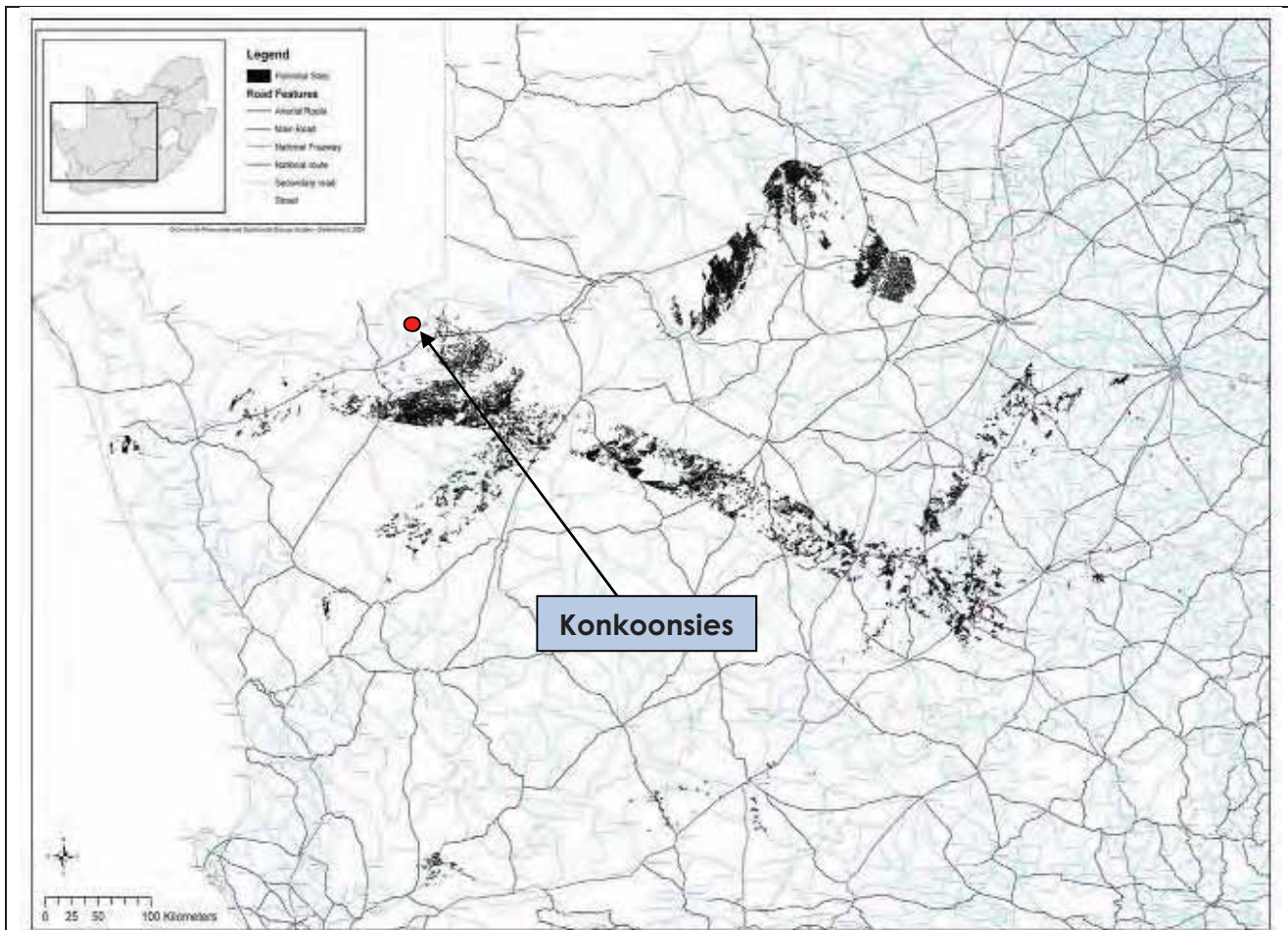


Figure 2-3: Map of South Africa indicating areas which are suitable for the installation of large concentrating solar thermal power plants (criteria: annual average direct normal irradiation > 7.0 kWh/m²/d, slope < 1%, distance to high-voltage transmission lines < 20 km, no environmentally sensitive areas). Source: <http://www.crses.sun.ac.za/html/solar.htm>

2.2 PURPOSE OF A SCOPING REPORT

This section of the report gives a brief background of the purpose of the scoping report as there is more than often misinterpretation between the scoping phase and the Environmental Impact Assessment phase of the EIA process. The Scoping and Environmental Impact Assessment (EIA) process flow diagram is presented in Figure 2-4.

The EIA process is divided into two main phases: Scoping and EIA. Scoping is a critical stage of any EIA process, and it is the initial step in involving interested and affected parties (I&APs) in environmental considerations for all stages of planning and development processes. Scoping involves the identification of various priority issues from a broad range of issues that should be addressed in the EIA, therefore scoping is the first critical step in compiling an EIA. Its main purpose is to identify the most important and significant issues that must be further investigated as part of the EIA and exclude issues that are of no concern; it therefore focuses the assessment on key issues. Scoping focuses the EIA process on significant issues and always involves participation by interested and affected parties (government, the public, proponent and industries) as to help identify key issues of concern. It gives I&APs an opportunity to participate in planning decisions of the development.

Upon approval of the final Scoping Report and plan of study for EIA to the competent authority, detailed visual, heritage, soil and biodiversity studies will be finalised and made

available for stakeholder review, together with the draft EIA Report and draft Environmental Management Plan (EMP). Please kindly also refer to section 9 of the scoping report to review the proposed terms of reference for investigations that will be undertaken as part of the EIA phase. The proposed investigation will be undertaken by specialists in various fields to determine the extent of the potential impacts.

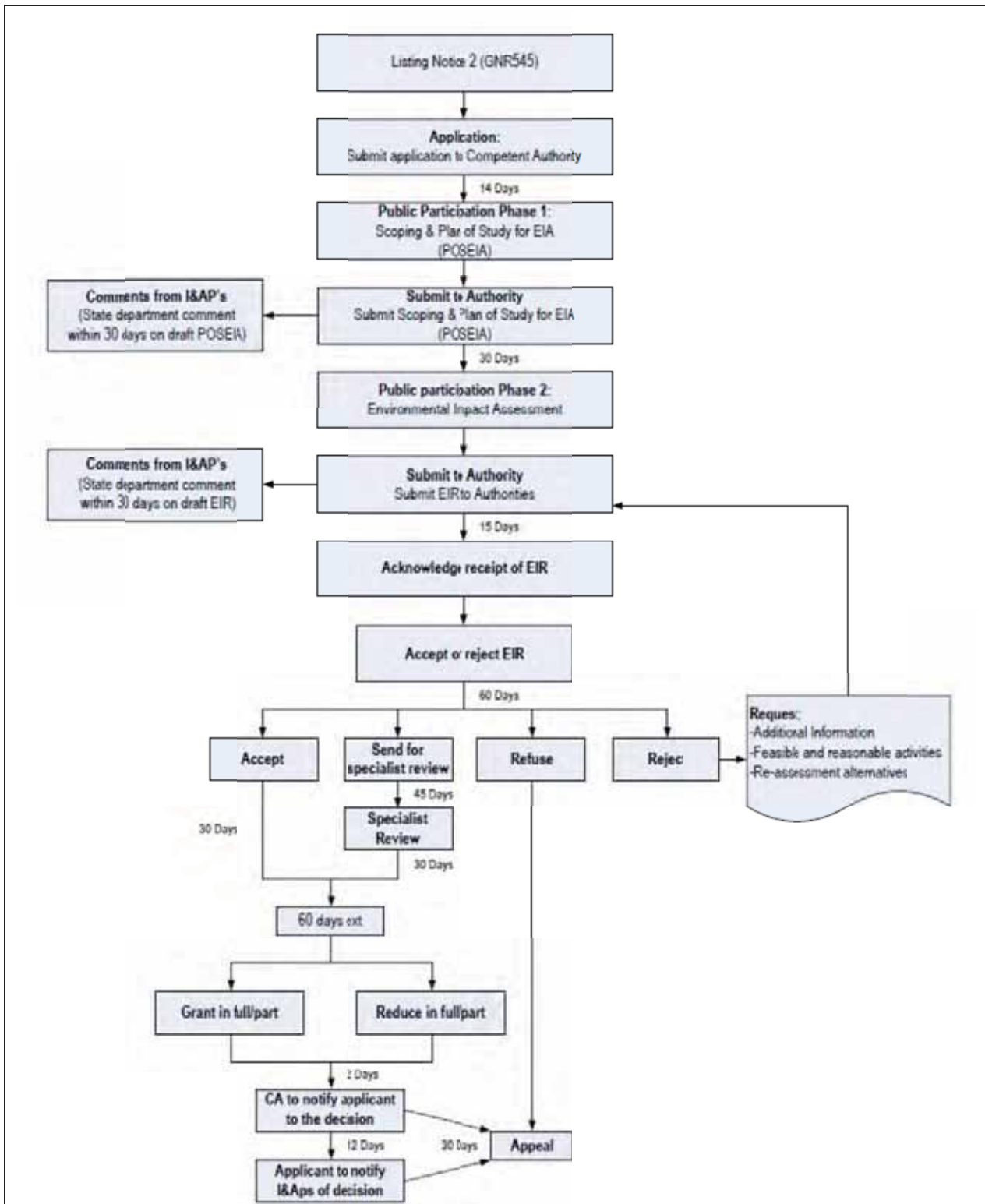


Figure 2-4: Scoping & EIA Process as prescribed by the NEMA 2010 EIA regulations

2.3 DETAILS OF ENVIRONMENTAL ASSESSMENT PRACTITIONERS (EAP)

The Scoping assessment for this application was undertaken by EScience Associates (Pty) Ltd. (ESA), as independent Environmental Assessment Practitioners (EAP) to Biotherm Energy (Pty) Ltd. The Environmental Impact Assessment study team was led by Mr Theo Fischer, senior environmental scientist with more than 10 years' experience in environmental management, with Roelof Letter and Hanre Crous in EIA project management roles (see Appendix 4 for relevant CVs).

2.4 LAND, LANDOWNER DETAILS AND SURFACE RIGHTS

The EIA will be undertaken on a portion of the farm Konkoonsies in the Northern Cape approximately 36 km north easterly from Pofadder on the road to Onseepkans border post. Only the area in close proximity to the Paulputs substation on the farm Konkoonsies will be investigated. Figure 7-1 indicates the area within the farm Konkoonsies which was identified as potential location of the solar facility and that will be assessed in detail as part of scoping and Environmental Impact Assessment process. The delineated study area is approximately 457 hectares and will be assessed in detail as part of the environmental assessment phase of the proposed project (see Figure 2-4).

It should however be noted that a portion of the study area has already received environmental authorisation for a basic assessment by the Department of Environmental Affairs to develop a 10 MW PV facility which is smaller than 20 hectares. The proposed larger solar facility will be an extension of the currently authorised facility increasing the capacity by over 100 MW to be developed in further phases of the IPP procurement programme. The feasibility area can take 200MW with current technology but the final capacity will be determined in the EIA phase. Figure 7-1 indicates the study area as well as the area demarcated for the development of the 10 MW PV solar facility.

Farm Portion	Owner/ contact person
Konkoonsies No. 91, portion 6 approximately 36km north easterly of Pofadder in Northern Cape.	Fanie van den Heever

Surveyor General 21 digit codes for farm Konkoonsies included in the EIA process:																				
C	0	3	6	0	0	0	0	0	0	0	0	0	0	0	9	1	0	0	0	6
Surveyor General 21 digit codes for farm Scuit Klip included in the EIA process:																				
C	0	3	6	0	0	0	0	0	0	0	0	0	0	0	9	2	0	0	0	4

2.5 MUNICIPALITY AND REGIONAL DETAILS

District Municipality:	Namakwa District Municipality
Local Municipality (LM):	Khai Ma Local Municipality
Nearest town/city:	Pofadder

2.6 THE PROPONENT (APPLICANT)

BioTherm Energy (Pty) Ltd (BTE) is one of South Africa's leading renewable energy developers. As one of South Africa's first independent power producer (IPP), BTE has embarked on delivering clean, renewable energy to South Africa with a series of wind and solar farms in the Eastern, Western and Northern Cape provinces. Construction will commence when all necessary approvals are secured and Power Purchase Agreements (PPAs) have been signed.

By way of background, BioTherm was founded in 2003 and is one of South Africa's first independent power producers. BioTherm's business was initially focused on developing waste gas and heat cogeneration projects. In October 2007, BioTherm commissioned a 4.2 megawatt biogas project at the PetroSA refinery in Mossel Bay, Western Cape, which was the first non-recourse project-financed independent power producer transaction completed in South Africa. Further, BioTherm is currently engaged in the commissioning of an anaerobic digester at Kanhym, the largest piggery in Africa.

As a proudly South African Company, BTE is a strong advocate for attaining the national goals of expanding the role of renewable energy, not just as an energy source but as an integral part of the economic, environmental and social aims of the country. BTE has strong Broad Based Black Economic Empowerment (BEE) partners, who are actively participating in the development of our projects.

Renewable energy has enormous potential to deliver energy to meet the needs of South Africa's growing economy, creating employment opportunities and new industries. BTE has the unique ability to fully develop renewable energy projects in-house with experts in site development, wind and solar resource measurement and analysis, turbine selection, carbon reduction, construction and maintenance.

2.7 PROJECT MOTIVATION, NEEDS AND DESIRABILITY

The activity involves the construction of a solar power (Photovoltaic) facility. With populations in South Africa growing rapidly, and the need for "green" energy (such as solar power) becoming more prevalent, the project will provide a sustainable, green energy, resource for present and future generations. The positive aspects of using solar power far outweigh the negative. This proposed site will aid the new generation capacity to the national grid from renewable energy and share a part of the 42% share targeted by the Department of Energy for renewable energy (Integrated resource plan, 2010-2030). According to the above strategy 8.4GW of the new generation capacity is proposed to be obtained from PV solar sources over the next twenty years.

A target of 10,000 GWh of renewable energy was set by the South African government by 2013, due to the high level of renewable energy potential in the country. To contribute towards this target, and kick start the renewable energy industry in South Africa and socio-economic and environmentally sustainable growth a need for a market mechanism was established. The Independent Power Producer (IPP) Procurement Programme was introduced in 2011 for the procurement of renewable energy projects. A maximum tariff was set for each technology and developers would bid for projects and compete on a competitive price basis.

The IPP Procurement Programme therefore supports the Government's 10,000 GWh 2013 Renewable Energy Target and also promotes competitive markets in long term renewable sustained growth in comparison with conventional energies. South Africa electricity generation from renewable energy offers various socio-economic and environmental benefits. These benefits include

- Increased energy security: the current electricity crisis outlines the need for more sustainable sources of electricity generations as consumer's increases. Grid connections with renewable energy acts as an alternative source of electricity as traditional sourced become strained and more expensive.

- Resource savings: Water and natural resources can be saved by using solar technologies as conventional coal fired power plant are major consumers of valuable natural resources.
- Pollution reduction: Major by-products of fossil fuel burning are nitrogen, oxides and sulphur and have a detrimental impact on human health though the formation of smog and causes the spread of respiratory illnesses. PV solar generation transforms solar radiation directly into electrical energy and therefore no toxic pollutant are emitted.
- Employment creation: The development, scale, installation, management and maintenance of solar facilities have significant potential for job creation in South Africa.

The activity will provide local communities in MA Municipal area with several benefits including job creation, socio-economic development and a reliable and clean source of energy for many years. Society in general will be benefited, as this project will create electricity without any emissions to air i.e. zero carbon emission to the atmosphere. This is in contrast to coal-fired power stations, which have massive carbon emissions and require vast amounts of water for power generation. Society will be benefited as less carbon emissions means less global warming, which evidently means healthier and better functioning environmental ecosystems on the planet. Further to this, and as described by de Jong 2011, *"the project has the potential to create sustainable employment in the Northern Cape while addressing some of the fundamental drivers of Climate Change. Being one of the pioneers of solar power in South Africa the project has the inherent role of developing solar power technology for the region. The viability and success of this project is strategic to paving the way for sustainable power technologies in this region. This is a project of strategic and national importance and capable of enhancing South Africa's position in the global technology arena while aligning the commitments made by South Africa in Copenhagen."*

3. PROJECT DESCRIPTION

3.1 PROCESS DESCRIPTION AND PROPOSED ONSITE INFRASTRUCTURE

Photovoltaic's (PVs) are materials that convert solar radiation directly into electricity. Photo-voltaic solar cells are divided into two distinct groups: Traditional crystalline silicon solar cells and thin film solar cells. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as photovoltaic effect. The crystalline silicon solar cells are made from monocrystalline silicon or polycrystalline silicon. The thin film technologies comprise of thinner layers of semiconductor material which are produced using a splutter process. The proposed project will also consist of a component Concentrated Photo-voltaic (CPV) panels to be developed in combination with the PV panels. CPV systems are very unique because they concentrate sunlight through a lens onto high performance solar cells and by doing so increases the electricity generated. These CPV panels are mounted on tracking systems as to maximise the benefit of each sun ray (Please refer to Appendix 2 for detailed description on the plant technology etc.)

The concentrated light improves the efficiency of the cells and reduces the amount of expensive solar cell material needed to produce a certain amount of electricity required. Some of these CPV panels can generate twice as much power per hectare in comparison with conventional solar panel technology. In comparison to normal PV panels certain designs of CPV uses 23.5 meter wide panels with more than 1000 pairs of lenses and solar cells on each (See Figure 4-1). CPV panels are mounted on a dual axis system and installed with tracking systems to maintain 0.8 degree angles with the sun throughout

the day (Bullis, 2011). Due to the growing demand for renewable energy sources, the manufacture of solar cells and photo-voltaic modules has advanced dramatically in recent years.

Photovoltaic production has been doubling roughly every 2 years, increasing by an average of 48% each year since 2002, making it the world's fastest-growing energy technology. The volume of new grid-connected PV capacities world-wide rose from 16 GW in 2010 to 27 GW in 2011. This increased the total installed PV capacity world-wide to over 67 GW at the end of 2011. Roughly 90% of PV generating capacity consists of grid-tied electrical systems. Such installations may be ground-mounted (and sometimes integrated with farming and grazing) or built into the roof or walls of a building, known as Building Integrated Photovoltaic's.

Photovoltaic solar power plants comprise of solar modules connected together to form solar arrays for the production of electricity. Direct current electricity is produced from the solar array which in turn is connected to inverters for conversion to alternating current. Power from the inverters is then stepped up via transformers to voltages suitable for injection into the national grid for distribution to consumers.

Solar power plants can either have fixed tilt systems or tracking systems as shown in the diagrams below. Modules in a fixed tilt system are mounted at an optimised angle facing the sun. With tracking systems, the surface of the arrays is moved to follow the sun resulting in large radiation gains. Systems can be set to track the sun's daily path and/or its annual path. Figure 3-1 below shows a typical example of a fixed tilt PV array and Figure 3-2 shows a typical example of a tracking PV array. (This is an example only)



Figure 3-1: Fixed tilt PV array



Figure 3-2: Tracking PV array

Photovoltaic (PV) Arrays can be up to several hundred hectares in spatial extent. The panels are mounted on metal structures which are fixed into the ground either through a concrete foundation or a deep seated screw. Central inverters are wired to sections of the PV field which can have a rated power of 500kW-1250kW each. The inverter is a pulse width mode inverter that converts DC current to AC current at grid frequency. A typical central rated at 500kW inverters has a size of approximately 3m x 2.5m x 1m and an Output voltage is 480V Alternating Current (AC).

The grid connection requires transformation of the voltage from 480V to between 22,000V and 400 000V depending on the existing infrastructure. The normal components and size of a distribution rated electrical substation will be required. Tracking Arrays (Figure 3-2) comprises of one (single axis) or two (dual –axis) motors and a sun sensor used to track the sun. The motors usually contain gears and moving parts that will need greasing from time to time.

The DOE's IPP programme currently allows for a maximum capacity of 75MW and this is envisaged to be the capacity of the 2nd phase as applied for in this EIA process. The remaining area will be utilised for a 3rd phase if the grid capacity and impact assessment allows. Approximately 1.5-2 hectares are required per installed MW of PV panels. The following infrastructure is required for PV solar facilities:

- Foundations to support the PV panels.
- Where the plant consists of arrays of photovoltaic (PV) panels: The panels are placed in number rows with a buffer from the boundary fence and access roads in between the each row. Panels will have a junction box located below the rows where all connections between rows meet up. Underground cables run from this box to the inverter/ transformer house at 400V-1000V Direct Current (DC).

- Access and inside roads/paths – already existing paths to be used where possible, turning circle of trucks to be taken into consideration, use of roads /paths minimal when plant is in operation.
- Trenching – all DC and AC wiring within the PV plant must be buried underground. Trenches will have a river sand base, space for pipes, backfill of sifted soil and soft sand and concrete layer where vehicles will pass. Cable trenches will be approximately 600mm (0.6m) deep and 400mm (0.4m) wide and backfilled with sand. Manhole covers will be placed every 40m or each direction change. A concrete slab will be placed where vehicles pass over cable trenches.
- Inverter/ transformer building –6mX3m brick buildings located within the PV array each containing an inverter and a step up transformer will be constructed in the plant. The number of buildings will be dependent on the size of plant and inverters chosen. Alternatively a pre-packaged inverter/transformer housed in a concrete substation for outdoor can be utilised.
- Combined guard house/ control room – One (1) brick building of approximately 100m² on the perimeter of the plant. Guardhouse will include a small kitchen and toilet. Building will include a storeroom for spare parts kept onsite. Control room will contain switchgear and monitoring equipment for the PV plant. The buildings will be a standard height of approximately 3m high.
- Connection to grid: The grid connection requires transformation of the voltage from 480V to between 22,000V and 400,000V depending on the available infrastructure. The normal components and size of a distribution rated electrical substation will be required.
- Small substation for the plant will be located on the outside of the control room.

3.2 ACTIVITIES PROPOSED DURING DEVELOPMENT STAGES OF THE PROJECT

3.2.1 CONSTRUCTION PHASE

The physical construction of the PV facility will take place in phases with the the DOE's IPP programme currently allows for a maximum capacity of 75MW and this is envisaged to be the capacity of the 2nd phase as applied for in this EIA process. The remaining area will be utilised for a 3rd phase if the grid capacity and impact assessment allows. The feasible area will be determined once all environmental aspects have been assessed and considered.

Details on the amount of construction workers required during construction phase (for example percentage skilled employees: 20 %; low level skills employees: 30 % and 50% of employees will have semi level skills). These low level skills will be sourced from local communities and will either be housed on site or will be housed within the existing towns and transported to the site during construction. The exact detail on this is presently not known but will be investigated and determined as part of the detail environmental assessment phase. The procedures typically for the construction phase of the PV facility would be as follows:

- The establishment of access roads: During the construction period internal roads would need to be established, these roads will however only be temporary. There are a number of permanent road that would need to be established that would need to be established for operation and will be gravel based.
- Preparation of the site: Vegetation would need to be cleared for the footprint of the infrastructure as well as for the access roads to the site/ internal roads as well the laydown yard etc. Topsoil stripping from the construction of access road and

infrastructure would need to be stockpiled and used to rehabilitated areas of the construction footprint.

- Transportation of equipment and components to the site: The main component of the proposed facility would be transported by road to the site. Excavators, graders, trucks and compacting equipment will need to be brought to the site
- Establishment of workshops, temporary laydown areas and construction camps: Once all the equipment etc. have been brought to the site a dedicated laydown and equipment camps will be established. Fuel will be stored on site during construction, appropriate mitigation measure must be employed to ensure no pollution occurs as a result.
- Construction of the PV array: The foundations for the PV panel array will be excavated. Another option would be to use a ramming system for the support structure which does not require excavation but is dependent on the geotechnical condition of the ground. Concrete and aggregates would need to be brought to the site. Trenches would also need to be excavated for underground connection of the panels to the inverters and subsequently to the plant substation.
- Undertake site rehabilitation: Removal of all construction equipment from the site and rehabilitation of areas where reasonable and practical.

3.2.2 OPERATIONAL PHASE

The PV Solar facility operational lifespan is estimated at approximately 20-25 years. The typical activities during the operational phase would be as follows:

- Operation of the electrical infrastructure and PV panels: Incoming solar radiation will be converted by the PV panels into electrical energy; associated inverters will convert this electrical energy into alternating current. This alternating current will be stepped up via transformers to grid voltage and transmitted via overhead cables to the Paulputs substation. The major maintenance of the PV plant is that it requires quarterly cleaning with water to remove dust from the panels. It is proposed that the water will be abstracted from the Orange River, tanked and transported to site or groundwater will be abstracted on site for these purposes. This water will temporary be stored in tanks on site. The option of sourcing water from a water services provider in the area is also available. Electrical and mechanical routine maintenance will also be carried out.
- Site security: Security will be stationed on site.

4. ALTERNATIVES

Alternatives were introduced into South Africa's 'environmental' legislation to encourage developers, 'industry' and 'mining' to consider different ways of doing things that would have different environmental impacts, whilst still achieving the development goal. Going through the process of identifying and comparing alternatives, through cost-benefit analysis, will likely yield improvements to the original concept proposal. The ultimate goal of consideration of alternatives is to both reduce negative environmental impacts and to increase or introduce positive environmental impacts.

4.1.1 SITE ALTERNATIVES

At present there are no alternative sites being considered for this particular project, but the optimum location within the existing study area will be selected based on the best optimum location based primarily on environmental considerations for placement of all components of the solar facility will be determined based on a detailed environmental

impact assessment phase. Once assessment has concluded the exact locations suitable for development, an effective design of the solar facility and associated infrastructure can commence. A preliminary layout will be determined during the EIA phase.

The placement of these types of renewable energy facility is dependent on various factors including the solar irradiation, site topography, and extent of the site, site access, local labour and economic factors and transmission considerations. This site was identified by BTE as being very desirable based on above characteristics. The placement of these facilities needs to be located within close proximity to existing substations/infrastructure to connect the plant to the national electrical grid and also reduced the amount of disturbance to the environment as the facilities will be located in close proximity to existing infrastructure, that has already been disturbed to some extent.

4.1.2 TECHNOLOGY ALTERNATIVES

As discussed, there will be no separate alternative sites assessed which are different to the proposed site. Only a technology alternative will be assessed, however it should be noted that both these technologies can be implemented on site in combination. The technology which is proposed to be assessed as opposed to the proposed technology use of PV arrays is Concentrated Photo-voltaic (CPV). CPV systems are very unique because they concentrate sunlight through a lens onto high performance solar cells and by doing so increases the electricity generated. These CPV panels are mounted on tracking systems as to maximise the collection of energy from the sun.

The concentrated light improves the efficiency of the cells and reduces the amount of expensive solar cell materials required to produce an equivalent amount of power in a comparable PV array. In comparison to normal PV panels, certain designs of CPV use 23.5 meter wide panels with more than 1000 pairs of lenses and solar cells on each (See Figure 3 3). These panels are all mounted on a single axis installed with tracking systems to maintain 0.8 degree angles with the sun throughout the day (Bullis, 2011). The CPV technology is more expensive and required more resources for installation compared to normal PV.





Figure 4-1: Example of Concentrated Photo-voltaic technologies (Bullis, 2011).

The materials used to construct these CPV panels are 95 % recyclable due to the two main materials used are glass and aluminium (Lozanova, 2009).

Table 4-1: Comparison between PV and CPV	
CPV vs. PV	
CPV	PV
Higher Efficiency	Lower Efficiency
Tracking Systems	Fixed and Tracking
Lenses/Mirrors/Panels	Panels
More Electricity	Less Electricity
Utility (Commercial)	All Markets
More Expensive than PV	Less expensive than CPV

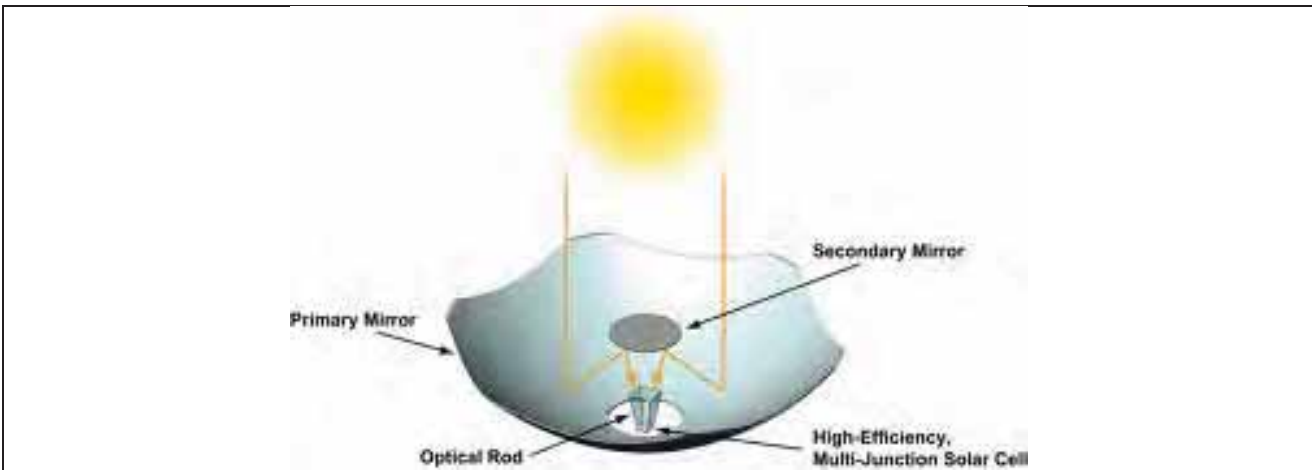


Figure 4-2: Diagram showing how Concentrated Photo-voltaic (CPV) works (Lozanova, 2009).

4.1.3 NO-GO ALTERNATIVE

The no-go option refers to the alternative of the proposed development not going ahead at all. This alternative will avoid potentially positive and negative impacts on the environment, and the *status quo* of the area would remain. The implications of the no-go option will be evaluated as part of the EIA, focussing on comparing potential impacts from the proposed project with the *status quo*, and will be particularly relevant should it be found that detrimental impacts cannot be managed to an acceptable level.

Should this alternative be exercised the socio-economic and environmental benefits of renewable energy will not be realised. These benefits would include the following:

- Increased energy security:
- Resource savings
- Exploitation of our valuable renewable energy resources
- Climate friendly development
- Pollution reduction
- Support for international agreements
- Acceptability to society
- Employment creation

5. LEGAL REQUIREMENTS

5.1 EIA & ENVIRONMENTAL AUTHORISATION

5.1.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA), 1998 (ACT 107 OF 1998)

NEMA is South Africa's overarching environmental legislation, and contains a comprehensive legal framework to give effect to the environmental rights contained in section 24 of The Constitution. Section 2 of NEMA contains environmental principles that form the legal foundation for sustainable environmental management in South Africa. NEMA introduces the principle of integrated environmental management that is achieved through the environmental assessment process in Section 24, which stipulates that certain identified activities may not commence without an Environmental Authorisation from the competent authority, in this case DEA. Section 24(1) of NEMA requires applicants to consider, investigate, assess and report the potential environmental impact of these activities. The requirements for the investigation, assessment and communication of potential environmental impacts are contained in the so-called 2010 amendment EIA Regulations (GN R.543, R.544, R.545 and R.546; 18 June 2010).

Based on the potential significance of impacts, the Regulations identify specific activities that are either subject to a Basic Assessment process, or more comprehensive Scoping and EIA process. The proposed Solar Facility includes activities that require a Scoping and EIA. All activities are however included in the Scoping and EIA assessments, i.e. a single application procedure. The activities that would be (or are likely to be) associated with the proposed Solar facility are listed in **Table 5-1** below. It should be noted that the two lists below are comprehensive, but some of the activities may eventually not proceed. The activities ultimately undertaken by BTE will be based on the findings and recommendations of the future detailed EIA investigation and final project infrastructure design, including certain capacity thresholds and the feasibility of identified alternatives.

Table 5-1: Listed activities applied for in terms of the NEMA 2010 EIA regulations		
Listing	Activity number	Description of each listed activity
Government Notice no 545 of 18 June 2010. "Listing Notice 2"	Activity 1	The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more. Reason: The proposed Solar facility will have a power generation capacity of more than 20 MW. The

AMENDED SCOPING REPORT

		development will be 238 hectares in special extent for the photo-voltaic (PV) solar power plant with a generation capacity covering the entire feasible area (+/- 119MW).
Government Notice no 545 of 18 June 2010. "Listing Notice 2"	Activity 8	<p>The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.</p> <p>Reason: The proposed solar facility may transmit and distribute more than 275 kilovolts as they propose to connect to the national energy grid via the Paulputs substation. Exact connection voltage will be determined by Eskom.</p>
Government Notice no 544 of 18 June 2010. "Listing Notice 1"	Activity 11	<p>The construction of:</p> <ul style="list-style-type: none"> (i) canals; (ii) channels; (iii) bridges; (iv) dams; (v) weirs; (vi) bulk storm water outlet structures; (vii) marinas; (viii) jetties exceeding 50 square metres in size; (ix) slipways exceeding 50 square metres in size; (x) buildings exceeding 50 square metres in size; <p>or</p> <ul style="list-style-type: none"> (xi) infrastructure or structures covering 50 square metres or more <p>where such construction occurs within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, excluding where such construction will occur behind the development setback line.</p> <p>Reason: At project initiation all potential activities were identified and included in the application form. Since then it was identified that no watercourse would be impacted on by the proposed development and all development would stay well outside 32 meters of any drainage lines.</p>
Government Notice no 545 of 18 June 2010. "Listing Notice 2"	Activity 15	<p>Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for:</p> <ul style="list-style-type: none"> (i) linear development activities; or (ii) agriculture or afforestation where activity 16 in this Schedule will apply. <p>Reason: The Proposed Solar facility will be 238 hectares in spatial extent.</p>
Gnr 546	Activity 4	Road wider than 4m with reserve less than 13.5m

		Reason: The internal roads between the panels as well the access road to the site may be wider than 4 meter but much less than 13.5.m
Gnr 546	Activity 14	The clearance of an area of 5ha or more of vegetation where 75% or more of the vegetative cover constitutes indigenous vegetation Reason: The site is located within a remote area of the country, where most of the natural landscape remains intact.

The process of applying for Environmental Authorisation includes a requirement to conduct an initial Scoping phase, followed by a detailed EIA as part of the application process. The assessment process (Figure 2-4) is comprehensive and detailed where appropriate, aimed at identifying potential positive and negative impacts on the environment (biophysical, socio-economic, and cultural), in order to:

- Examine alternatives / management measures to minimise negative and optimise positive consequences;
- Prevent substantial detrimental impact to the environment;
- Improve the environmental design of the proposal;
- Ensure that resources are used efficiently; and
- Identify appropriate management measures for mitigation and the monitoring thereof.

5.1.2 DUTY OF CARE – SECTION 28 OF NEMA

The National Environmental Management Act, Act 107 of 1998, (NEMA) places a duty to care on all persons who may cause significant pollution or degradation of the environment. Specifically, Section 28 of the Act states:

“28 (1) Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

(2) Without limiting the generality of the duty in subsection (1), the persons on whom subsection (1) imposes an obligation to take reasonable measures, include an owner of land or premises, a person in control of land or premises or a person who has a right to use the land or premises on which or in which-

- (a) any activity or process is or was performed or undertaken; or*
- (b) any other situation exists, which causes, has caused or is likely to cause significant pollution or degradation of the environment.*

(3) The measures required in terms of subsection (1) may include measures to-

- (a) investigate, assess and evaluate the impact on the environment;*
- (b) inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed in order to avoid causing significant pollution or degradation of the environment;*
- (c) cease, modify or control any act, activity or process causing the pollution or degradation;*

- (d) contain or prevent the movement of pollutants or the causant of degradation;
- (e) eliminate any source of the pollution or degradation; or
- (f) remedy the effects of the pollution or degradation."

Consequently, in the context of this assessment, the owner/operator of the Solar Facility must take "reasonable steps" to prevent pollution or degradation of the environment which may result from the proposed activities and related activity. These reasonable steps include the investigation and evaluation of the potential impact and identification of means to prevent an unacceptable impact on the environment, and to contain or minimise potential impacts where they cannot be eliminated.

5.2 BIODIVERSITY

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

The National Environmental Management: Biodiversity Act (Act 10 Of 2004) (NEMBA) is the primary legislation governing biodiversity management in South Africa. Section 2: "Objectives of the Act", states the following:

Objectives of Act:

2. The objectives of this Act are-

- a) within the framework of the National Environmental Management Act, to provide for-
 - (i) the management and conservation of biological diversity within the Republic and of the components of such biological diversity.
 - (ii) the use of indigenous biological resources in a sustainable manner; and
 - (iii) the fair and equitable sharing among stakeholders of benefits arising from bioprospecting involving indigenous biological resources;
- b) to give effect to ratified international agreements relating to biodiversity which are binding on the Republic;
- c) to provide for co-operative governance in biodiversity management and conservation; and
- d) to provide for a South African National Biodiversity Institute to assist in achieving the objectives of this Act.

The objectives of this Act will be upheld and promoted during the development of the EIR and EMP. The specialist who will be undertaking the biodiversity assessment will include this legislation in the development of their management and monitoring recommendations.

5.2.2 REQUIREMENTS FOR BIODIVERSITY ASSESSMENTS

It is acknowledged that there are no National guidelines for biodiversity assessments, however, in November 2009, the Department of Agriculture and Rural Development: Directorate of Nature Conservation published the "GDARD requirements for biodiversity assessments" (Version 2). Although these guidelines are specific for Gauteng Province, the essence of reporting on biodiversity issues and the minimum requirements for biodiversity studies can be adapted and used in any situation.

These guidelines will act as reference documentation for the reporting of biodiversity aspects on the Proposed PV Solar Project.

5.2.3 CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT 43 OF 1983)

As defined by the Conservation of Agricultural Resources Act (CARA) (Act 43 of 1983), **Conservation** is defined as: "in relation to the natural agricultural resources, includes the protection, recovery and reclamation of those resources;"

The objectives of the CARA, as stated in section 2 of the Act, entitled "Objects of Act", are:

"The objects of this Act are to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants."

Furthermore, Regulation 5 of CARA entitled: "Prohibition of spreading weeds", states: No person shall-

- (a) sell, agree to sell or offer, advertise, keep, exhibit, transmit, send, convey or deliver for sale, or exchange for anything or dispose of to any person in any manner for a consideration, any weed; or
- (b) in any other manner whatsoever disperse or cause or permit the dispersal of any weed from any place in the Republic to any other place in the Republic.

Regulation 5 is noted, and the solar facility will strive to meet this requirement of CARA, and the management and mitigation measure to achieve this will be defined in the EIA.

Furthermore, Government Notice Regulation (GNR) 1048 of 25 May 1984 are the regulations which have been promulgated under the Conservation of Agricultural Resources Act (CARA). Amongst others, GNR 1048 defines the following key aspects:

"flood area: in relation to a water course, means the area which in the opinion of the executive officer is flooded by the flood water of that water course during a 1-in-10 years flood";

Utilisation and protection of vlei, marshes, water sponges and water courses

7. (1) Subject to the provisions of the Water Act, 1956 (Act 54 of 1956), and sub regulation(2) of this regulation, no land user shall utilise the vegetation in a vlei, marsh or water sponge or within the flood area of a water course or within 10 metres horizontally outside flood area in a manner that causes or may cause the deterioration of or damage to the natural agricultural resources.

(2) Every land user shall remove the vegetation in a water course on his farm unit to such an extent that it will not constitute an obstruction during a flood that could cause excessive soil loss as a result of erosion through the action of water.

(3) Except on authority of a written permission by the executive officer, no land user shall-

- (a) drain or cultivate any vlei, marsh or water sponge or a portion thereof on his farm unit; or
- (b) cultivate any land on his farm unit within the flood area of a water course or within 10 metres horizontally outside the flood area of a water course.

- (4) The prohibition contained in subregulation (3) shall not apply in respect of-
- (a) a vlei, marsh or water sponge or a portion thereof that has already been drained or is under cultivation on the date of commencement of these regulations provided it is not done at the expense of the conservation of the natural agricultural resources; and
 - (b) Land within the flood area of a water course or within 10 metres horizontally outside the flood area of a water course that is under cultivation on the date of commencement of these regulations, provided it is already protected effectively in terms of regulation 4 against excessive soil loss due to erosion through the action of water.

(5) The provisions of regulation 2 (2), (3) and (4) shall apply mutatis mutandis with regard to an application for a permission referred to in subregulation (3).

These regulations will be adhered to as far as possible, and addressed accordingly in the EIA phase, where impacts and mitigation measures are tabled and discussed. The management of high potential agricultural soils (such as those currently under intensive centre-pivot irrigation) will be discussed during the EIA phase.

5.3 NORTHERN CAPE CONSERVATION ACT (ACT NO. 1374 OF 2009)

The act's main purpose is to ensure the sustainable utilisation of aquatic biota, wild animals and plants. The act provides for the implementation of sustainable utilisation of flora, wild animals and endangered species and provides for penalties and offences contravening the act. The act places restricted activities involving specially protected plants listed under schedule 1 or 2 as follows:

- “(1) No person may; without a permit-
- a) Pick;
 - b) Import;
 - c) Export;
 - d) Transport
 - e) Possess
 - f) Cultivate; or
 - g) Trade in,

A specimen of a specially protected plant.”

Schedule 2 of the Northern Cape Conservation Act (Act No. 1374 of 2009) lists protected species within the Northern Cape Province that require a permit for removal from the Northern Cape Department of Agriculture, Forestry and Fisheries.

Section 51 (3) states that “no person may collect firewood or pick, transport or remove an indigenous plant on land of which such person is not the owner without the written permission”

5.4 WATER

5.4.1 NATIONAL WATER ACT (NWA), 1998 (ACT 36 OF 1998)

The National Water Act (NWA), 1998 (Act 36 of 1998), aims to manage national water resources in order to achieve sustainable use of water for the benefit of all water users.

This requires that the quality of water resources is protected, and integrated management of water resources takes place.

In terms of section 21 of the National Water Act, Act No. 36 of 1998 (NWA) a water use licence is required for:

- (a) taking water from a water resource;
- (b) storing water;
- (c) impeding or diverting the flow of water in a watercourse;
- (d) engaging in a stream flow reduction activity contemplated in section 36;
- (e) engaging in a controlled activity identified as such in section 37 (1) or declared under section 38 (1);
- (f) discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- (g) disposing of waste in a manner which may detrimentally impact on a water resource;
- (h) disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- (i) altering the bed, banks, course or characteristics of a watercourse;
- (j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and
- (k) using water for recreational purposes.

Other provisions of the NWA have been taken into account, specifically relating to Part 4 (Section 19), which deals with pollution prevention, in particular situations where pollution of a water resource occurs or might occur as a result of activities on land. A person who owns controls, occupies or uses the land in question is responsible for taking measures to prevent pollution of water resources. If these measures are not taken, the catchment management agency concerned may itself do whatever is necessary to prevent the pollution or to remedy its effects, and to recover all reasonable costs from the persons responsible for the pollution.

Depending on the exact process that will be undertaken by the Solar facility, which will be further investigated during the EIA phase of the project, if one or more of the uses listed above are triggered a water use licence is required by the Department of Water Affairs (DWA).

Section 19 of the NWA also places a general duty to care in so far as the pollution of water resources is concerned. This will need to be taken into consideration during the WUL application.

5.5 HERITAGE

Aspects concerning the conservation of cultural resources are dealt with mainly in two acts. These are the National Heritage Resources Act (Act 25 of 1999) and to a lesser extent, the National Environmental Management Act (Act 107 of 1998). A similar study was done on the farm for BTE/APS during January 2011, during which a number of archaeological sites were recorded. Based on the results of the earlier work Aurora has positioned their plant in order not to impact negatively on these sites. The 2012 assessment will be necessitated by the fact that a second area on Konkoonies, for the expansion of the Solar Plant, has been selected for development.

5.5.1 NATIONAL HERITAGE RESOURCES ACT (NHRA) (ACT 25 OF 1999)

According to the above-mentioned act the following is protected as cultural heritage resources:

- a. Archaeological artefacts, structures and sites older than 100 years
- b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
- c. Objects of decorative and visual arts
- d. Military objects, structures and sites older than 75 years
- e. Historical objects, structures and sites older than 60 years
- f. Proclaimed heritage sites
- g. Grave yards and graves older than 60 years
- h. Meteorites and fossils
- i. Objects, structures and sites of scientific or technological value.

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources. An HIA must be done under the following circumstances:

- i. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
- ii. The construction of a bridge or similar structure exceeding 50m in length
- iii. Any development or other activity that will change the character of a site and exceed 5 000m² or involve three or more existing erven or subdivisions thereof
- iv. Re-zoning of a site exceeding 10 000 m²
- v. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

Structures

Section 34 (1) of the NHRA states that no person may demolish any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Alter means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or the decoration or any other means.

Archaeology, palaeontology and meteorites

Section 35(4) of this act deals with archaeology, palaeontology and meteorites. The act states that no person may, without a permit issued by the responsible heritage resources authority (national or provincial):

- a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site or any meteorite;
- b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or paleontological material or object or any meteorite;

- c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or paleontological material or object, or any meteorite; or
- d) bring onto or use at an archaeological or paleontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and paleontological material or objects, or use such equipment for the recovery of meteorites.
- e) alter or demolish any structure or part of a structure which is older than 60 years as protected.

The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.

Human remains

Graves and burial grounds are divided into the following:

- A. ancestral graves
- B. royal graves and graves of traditional leaders
- C. graves of victims of conflict
- D. graves designated by the Minister
- E. historical graves and cemeteries
- F. human remains

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:

- a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- b) 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; or
- c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Human remains that are less than 60 years old are subject to provisions of the Human Tissue Act (Act 65 of 1983) and to local regulations. Exhumation of graves must conform to the standards set out in the Ordinance on Excavations (Ordinance no. 12 of 1980) (replacing the old Transvaal Ordinance no. 7 of 1925).

Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated) before exhumation can take place.

Human remains can only be handled by a registered undertaker or an institution declared under the Human Tissues Act (Act 65 of 1983 as amended).

Unidentified/unknown graves are also handled as older than 60 until proven otherwise.

Following the completion of the AIA and HIA the coordinates of the entities identified will be added to the location map. The entities will be classified in terms of the ranking afforded to each in the report, and the Applicant will aim to minimise the impact on any identified entities throughout the detail design phase, and prior to finalising permits for destruction and/or exhumation, which will only be considered in circumstances when mitigation is impossible.

5.6 VISUAL

5.6.1 WESTERN CAPE DEPARTMENT OF AND DEVELOPMENT PLANNING: GUIDELINE FOR INVOLVING VISUAL AND AESTHETIC SPECIALISTS IN EIA PROCESSES

A guideline document was developed by the Provincial Government of the Western Cape: Department Of Environmental Affairs and Development Planning (WCDEADP), which is entitled: "Guideline for Involving Visual and Aesthetic Specialists in EIA Processes".

This guideline document, which deals with specialist visual input into the EIA process, has been organised into a sequence of sections, following a logical order covering the following:'

- the background and context for specialist visual input;
- the triggers and issues that determine the need for visual input;
- the type of skills and scope of visual inputs required in the EIA process;
- the methodology, information and steps required for visual input;
- Finally, the review or evaluation of the visual assessment process.

5.6.1.1 PRINCIPLES AND CONCEPTS UNDERPINNING VISUAL INPUT

The following key principles and concepts will be considered during visual input into the EIA process (WCDEADP, 2005):

- An awareness that 'visual' implies the full range of visual, aesthetic, cultural and spiritual aspects of the environment that contribute to the area's sense of place.
- The consideration of both the natural and the cultural landscape, and their inter-relatedness.
- The identification of all scenic resources, protected areas and sites of special interest, together with their relative importance in the region.
- An understanding of the landscape processes, including geological, vegetation and settlement patterns, which give the landscape its particular character or scenic attributes.
- The need to include both quantitative criteria, such as 'visibility', and qualitative criteria, such as landscape or townscape 'character'.
- The need to include visual input as an integral part of the project planning and design process, so that the findings and recommended mitigation measures can inform the final design, and hopefully the quality of the project.

5.7 NATIONAL PLANNING AND POLICY CONTEXT ON ENERGY

5.7.1 WHITE PAPER ON THE ENERGY POLICY OF SOUTH AFRICA, 1998

The white paper on South African energy policy governs the development of South Africa energy sector (DME, 1998). This document identifies key objectives for energy supply such as managing energy related environmental impacts, access to affordable energy services and securing energy supply through diversity.

5.7.2 RENEWABLE ENERGY POLICY IN SOUTH AFRICA, 2003

The white paper on renewable energy (DME, 2003) supplements the energy Policy and sets out government's strategic goals, vision, policy principles and objectives implementing and promoting renewable energy in South Africa. South Africa has various sources of renewable resources in particular solar and wind and therefore this policy supports this rational and that from a fuel resource perspective renewable application is proven to be the least costly especially from an environmental and social perspective. Meeting technical and economic as well other constrains is one of the major concerns of the governmental policy on renewable energy.

South Africa has set a 10 year 10 000 GWH target for renewable energies by 2013 to be produced mainly from solar, wind and biomass as well small scale hydro. This amounts to approximately 4% of the country estimated demands by 2013.

5.7.3 FINAL INTEGRATED RESOURCE PLAN, 2010 -2030

Minister of energy is obligated as per the Energy Act of 2008 to publish and develop an integrated resource plan for energy. The department of Energy (DOE) in partnership with the National Energy Regulator of South Africa (NERSA) has published the Integrated Resource Plan (IRP) for the time period 2010 to 2030. The main objective of the IRP develops an electricity investment strategy that is sustainable for the transmission infrastructure and generation capacity for South Africa for the next 20 years.

The white paper on renewable energies states that it is of global/national importance to supplement existing energy demand with renewable forms of energy as to combat climate change. The outcome of this IRP acknowledged that coal fired power generation facilities is still required over the next 20 years. The DOE released the final IRP in March 2011 and accepted by parliament at the end of March. In addition to all existing and committed power plants the IRP includes 6.3 GW of coal, 9.6 GW for Nuclear, 17.8 GW for renewables (including 8.4 GW for solar) and 8.9 from other sources.

5.8 ASTRONOMY GEOGRAPHIC ADVANTAGE ACT, 2007

The objectives of the Astronomy Geographic Advantage Act are as follows:

- a) to provide measures to advance astronomy and related scientific endeavours in the Republic;
- b) to develop the skills, capabilities and expertise of those engaged in astronomy and related scientific endeavours in Southern Africa;
- c) to identify and protect areas in which astronomy projects of national strategic importance can be undertaken;
- d) to provide a framework for the establishment of a national system of astronomy advantage areas in the Republic, to ensure that the geographic areas in the Republic which are highly suitable for astronomy and related scientific endeavours due to, for example, high atmospheric transparency, low levels of light pollution, low population density or minimal radio frequency interference are protected, preserved and properly maintained;
- e) to regulate activities which cause or could cause light pollution or radio frequency interference or interfere in any other way with astronomy and related scientific endeavours in those areas;
- f) pursuant to Section 5, to provide for the declaration and management of astronomy advantage areas; and
- g) to enable the Minister to participate in efforts to preserve the astronomy advantage of Southern Africa and to coordinate astronomy within this area.

In line with the above the MEC may declare astronomy advantage areas (AAA). The provisions provide for the minister within the act to declare any area in the Northern Cape Province as an AAA; however no such declaration may be made in respect to any area demarcated in terms of the Municipal Demarcation Act and falling within the Sol Plaatje Municipality. The entire Northern Cape province excluding Sol Plaatje Municipality was declared an astronomy advantage area within GN: 31855 (No. 82 of 2009) in terms of Astronomy Geographic Act, 2007 (Act No. 21 of 2007).

Notice of intention to declare the Karoo astronomy advantage area was published for public comment in General Notice 115 of 2009 within GN. 31855 of 2009. This general notice describes the boundaries of radio Astronomy Advantage Areas, including Karoo core radio AAA, Karoo Central radio AAA 1, Karoo Central radio AAA 2 and Karoo Central radio AAA 3

The purpose of declaring areas as astronomy advantage areas is mainly to ensure that areas suitable for astronomy and related scientific endeavours in South Africa are preserved and maintained. These areas consist of, among other things, atmospheric transparency, low levels of light pollution, low population density or minimal radio frequency interference. The AAAs also enhance and provide management to existing geographic advantage areas.

In terms of this act no person without prior permission from the delegated management authority in terms of the act, may:

1. "Enter any core astronomy advantage area
2. Reside in a core astronomy advantage area
3. Have in their possession, within a core astronomy advantage area designated by the Minister in terms of Section 7(1)(c) for radio astronomy, any interference source, mobile radio frequency interference source or short range device, unless the source or device has been turned off and, when in that state, is incapable of causing any form of radio frequency interference; and
4. Perform any other activity in a core astronomy advantage area that might be harmful to astronomy and related scientific endeavours or to the preservation of the area's astronomical advantage."

In terms of this act restrictions can also be placed on the use of radio frequency spectrums in astronomy advantage areas. Draft regulations regarding radio astronomy protection levels in astronomy advantage areas were published in GN .539 of 2011 in terms of the Astronomy Geographic Advantage Act, 2007 (Act No. 21 of 2007).

5.9 OTHER RELEVANT LEGISLATION AND GUIDELINES

5.9.1 NATIONAL VELD AND FOREST FIRE ACT (ACT 101 OF 1998)

In terms of Section 21 of the act, the project company would be required to burn firebreaks to ensure that if a veldfire occurs it does not spread to adjacent properties. No licence or permit is required in term of this act by the project company; however this legislation will be used and integrated into the site's EMPr (Appendix 7).

5.9.2 EQUATOR PRINCIPLES

Project financing would require the project to comply with the Equator Principles. These principles are a set of standards that are voluntarily implemented to identify, assess and manage environmental and social risks. The Equator Principles are based on the guidelines of the World Bank group of social policies of the International Finance

Corporation (IFC). Once financial institutions adopt the Equator Principles they place a commitment onto themselves not to finance projects that do not comply with these principles.

Therefore the proposed expansion project would have to demonstrate compliance with all potential environmental and social impacts associated with the project. The Equator Principles would have to be used to monitor and manage the project in line with these requirements. The following table represents the principles that have been considered in compiling this report.

Table 5-2: Equator Principles considered	
Equator Principles 1: Review and Categorisation	“Category B or C – Projects with minimal or no social or environmental impacts.”
Equator Principles 2: Social and Environmental Assessment	This subject report is compiled to assess the environmental and social impact of the proposed development. The mitigation measures are prescribed in this report as well as in the EMPr (Appendix 7)
Equator Principles 3: Applicable Social and environmental Standards	The following IFC performance standards are applicable to the proposed project: <ol style="list-style-type: none"> 1. Social and environmental Sustainability 2. Labour and Working conditions 3. Pollution prevention and abatement 4. Community health, Safety and Security 5. Land Acquisition and Involuntary Resettlement 6. Biodiversity Conservation and Sustainable Natural resource Management 7. Cultural Heritage
Equator Principles 4: Action Plan and Management system	The EMPr should be used as the management plant to develop a site-specific Action Plan that would need to be implemented as part of the site's Environmental Management System (EMS) and implemented by the site Environmental Control Offices
Equator Principles 5: Consultation and Disclosure	The public participation process has been and will be undertaken in line with South African legislation in terms of NEMA: EIA regulation R543.
Equator Principles 6: Grievance Mechanism	A grievance process will be implemented by the project development company to ensure disclosure, consultation and public engagements during all phases of development of the facility.
Equator Principles 7: Independent Review	Independent review of all environmentally related aspects/documents of the proposed project lender must be undertaken.
Equator Principle 8: Covenants	All South African legislation must be

	complied with by the proponent.
Equator Principle 9: Independent Monitoring and Reporting	ECO must monitor the site to ensure independent verification of monitoring results.
Equator Principle 10: EPFI Reporting	Annual report must be submitted to the relevant lender.

5.9.3 OCCUPATIONAL HEALTH AND SAFETY

The EIA process assesses impacts on the environment, and does not specifically focus on issues of internal health and safety, as these are regulated by other legislation such as the Occupational Health and Safety Amendment Act, Act No. 181 of 1993, (OHSA). However there are instances in which the application of health and safety regulation is relevant within the domain of impact on the environment. The Occupational Health and Safety Act (OHSA) regulations include Regulation 1179 (Hazardous Chemical Substances) and Regulation 7122 (Major Hazard Installations). A “hazardous chemical substance” is defined in Government Notice R.1179 Hazardous Chemical Substances Regulations (1995) as any toxic, harmful, corrosive, irritant or asphyxiant substance, or a mixture of such substances for which (a) an occupational exposure limit is prescribed, or (b) an occupational exposure limit is not prescribed; but which creates a hazard to health.

In terms of Section 8(2d) of the Occupational Health and Safety Act, 1993 the employers has to establish, as far as is reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business; and he shall, as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons. The employer shall, furthermore, provide the necessary means to apply such precautionary measures.

A Major Hazardous Installation is defined in terms of the Occupational Health and Safety Act as an installation:

- “where more than the prescribed quantity of any substance is or may be kept, whether permanently or temporarily; or
- where any substance is produced, used, handled or stored in such a form and quantity that it has the potential to cause a major incident”.

A major incident as referred to above is defined as “an occurrence of catastrophic proportions, resulting from the use of plant or machinery, or from activities at a workplace”. It is impossible to put a specific value to “catastrophic” because it will always differ from person to person and from place to place. However, when the outcome of a risk assessment indicates that there is a possibility that the public will be involved in an incident, then the incident can be seen as catastrophic (Department of Labour 2005). Certain substances listed in Schedule A of the General Machinery Regulations may possibly be used or stored in quantities exceeding the stated thresholds. However due to previous experience with such this would not necessarily be the case.

5.9.4 GUIDELINES PUBLISHED IN TERMS OF NEMA EIA REGULATIONS:

- Guideline 3: General Guide to Environmental Impact Assessment Regulations, 2006 (DEAT, June 2006).
- Guideline 4: Public Participation in support of the Environmental Impact Assessment Regulations, 2006 (DEAT, June 2006)
- Guideline 5: Assessment of alternatives and impact in support of the Environmental Impacts Assessment Regulations, 2006 (DEAT, June 2006)
- Integrated Environmental Management Information series

5.9.5 GUIDELINES ON THE INVOLVEMENT OF SPECIALISTS IN THE EIA PROCESS

The Western Cape Department of Environmental Affairs and Development Planning (WC DEADP) have developed policy guidelines around specialist involvement in EIA processes. The guidelines aim to improve the quality of specialist input and facilitate informed decision-making. The guidelines clarify the roles and responsibilities of all role players with regard to specialist input in the EIA process. These guidelines have been derived to help practitioners draft appropriate terms of reference for specialist input and assist role players to evaluate the appropriateness of specialist input in individual cases. Although these guidelines have been developed by the Western Cape, they can be adopted for use anywhere in the country.

Hence, the EIA process will endeavour to adhere to these set of guidelines, in order to be in line with provincial guidelines relevant to EIA's.

These guidelines include:

- Guideline for Determining the Scope of Specialist involvement in EIA processes (June 2005)
- Guideline for the Review of Specialist input in EIA processes (June 2005)
- Guideline for involving Biodiversity specialists in EIA processes (June 2005)
- Guideline for involving Heritage specialists in EIA processes (June 2005)
- Guideline for involving Visual and Aesthetic specialists in EIA processes (June 2005)
- Guideline for Environmental Management Plans
- Guideline for Involving Social Assessment Specialists in EIA Processes

The full versions of these reports can be downloaded from:
<http://www.capecapegateway.gov.za/eng/pubs/guides/G/103381>

6. PUBLIC PARTICIPATION

6.1 INTRODUCTION

Public participation provides the opportunity for Interested and Affected Parties (I&APs) to participate on an informed basis, and to ensure that their needs and concerns are considered during the impact assessment process. In so doing, a sense of ownership of the project is vested in both the project proponent and interested or affected parties. The Public Participation Process is aimed at achieving the following:

- Provide opportunities for I&APs and the authorities to obtain clear, accurate and understandable information about the expected environmental and socio-economic impacts of the proposed development.
- Establish a formal platform for the public with the opportunity to voice their concerns and to raise questions regarding the project.
- Utilise the opportunity to formulate ways for reducing or mitigating any negative impacts of the project, and for enhancing its benefits.
- Enable project proponent to consider the needs, preferences and values of I&APs in their decisions.
- Clear up any misunderstandings about technical issues, resolving disputes and reconciling conflicting interests.
- Provide a proactive indication of issues which may inhibit project progress resulting in delays, or which may result in enhanced and shared benefits.
- Ensure transparency and accountability in decision-making.

The public participation process is discussed below: (Appendix 4 – Public participation information will be added and updated before the FINAL scoping report is submitted to the authorities)

- The project Background Information Document (BID);
- Proof of notifications to I&APs of the application to DEA for Environmental Authorization;
- Proof of press advertisements and site notices;
- List of I&APs; and
- 30 day commenting period for registered I&Ap and 40 days commenting period for key stakeholders (DAFF, DEA, DWA etc.) on draft scoping report
- 30 day commenting period was given on the final scoping report to registered I&Ap as well key stakeholders.
- Comments and Responses Report (C&RR).

6.2 IAP NOTIFICATION & CONSULTATION

The first step in the public participation process was to advertise the project as required by the 2010 EIA Regulations, in order to inform potential I&AP's of the proposed project and EIA process. This was done by means of the following:

- A Background Information Document (BID) was compiled giving detail on the applicant, the Environmental Assessment Practitioner (EAP), the scope and locality of the proposed project, the EIA process, purpose and process of public

participation, and included an invitation to register as I&AP and provide comment, as well as an open invitation to the first public meeting.

- Pre-identification of interested and affected parties (I&APs), including adjacent landowners, using existing databases, and distributing the BID to these stakeholders. The BID was also sent to any other IAPs who responded to site or press notifications.
- Advertising the proposed project and associated EIA process in “Die Gemsbok” on 16 March 2012. The advertisements indicated where written comments may be directed to and were placed in English.
- A2-size site notices were erected on the site
- The draft Scoping report was distributed to all registered I&APs for a 30 day commenting period from 23 April 2012 to 23 May 2012. All key identified commenting authorities were sent a hardcopy as well, including electronic copies (via email) of the draft scoping report on 20 April 2012 and also received a 30 day commenting period.
- The final Scoping report was distributed to all registered I&APs for a 30 day commenting period from 14 June 2012 to 14 July 2012. All parties were instructed to send comments directly to the Department. All key identified commenting authorities were sent a hardcopy as well, including electronic copies (via email) of the final scoping report on the 14 June 2012 and also given a 30 day commenting period
- All existing as well as additional stakeholders (SANPARKS, ESKOM and SKA) as per DEA requirements has been given an opportunity to comment on the draft amendment of the Scoping report from the 6 September 2012 to the 6 October 2012.

The following key identified commenting authorities received hardcopies as well electronic copies for comment. These parties included the following: (Please note proof of delivery to their offices contained in the Public participation report appendix 4)

Table 6-1: Key commenting authorities.				
Northern Cape Department of Agriculture, Forestry and Fisheries (DAFF)	Mrs. Jacoline Mans	054 338 5839	JacolineMa@nda.agric.za	
Northern Cape Department of Environment and Nature Conservation	Mr. Tshlo Makaundi	053 807 7464	tmakaudi@half.ncape.gov.za	
Department of Water Affairs (DWA)	Mr. A Abrahams	053 830 8802	AbrahamsA@dwa.gov.za	
Khai Ma Local Municipality	Mr. W. Andre	054 933 1000	New Street, Pofadder, 8890	
Namakwa District Municipality	Mr. A Richards	027 712 8000	Private Bag X20, Springbok, 8240	

The following key commenting authorities was send electronic copies of the report:

Table 6-2: Key commenting authorities send electronic copies of reports.		
Field service centre manager (Eskom Northern Cape)	Masilo Ramapkakela	north.western@eskom.co.za
Eskom Snr Supervisor land rights - North-western region	Rene de bruin	dBruinER@eskom.co.za
WESSA NC	Suzanne Erasmus & Tania Anderson	spothil@gmail.com & se@museumsnc.co.za
SAHRA	Katie Smuts	ksmuts@sahra.org.za
DAFF	Mrs. Anneliza Collett	AnnelizaC@nda.agric.za
Eskom (Grid connectivity)	Kevin Leask	Kevin.leask@eskom.co.za
Eskom (Grid connectivity)	Ronald Marais	ronald.marais@eskom.co.za
SANPARKS – Environmental Manager	Sarel Yssel	sarel.yssel@sanparks.org
SANPARKS – Arid region Environmental Manger	Dries Englebrecht	dries.engelbrecht@sanparks.org
SKA office	Dr Adrian Tiplady	atiplady@ska.ac.za
DAFF (Delegate of the Minister (Act 70 of 1970)	Ms Mashudu Marubini	MashuduMa@daff.gov.za
DAFF (AgriLand Liaison office)	Ms Thoko Buthelezi	ThokoB@daff.gov.za

Proof of these advertisements, sending of the BID, proof of site notices, communications with I&AP's and others are contained in the Public participation report attached as Appendix 4 to this report.

6.3 DEA ADDITIONAL REQUIREMENTS FOR PUBLIC PARTICIPATION

The DEA rejection letter of the final scoping report received on 21 August 2012 identified several public participation requirement; these include the following:

- The final scoping report does not indicate where and for how long the draft SR and FSR was available for public comment. (Refer to section 6.2)
- The final scoping report does not contain proof that the draft/ final Scoping report was send to the relevant authorities and organs of state (See appendix 4). The SANPARKS, ESKOM and SKA project office must also be included in the list of organs of state that receive reports for comment.
- There is no indication of the status of the recipients of the email and letters as a key stakeholder. Please provide the department with a list of the names and contact details of all the key stakeholders that received written notification of the project.

In line with the above requirements from the department, the following stakeholders have been included in the process and will be informed on all aspect regarding the proposed development:

Table 6-3: Additional Key commenting stakeholders included in the EIA process.	
Eskom (Grid connectivity)	Kevin Leask
Eskom (Grid connectivity)	Ronald Marais
SANPARKS – Environmental Manager	Sarel Yssel
SANPARKS – Arid region Environmental Manger	Dries Englebrecht
SKA office	Dr Adrian Tiplady

A 30 day commenting period has been given to these parties to comment on the draft amended scoping report. Comments received during this time period will be included in the final version of the report submitted to the department. The draft and final amended scoping report will all be sent to all I&As for comment.

6.4 COMMENTS & ISSUES RAISED BY I&APS

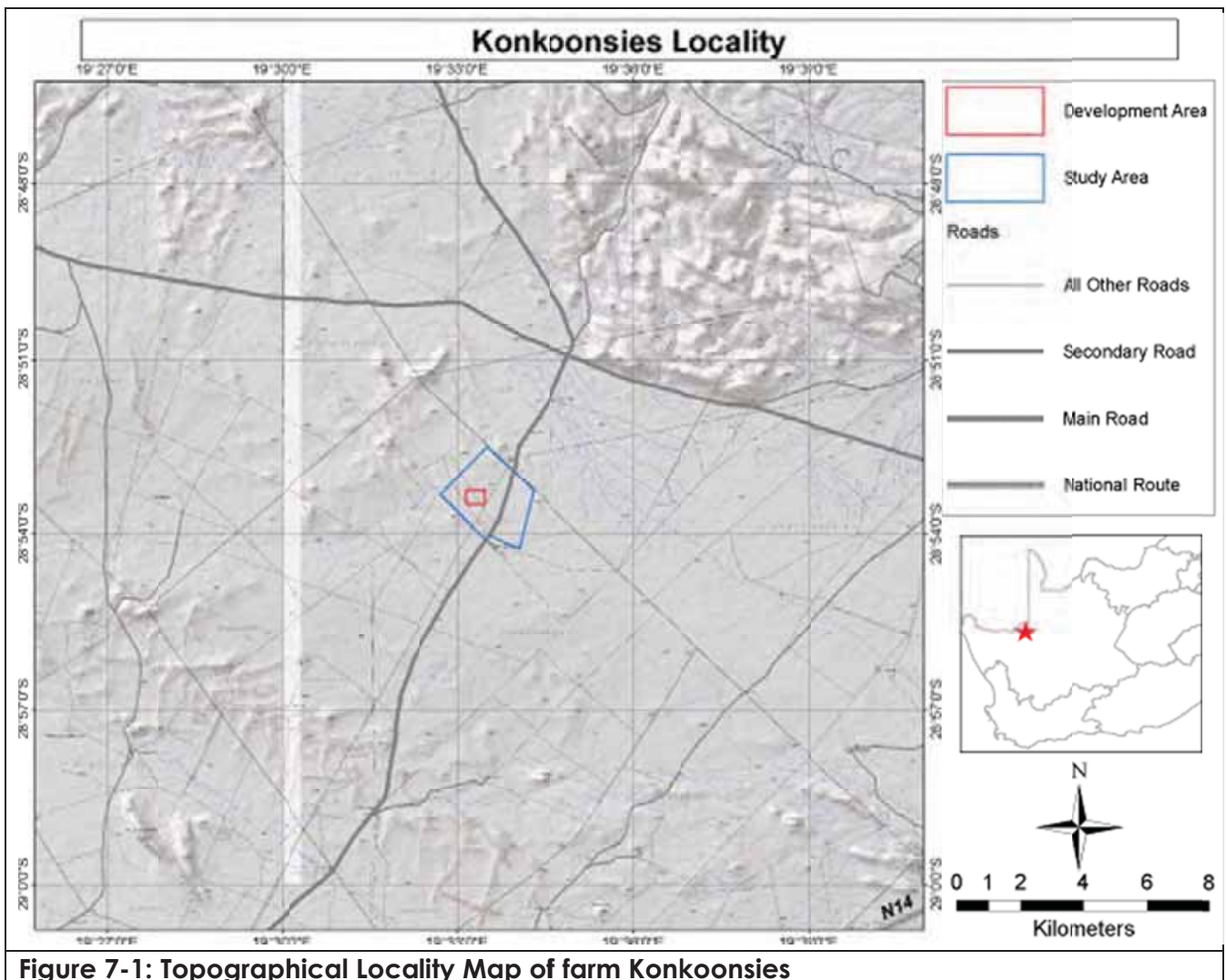
Interested and affected parties were given 30 days to register and comment on the proposed application. To date there were no comments or issues raised by any I&APs.

Comment	Response
<p><u>Jacoline Mans (NC DAFF):</u></p> <ol style="list-style-type: none"> The DAFF is mainly concerned about the potential impact on protected tress species. See the National forest Act, Act 84 of 1998 (NFA) as amended section 12(1)(d) read with s15(1) and s62(2)©. The list of protected tree species was published in GN 734 of 16 September 20122. Please ensure that the anticipated impact (if any) on protected trees are properly assessed during the EIA phase. The final scoping report pointed out that a biodiversity assessment will be conducted during the EIA phase. Please send a copy of this report to the DAFF as soon as it becomes available for comment. . 	<p>Noted. The necessary assessment will be conducted and the Biodiversity Assessment provided during the EIA after completion.</p>

7. DESCRIPTION OF THE ENVIRONMENT AND POTENTIAL IMPACTS

7.1 REGIONAL LOCATION

The property on which the proposed development is to take place belongs to local farmers, and not to BioTherm Energy. The land will be leased from the land-owner for the development with an option to purchase. The site for the proposed facility lies within the Namakwa District Municipality and within the Khai-Ma local Municipality. The farm Konkoonies 91 is located on the Gravel road between the N14 national tar road and the R358 Pofadder-Onseepkans road in the Northern Cape. Namakwa District Municipality covers an area of approximately 126 747 square kilometres. The area demarcated in red within the study area refers to the area which already has environmental authorisation and is in the process of being developed as a 10 MW PV facility (DEA Ref: 12/12/20/2098). The proposed study area forms part of a larger study being undertaken to potentially expand the development area to a much larger facility in the future.



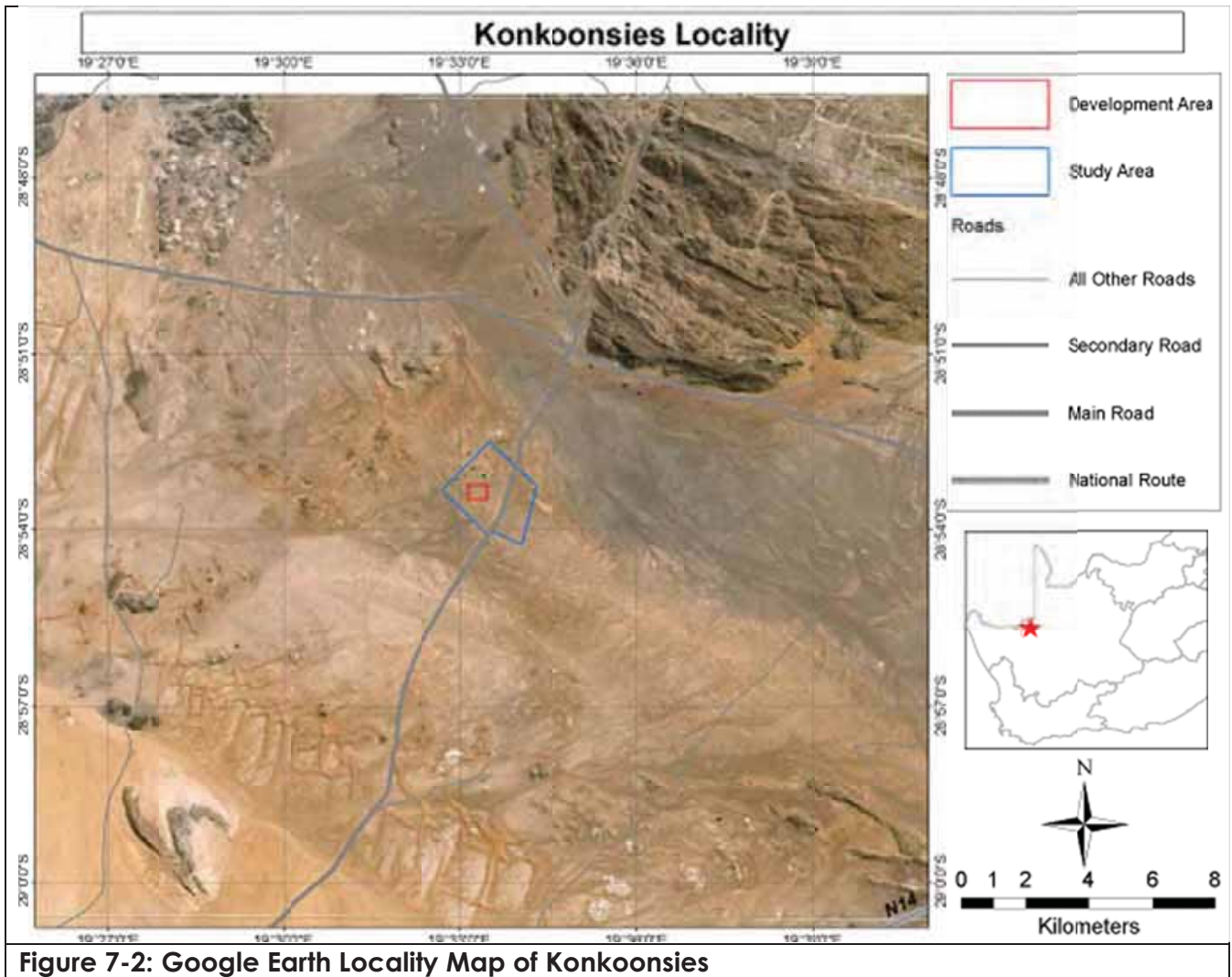
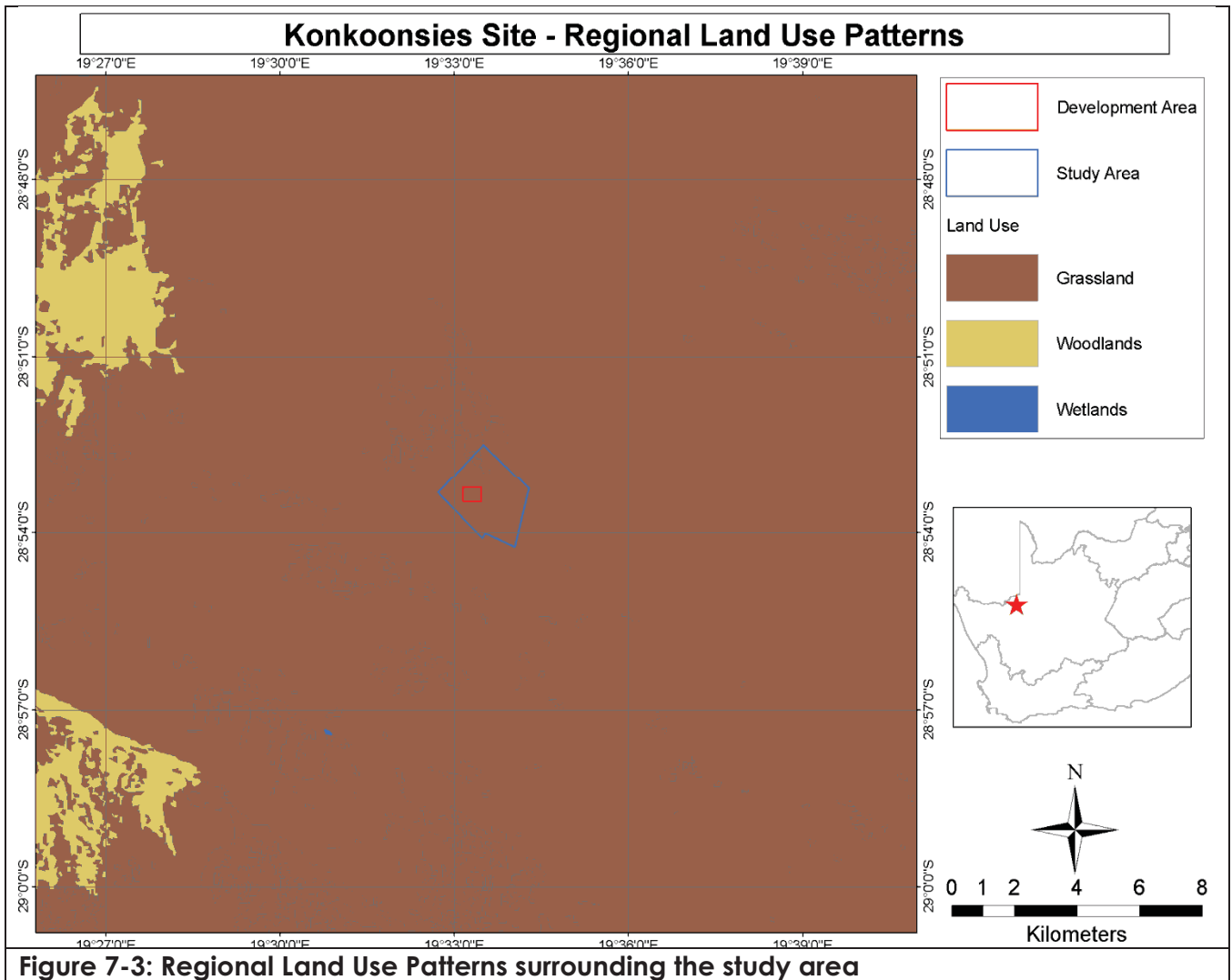


Figure 7-2: Google Earth Locality Map of Konkoonsies

7.1.1 LAND-USE AND LAND-COVER OF THE STUDY AREA

The predominant land use activities within the Northern Cape are mining and goat, sheep, cattle and game farming. The site is also characterised by mostly cattle and game farming, with limited irrigational schemes using the Orange River to the north. The surrounding land cover is mostly grassland and scrubland. The main issues were identified as issues relating to land resources in the Northern Cape Province are desertification, land degradation, land ownership and land use. The province is classified to be 30.3% moderately degraded and 24.2% of the land classified as extremely degraded. This results in approximately 50% of the province land falls into the above categories and therefore measures must be put in place to ensure that this situation does not worsen. The Northern Cape Province is very susceptible to desertification and measure should be put in place to ensure sustainable land management. Figure 7-3 indicated the regional land use patterns of the study area and surrounding.



7.2 CLIMATE

The Northern Cape region is semi-arid and receives an annual rainfall of 103 millimetres, with the majority of rain falling in the summer months between October and March. On average the heaviest rains fall in mid to late summer, with February and March being the wettest months. The areas within the study area falls is considered to be arid to very arid region of South Africa mainly because areas with less than 400 millimetre of rainfall a year is considered to be arid.

7.2.1 TEMPERATURE

A daily average maximum temperature in January in the area is approximately 37 Celsius and minimum average are 4 degrees Celsius in July when mercury drops to 3.1.

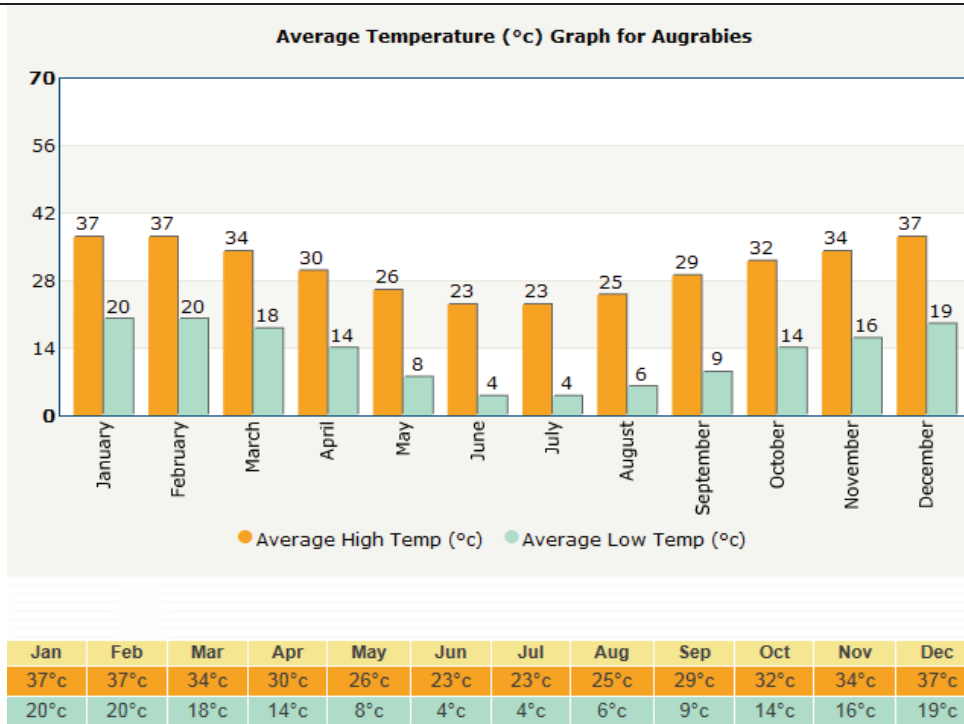


Figure 7-4: Average Temperature Graph for Augrabies region (<http://www.worldweatheronline.com>)

7.2.2 RAINFALL

There are no official rainfall stations in close proximity to the study area. It was subsequently necessary to use data from the nearest official rainfall station. The acquired information was retrieved from the following website, www.worldweatheronline.com. The data is for the Augrabies Falls National Park on the Orange River some 72 Km east northeast of the study area.

Table 7-1: The monthly average rainfall for the Augrabies Falls National Park. (Courtesy, www.worldweatheronline.com)



7.2.3 WIND

Figure 7-5 represents a wind rose of the dominant wind direction in the Augrabies region (Augrabies is the closes area were reliable data could be retrieved within the area) to be predominately South Easterly. This is expected as Augrabies is in a part of the country where the mean flow is from the Anticlonic circulation from the South Atlantic High pressure.

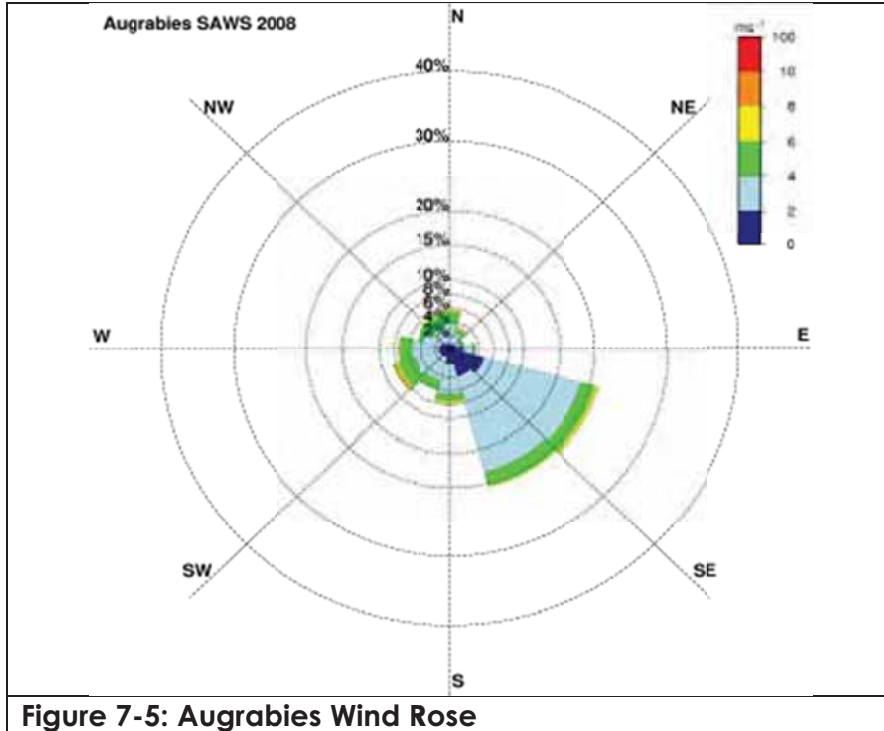
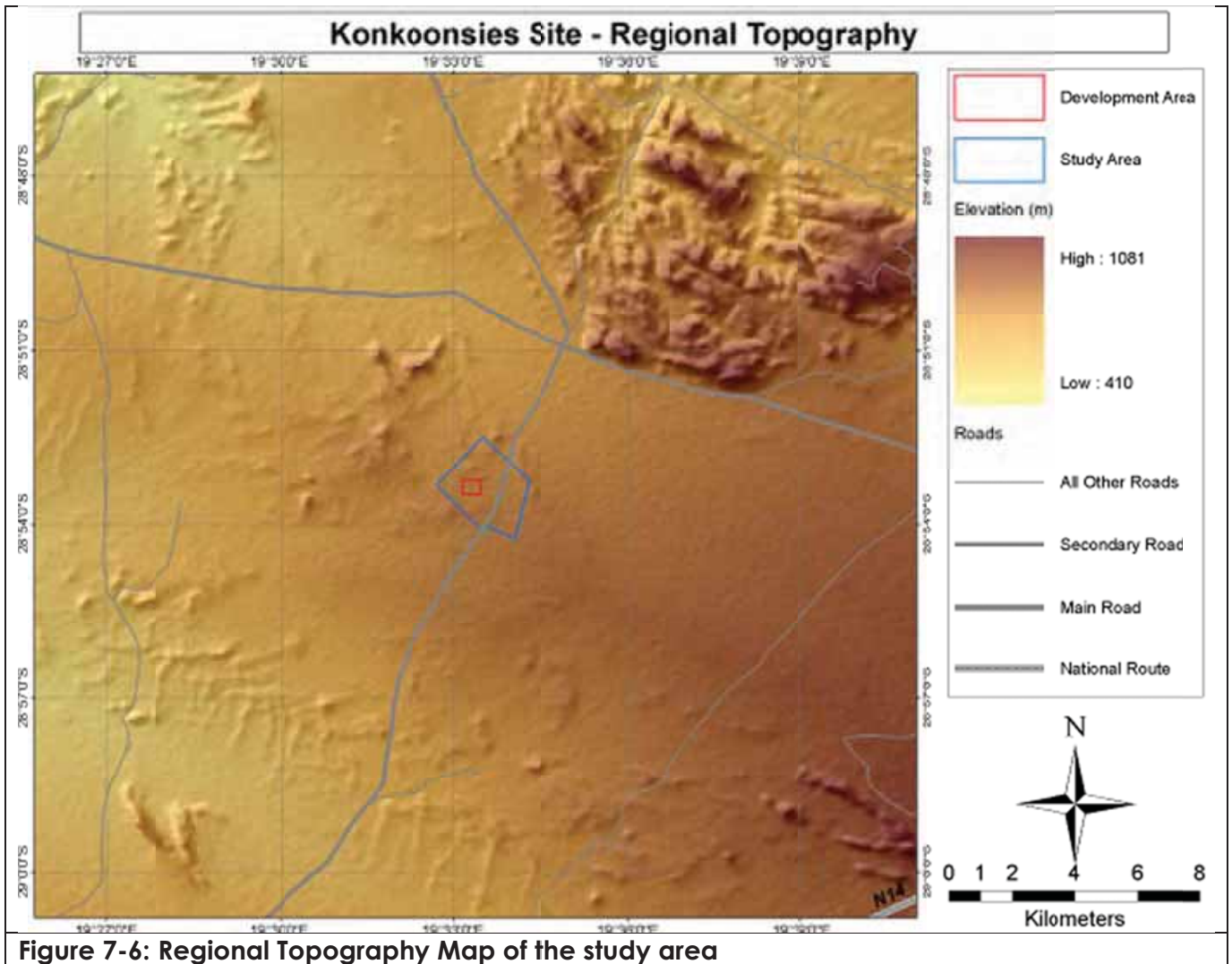


Figure 7-5: Augrabies Wind Rose

7.3 TOPOGRAPHY

The proposed study area has very dominant rocky outcrops (koppies) on the site, with flat land in between. The majority of the site is flat, with minimal change in elevation throughout. The broader region around Konkoonsies is also flat, with higher mountains (Ysterberg) approximately 4km's to the North-east of the site. Figure 7-6 below shows the regional topography of the study area. The figure indicated that the study area is relatively flat with no major topological constraints to the proposed development.



7.4 GEOLOGY

The study area is located predominantly on unconsolidated quaternary sediments. The Little Namaqualand Suite outcrops to the east of the site and the Hoogoor Formation outcrops to the west of the site. Essentially the site exists within the Namaqualand Metamorphic Province, which consists of an assemblage of metasedimentary, metavolcanic and intrusive rocks, which are schistose and/or gneissose (Visser, 1989). Strikes and dips are not constant and dips are fairly steep almost everywhere (Rison, 2012).

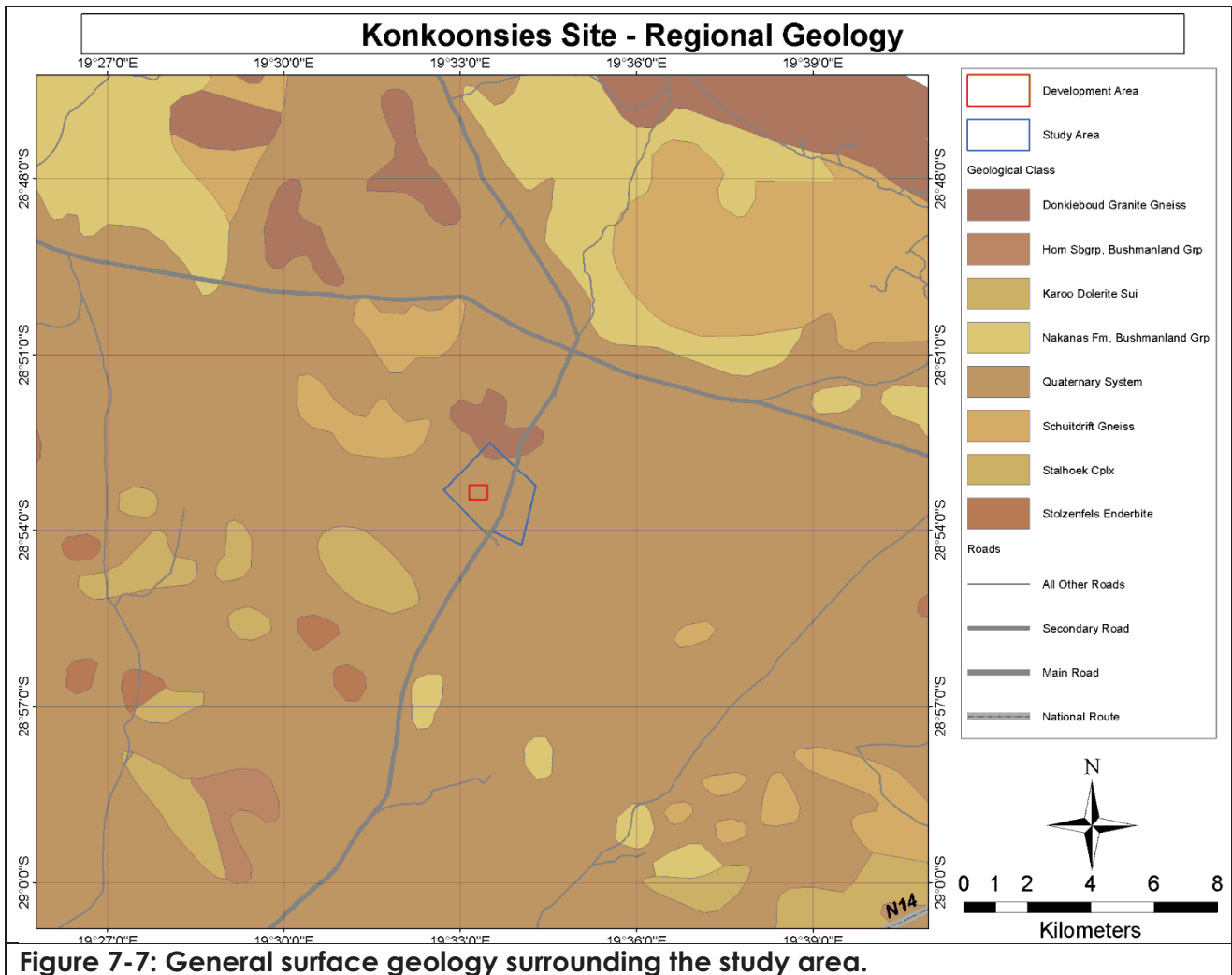


Figure 7-7: General surface geology surrounding the study area.

7.5 SOIL

Land degradation is seen as the reduction or loss of biological or economic productivity and complexity in different land covers/uses. Approximately 21% of the Province has light degradation whilst around 30% is moderately degraded. About 24.2% is extremely degraded, meaning that just over half the Province falls into the moderate and extreme degradation categories. Veld degradation was found to be serious but decreasing - the Province has the third highest provincial veld degradation index in South Africa. Soil degradation on the other hand was not perceived to be a serious problem. Overall, commercial farming areas require the most attention. (SoER, 2004)

Soil salinization is a problem in the Northern Cape, particularly in areas where irrigated agriculture is practised. Soil salinity may lead to a loss in crop production and affect the long term agricultural potential of land in the Province. Roughly 63% of the Northern Cape can be classified as saline. This could be due to naturally occurring salts in water accumulating in the soil, through geological processes (e.g. rock weathering), or it could be induced by certain agricultural practices. (SoER, 2004) AS per figure below the proposed PV facility occurs within an area considered to be non-saline.

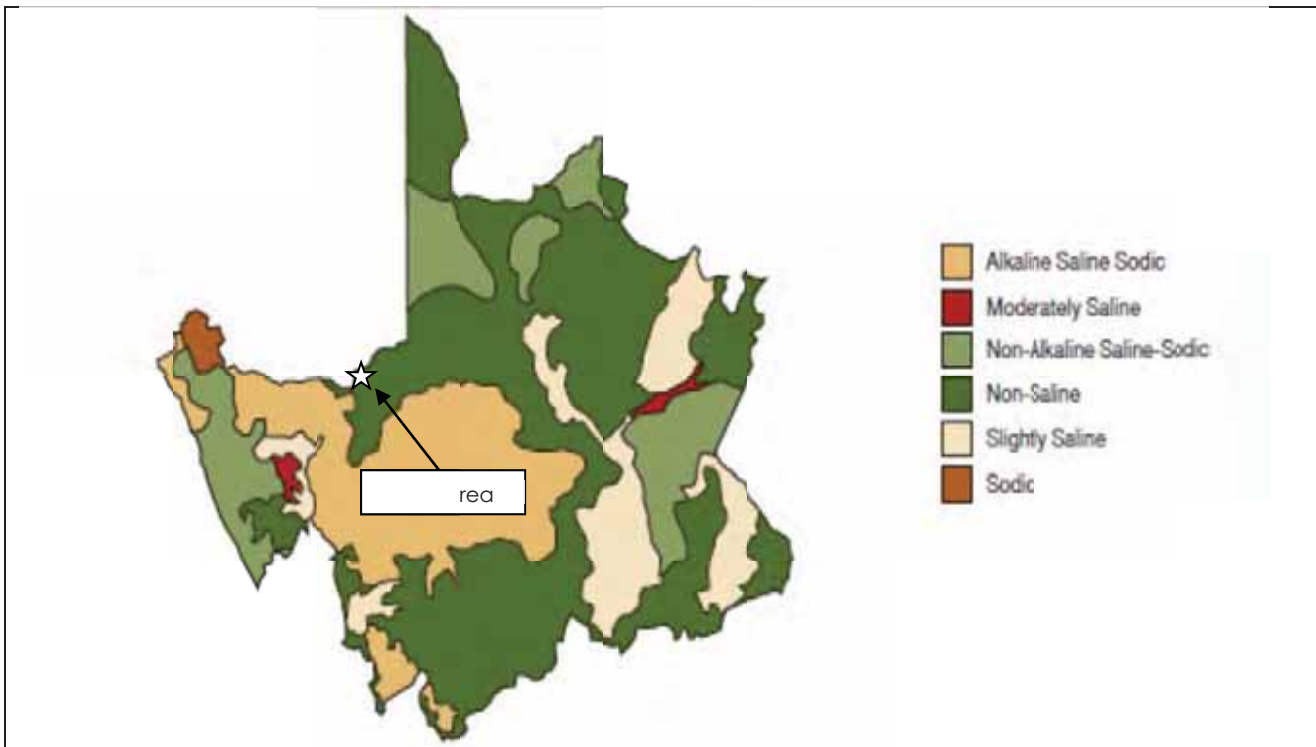


Figure 7-8: Soil salinity map of the Northern Cape

7.6 VEGETATION

The study area is located within the Nama Karoo biome within the Bushmanland Arid Grassland. This vegetation type covers an area of approximately 45479 km². Approximately 99.4% of this vegetation type is still remaining. In the context of the study area the entire area assessed was 524 hectares, assuming the entire study area was developed only 0.01% of the vegetation unit will be transformed. The transformation of all vegetation within the study area would be considered negligible. However a detailed species account within the study area was not assessed, however this will be made obligatory to the proponent before construction commences following approval from regional DAFF. The construction of the solar panel station on its own will not significantly contribute to habitat loss on a regional scale. Due to the presence of other power generation infrastructure (power lines), it is not possible to utilise the whole property and therefore the loss in habitat will even be less.

Using Landsat 7 (at various bands), in an unsupervised classification, clusters of regionally and locally derived areas of LEAST influence were modelled (de Frey, 2012). The image below shows the overlay of both the regionally and locally potential areas of least influence within the study area on the farm Konkoonsies. If the proposed solar facility footprints are located within the areas where these two layers overlap, then in principal the construction of the facility will have the least influence on both regional and local level (de Frey, 2012).

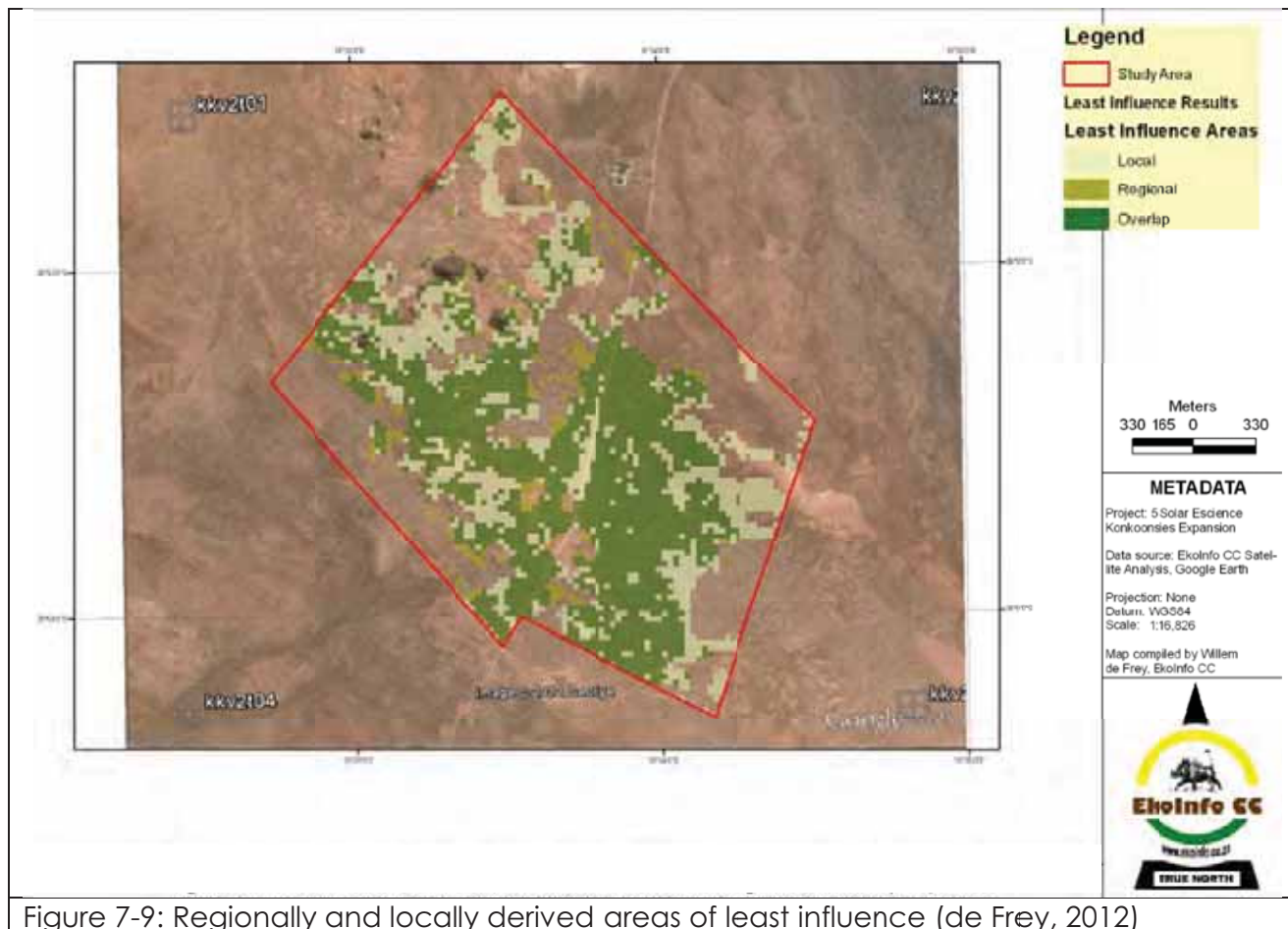


Figure 7-9: Regionally and locally derived areas of least influence (de Frey, 2012)

The majority of threatened and endangered plant species is represented by either woody or forbs species (shrubs and/or trees) in the Northern Cape. Specialist indicated that the majority of threatened plants in the Northern Cape occur at an altitude between 500 -100 meters above sea level, either on igneous or sedimentary rock, and often on granites. It was determined that the following two threatened species associated between 500 – 1000 meters above sea level and on granite could occur within the study area: *Geissorhiza Kamiesmontana* Goldblatt and *Otholobium hamatum* (harv.)C.H.Stirt. There is also a possibility that the following vulnerable species could occur within the study area: *Avonia herreana* (Poelln.); G.D.Rowley; *Avonia recurvata* (Schönland) G.D.Rowley subsp. *buderiana* (Poelln.) G.Will.; *Caesalpinia bracteata* Gemish. and *Lithops olivacea* L.Bolus.

The following protected species was observed during the specialist scoping site assessment (Appendix 6): *Nymania capensis* tree. It should be noted that permission to remove or destroy these trees has to be obtained from the Northern Cape Directorate of Nature Conservation. In terms of the national Forest Act (No. 84 of 1998) *Acacia erioloba* (Camel Thorn) and *Boscia albitrunca* (Shepherd tree) were recorded in the surrounding top-cadastral grids adjacent to the study area. A permit from the Department of Agriculture, Forestry and Fisheries (DAFF) must be obtained to remove or destroy these species. The presence of *Boscia albitrunca* had been confirmed within the study area.

This site of 518 ha is located west of the town Kakamas (Figure 7-10); it represents agricultural land with a single non-perennial drainage line draining towards north, in the most northern corner. An ESKOM substation (Paulputs) is located along the north eastern boundary. Large outcrops occur towards the north western boundary. Both a low and high voltage power line transects the area towards the south. Two watering points for domestic animals also occur within the area. The site falls within the Bushmanland Arid Grassland vegetation type. Approximately 45 000 km² of the northern Cape is covered by this vegetation type and also considered the second most extensive vegetation type in South Africa. It is generally considered that approximately 99% of this vegetation type is still intact. The study is not considered to fall within a Critical Biodiversity Area or within an Ecological Support area.

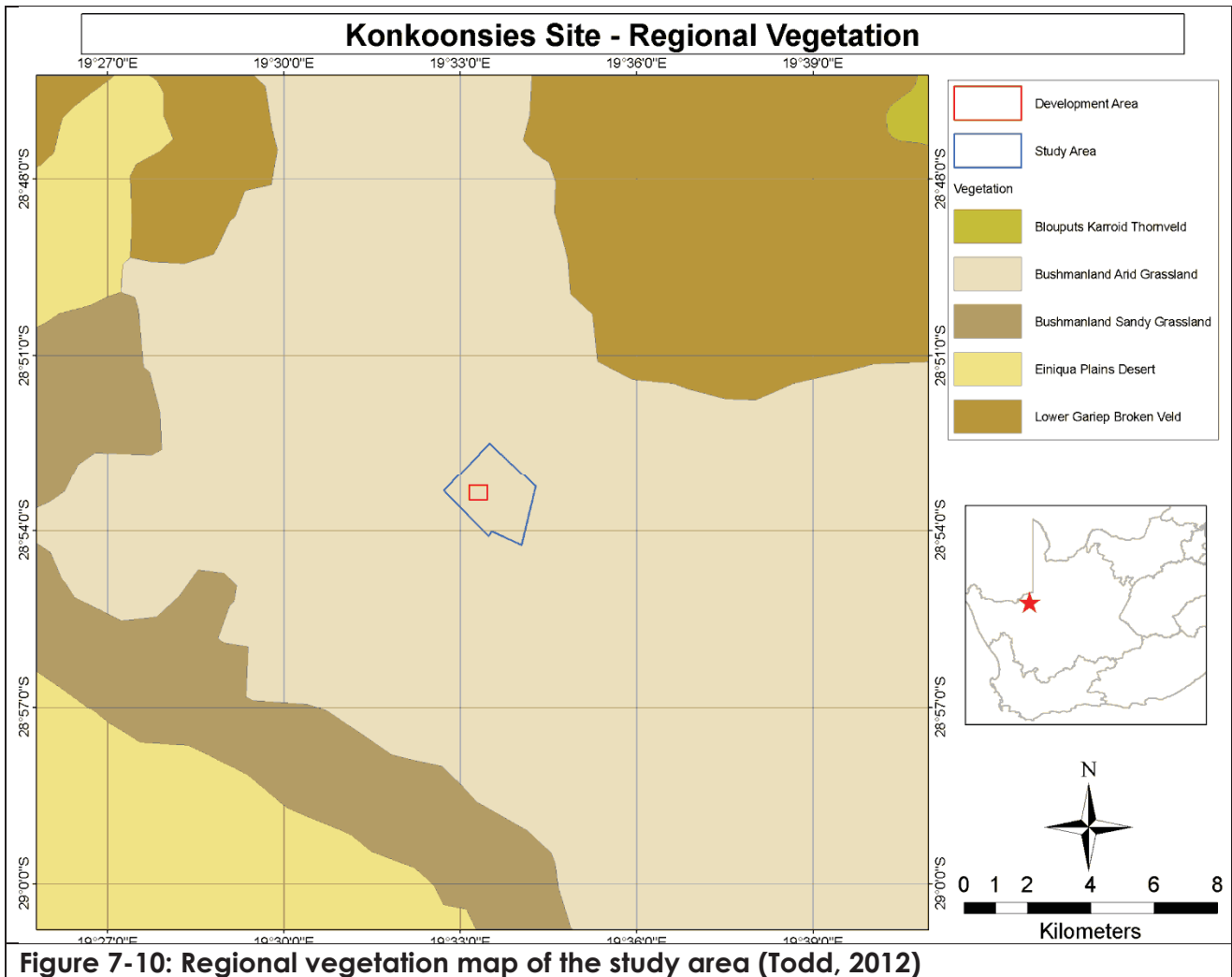


Figure 7-10: Regional vegetation map of the study area (Todd, 2012)



Figure 7-11: Overview of the landscape within the study area

7.7 SURFACE HYDROLOGY

The area receives an annual rainfall of around 103 mm and locates in a warm, dry climate commonly associated with deserts. There is no surface water whatsoever in the vicinity of the study area. The study area is located in the arid parts of the Kalahari Basin in the Northern Cape Province. There are no rivers or surface streams in close proximity to the study area. The drainage channels that do exist in the vicinity of the study area are almost perpetually dry, only conveying water during the odd occasion when it rains in the area. In most cases with the drainage channels around the study area, these streams also only flow for a limited distance before they merely disappear into the Kalahari Basin sand. (Krige, 2012)

The study area locates right on a watershed between quaternary catchment D81E and D81F, both falling in the Lower Orange River Water Management Area. The non-perennial Kaboep River drains quaternary catchment D81F, while the drainage channel nearest to the study area draining quaternary catchment D81E does not have a name. The other drainage channel in this quaternary catchment further away from the study area does have a name, the “Samoep” River, but is irrelevant to this particular study. (Krige, 2012)

Quaternary catchment D81F has a mean annual rainfall (MAP) of 91.34 mm and a mean annual run-off (MAR) into surface streams of only 0.5 mm, while quaternary catchment D81E has a MAP of 97.01 mm and a MAR of 0.6 mm (Midgley et. al. 1994) (Middleton and Bailey, 2005 – WR2005). Refer to Figures 1 and 2 for details of the quaternary catchments at the study area. (Krige, 2012).

There are no perennial streams in the vicinity of the study area from which water samples could be collected. The nearest perennial river is the Orange River, some 30 Km downstream from the study area in quaternary catchment D81F. It would be pointless to collect samples from this source. The only water in the vicinity of the study area is groundwater. (Krige, 2012)

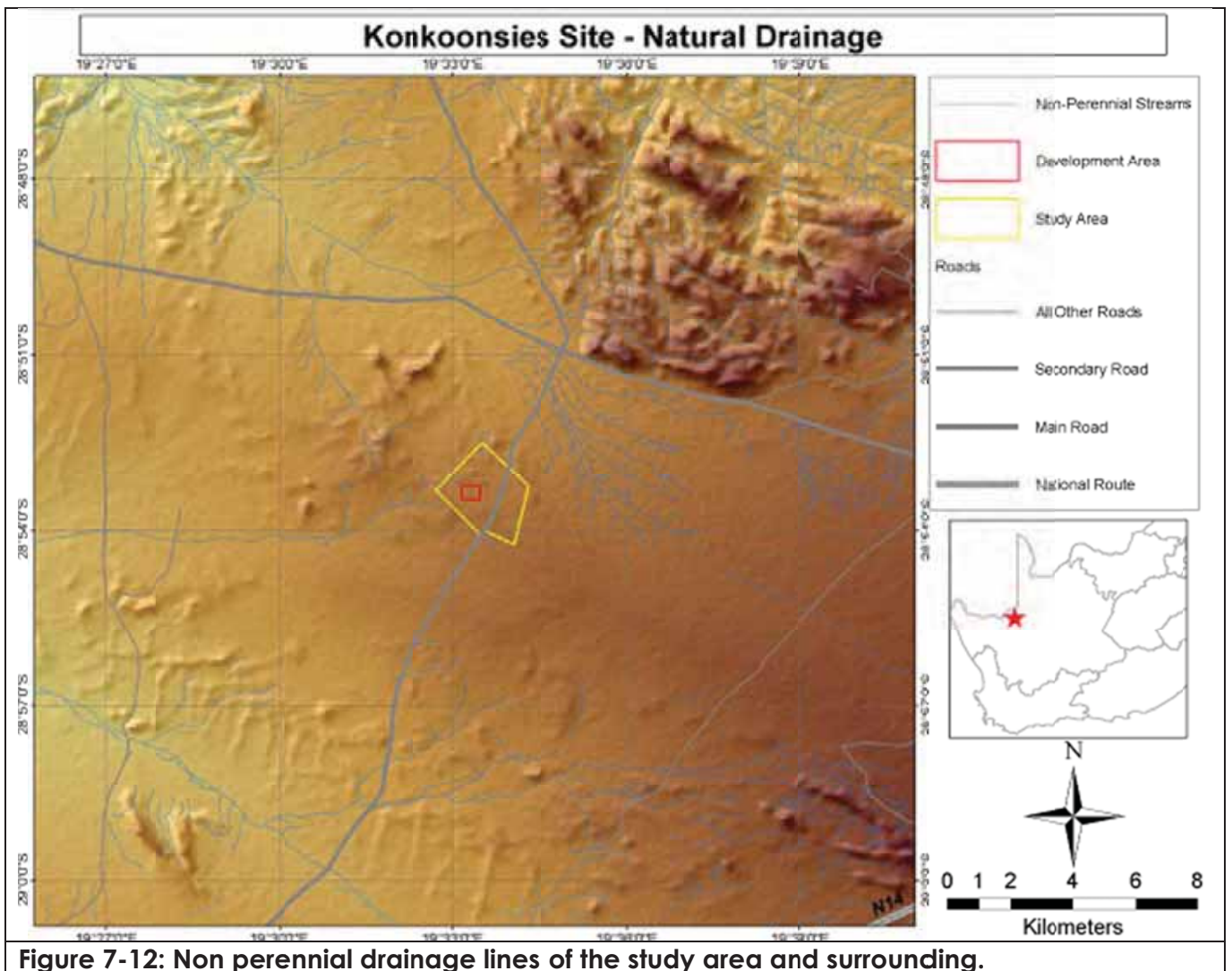


Figure 7-12: Non perennial drainage lines of the study area and surrounding.

7.8 GROUNDWATER

Based on the geology it is assumed that two aquifers underlie the site, namely an unconfined primary aquifer within the quaternary sediments and a deeper secondary fractured hard rock aquifer where fracture flow dominates (Van Bart, 2012).

Groundwater migration within the upper portion of this latter aquifer will be governed by jointing while major faults, dyke contacts and shears form significant conduits at depth. The aquifer is further classified as semi-confined. The Department of Water Affairs and Forestry (1999) classified the underlying aquifer as type d2, meaning that the aquifer is intergranular and fractured with average yields between 0.1 – 0.5 L/s (Figure 7-13) (Van Bart, 2012).

A schematic cross-section to illustrate groundwater occurrence was produced by DWAF (1999) (Figure 7-14). The cross-section is oriented northeast – southwest from the Onseepkans area to the Orange River. Number 1 on the figure is defined by intense folding especially in the granite-gneiss of the Little Namaqualand Suite and the lava, gneiss and the metasediments of the Orange River Group (Mu) (Van Bart, 2012)..

Joints and fractures on the crests of anticlines are typically targeted for groundwater development. The area delineated as number 2 typically contains water in joints and weathered zones as well as along lithological contacts such as gneiss with quartzitic and pelitic zones, amphibole-gneiss and subordinate foliated porphyritic granite (Van Bart, 2012).

The pink line on Figure 7-14 suggests that the groundwater level is clearly controlled by topography i.e. groundwater flow mimics the topography. The Konkoonies site straddles two quaternary catchments namely D81E. The cumulative surface area is approximately 3582 km². Aquifer recharge in Namaqualand is approximately 1.5 % of the annual precipitation (107 mm) which is equivalent to 5 767 020 m³ (Van Bart, 2012).

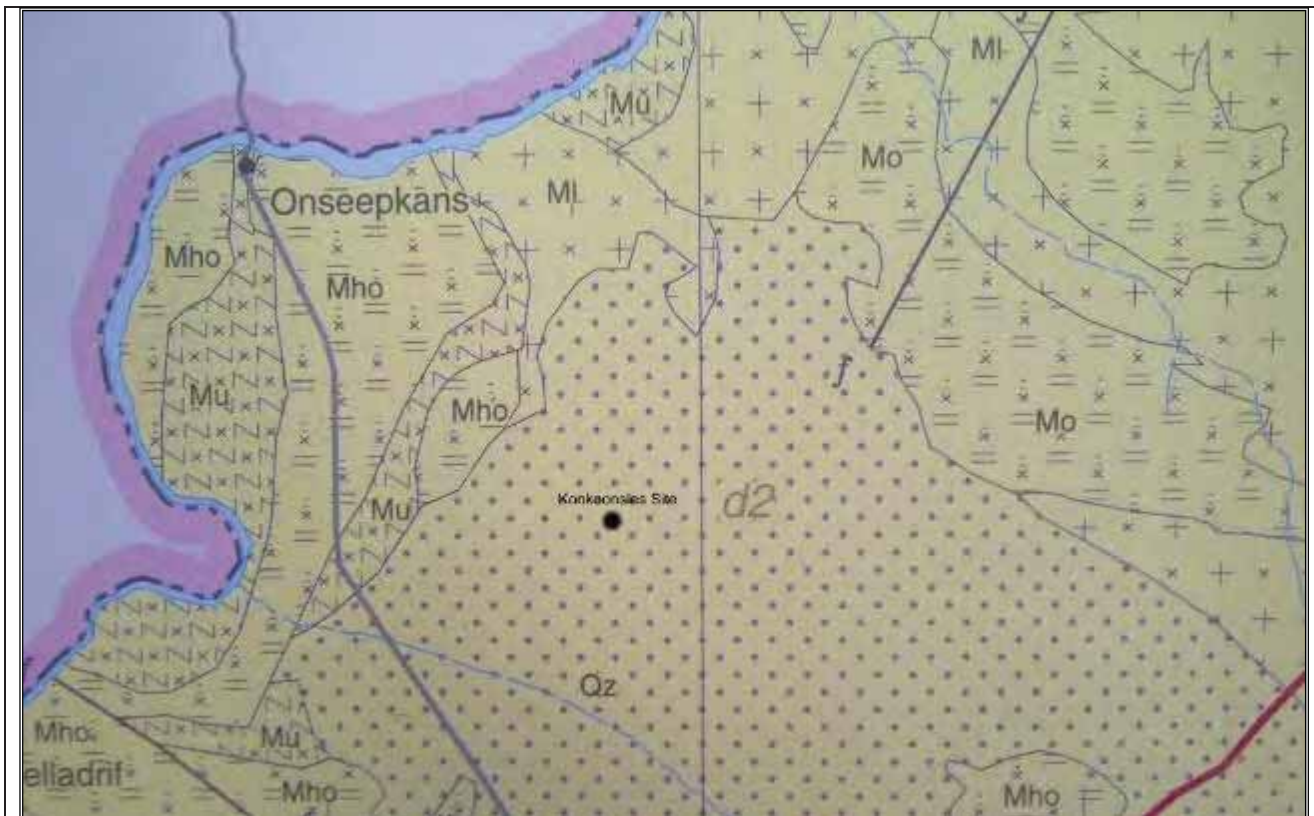


Figure 7-13: DWAf (1999) aquifer classification based on yield (Upington 2718).

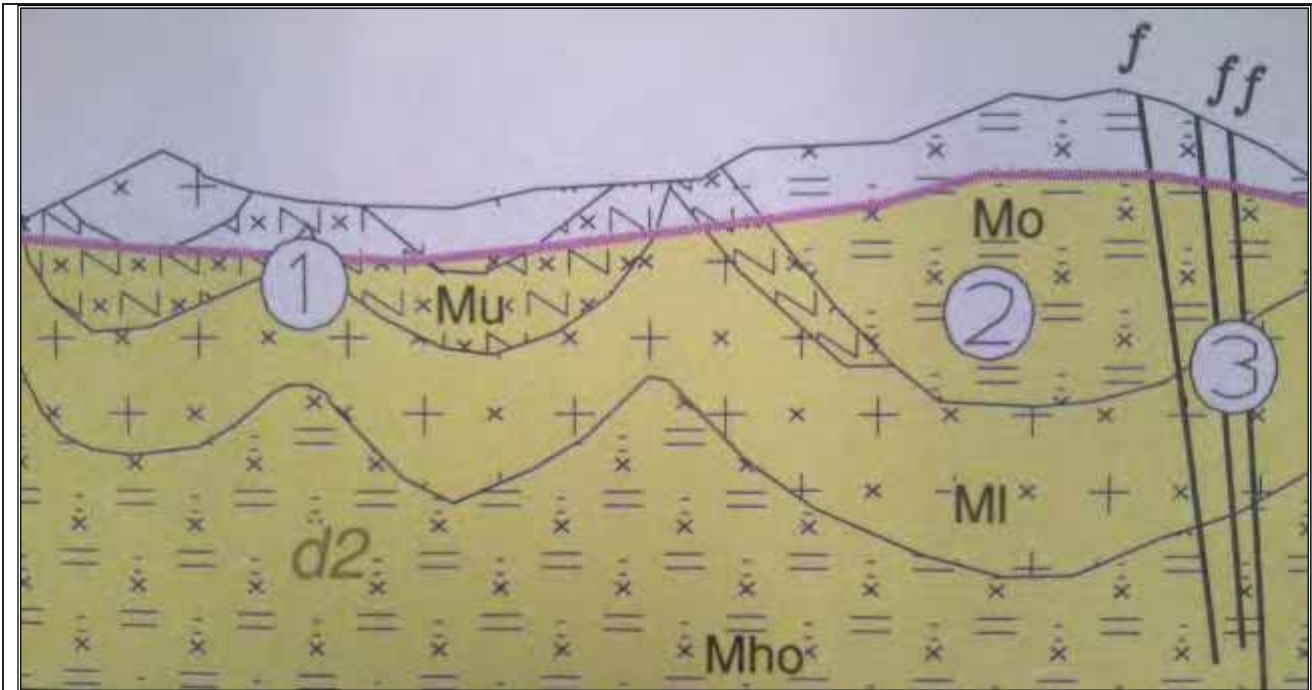


Figure 7-14: DWAf (1999) cross-section illustrating groundwater occurrence

7.9 NOISE

The area is generally characterized by farming and the ambient noise levels are very low. Vehicular traffic on the gravel dirt road only source of increase in ambient noise levels in the area. There are therefore no major contributors to the static noise levels in the area.

7.10 VISUAL AESTHETICS

The general appearance of the farm Konkoonsies is dominated by largely unspoilt natural Nama- Karoo vegetation on relatively flat landscapes. The general "sense of place" of the area is particular kind of openness and generally unspoilt natural beauty. As the area is dominated by open land of the Karoo, the visual and aesthetic feeling of the area is pleasant. There is however some visual intrusions existing around the proposed site; various power lines going in to the substation as well the substation.

7.11 ARCHAEOLOGY, HERITAGE & CULTURE

The semi-arid Karoo region is rich in archaeological sites (rock arts and engravings found throughout the Karoo region) even though the region is regarded marginal pre-colonial human settlement. A short, general, background to archaeology in general is given in this section, a detailed heritage/archaeological impact assessment will be undertaken as part of the EIA process.

7.11.1 THE STONE AGE

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools (Coertze & Coertze 1996: 293, as referenced by Pelsler, 2011). In South Africa the Stone Age can be divided in three periods. It is however important to note that dates are relative and only provide a broad framework for interpretation. The division for the Stone Age according to Korsman & Meyer (1999: 93-94, as referenced by Pelsler, 2011) is as follows:

- o Early Stone Age (ESA) 2 million – 150 000 years ago

- Middle Stone Age (MSA) 150 000 – 30 000 years ago
- Late Stone Age (LSA) 40 000 years ago – 1850 - A.D.

There is a possibility Stone Age artefacts to potentially be located within the study area (dating right from the Early to the Later Stone Age).

7.11.2 THE IRON AGE

The Iron Age is the name given to the period of human history when metal was mainly used to produce artefacts (Coertze & Coertze 1996: 346), as referenced by Pelsler, 2011. In South Africa it can be divided in two separate phases according to Van der Ryst & Meyer (1999: 96-98), as referenced by Pelsler, 2011, namely:

- Early Iron Age (EIA) 200 – 1000 A.D.
- Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii), as referenced by Pelsler, 2011 however indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

- Early Iron Age (EIA) 250 – 900 A.D.
- Middle Iron Age (MIA) 900 – 1300 A.D.
- Late Iron Age (LIA) 1300 – 1840 A.D.

7.12 PALEONTOLOGICAL ENVIRONMENT

The entire area is situated on the Namaqua-Natal Metamorphic Province comprising Precambrian igneous and metamorphic rocks of the Naro, Witwater, Hoogoor and Grünau suites which are exposed in places but in turn are covered by Quaternary alluvial deposits.

The granites and gneisses of the Naro, Witwater, Hoogoor and Grünau suites, which are Precambrian in age, are unlikely to contain fossils. There is a slight, but unlikely, possibility of Quaternary fossils being present in the unconsolidated alluvial deposits. It is unlikely that the proposed development will have an impact on palaeontological heritage, but it is essential that if fossils are uncovered in the process of development activities that a professional palaeontologist be bought in to access the situation. Please refer to Appendix 5 of this report for more detail on this study already undertaken.

7.13 SOCIO-ECONOMIC ENVIRONMENT

The Northern Cape is the province with the smallest economy. It is situated towards the west of the country. The province shares international borders with Namibia and Botswana and provincial boundaries with the North West, Free State, Western Cape and Eastern Cape provinces. The Northern Cape is spatially the largest province covering 363 389 km² or approximately 29.7% of the total surface area of South Africa. On the western side of the province lies the Atlantic Ocean.

The Northern Cape is the least populated province with a population density estimated at approximately 2 persons per square kilometre. Approximately 78% of the population lives in functional urbanized areas. This combination of low population density and high urbanization provided awesome development challenges.

The local economic regeneration program, undertaken mainly through the Social Plan Fund, is intended to enable Municipalities to undertake studies so as to identify economic development opportunities and viable projects for implementation. A particular emphasis

is placed primarily on Municipalities that face, or are likely to endure strenuous economic development problems.

8. IMPACT ASSESSMENT

8.1 IMPACT ASSESSMENT METHODOLOGY

The following criteria and methodology is proposed to determine the significance of environmental impacts caused by the proposed project.

8.1.1 TYPE OF IMPACTS

Potential environmental impacts may either have a positive or negative effect on the environment, and can in general be categorised as follows:

a) Direct/Primary Impacts

Primary impacts are caused directly due to the activity and generally occur at the same time and at the place of the activity.

b) Indirect/Secondary Impacts

Secondary impacts induce changes that may occur as a result of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken.

c) Cumulative Impacts

Cumulative impacts are those that result from the incremental impact of the proposed activity on common resources when added to the impacts of the other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period of time, and can include both direct and indirect impacts.

8.1.2 DETERMINING SIGNIFICANCE

The following criteria will be used to determine the significance of an impact. The scores associated with each of the levels within each criterion are indicated in brackets after each description [like this].

Nature

Nature (N) considers whether the impact is:

- positive [- ¼]
- negative [+1].

Extent

Extent (E) considers whether the impact will occur:

- on site [1]
- locally: within the vicinity of the site [2]
- regionally: within the local municipality [3]
- provincially: across the province [4]
- nationally or internationally [5].

Duration

Duration (D) considers whether the impact will be:

- very short term: a matter of days or less [1]
- short term: a matter of weeks to months [2]
- medium term: up to a year or two [3]

long term: up to 10 years [4]
very long term: 10 years or longer [5].

Intensity

Intensity (I) considers whether the impact will be:

negligible: there is an impact on the environment, but it is negligible, having no discernable effect [1]

minor: the impact alters the environment in such a way that the natural processes or functions are hardly affected; the system does however, become more sensitive to other impacts [2]

moderate: the environment is altered, but function and process continue, albeit in a modified way; the system is stressed but manages to continue, although not with the same strength as before [3]

major: the disturbance to the environment is enough to disrupt functions or processes, resulting in reduced diversity; the system has been damaged and is no longer what it used to be, but there are still remaining functions; the system will probably decline further without positive intervention [4]

severe: the disturbance to the environment destroys certain aspects and damages all others; the system is totally out of balance and will collapse without major intervention or rehabilitation [5].

Probability

Probability (P) considers whether the impact will be:

unlikely: the possibility of the impact occurring is very low, due either to the circumstances, design or experience [1]

likely: there is a possibility that the impact will occur, to the extent that provisions must be made for it [2]

very likely: the impact will probably occur, but it is not certain [3]

definite: the impact will occur regardless of any prevention plans, and only mitigation can be used to manage the impact [4].

Mitigation or Enhancement

Mitigation (M) is about eliminating, minimising or compensating for negative impacts, whereas enhancement (H) magnifies project benefits. This factor considers whether –

- A negative impact can be mitigated:

unmitigated: no mitigation is possible or planned [1]

slightly mitigated: a small reduction in the impact is likely [2]

moderately mitigated: the impact can be substantially mitigated, but the residual impact is still noticeable or significant (relative to the original impact) [3]

well mitigated: the impact can be mostly mitigated and the residual impact is negligible or minor [4]

- A positive impact can be enhanced:

un-enhanced: no enhancement is possible or planned [1]

slightly enhanced: a small enhancement in the benefit is possible [2]

moderately enhanced: a noticeable enhancement is possible, which will increase the quantity or quality of the benefit in a significant way [3]

well enhanced: the benefit can be substantially enhanced to reach a far greater number of receptors or recipients and/or be of a much higher quality than the original benefit [4].

Reversibility

Reversibility (R) considers whether an impact is:

irreversible: no amount of time or money will allow the impact to be substantially reversed [1]

slightly reversible: the impact is not easy to reverse and will require much effort, taken immediately after the impact, and even then, the final result will not match the original environment prior to the impact [2]

moderately reversible: much of the impact can be reversed, but action will have to be taken within a certain time and the amount of effort will be significant in order to achieve a fair degree of rehabilitation [3]

mostly reversible: the impact can mostly be reversed, although if the duration of the impact is too long, it may make the rehabilitation less successful, but otherwise a satisfactory degree of rehabilitation can generally be achieved quite easily [4].

8.1.3 CALCULATING IMPACT SIGNIFICANCE

The table below summarises the scoring for all the criteria.

Table 8-1: Scoring for Significance Criteria						
CRITERION	SCORES					
	- ¼	1	2	3	4	5
N-nature	positive	negative	-	-	-	-
E-extent	-	site	local	regional	provincial	national
D-duration	-	very short	short	moderate	long	very long
I-intensity	-	negligible	minor	moderate	major	severe
P-probability	-	very unlikely	unlikely	likely	very likely	-
M-mitigation	-	none	slight	moderate	good	-
H-enhancement	-	none	slight	moderate	good	-
R-reversibility	-	none	slight	moderate	good	-

Impact significance is a net result of all the above criteria. The formula proposed to calculate impact significance (S) is:

For a negative impact: $S = N \times (E+D) \times I \times P \div \frac{1}{2}(M+R)$; and

For a positive impact: $S = N \times (E+D) \times I \times P \times (H)$.

Negative impacts score from 2 to 200. Positive impacts score from - ½ to -200.

8.1.4 UNDERSTANDING IMPACT SIGNIFICANCE

The following is a guide to interpreting the final scores of an impact (for negative impacts):

Table 8-2: Final Significance Scoring	
Final score (S)	Impact significance
0 – 10	negligible the impact should cause no real damage to the environment, except where it has the opportunity to contribute to cumulative impacts

10 – 20	Low	the impact will be noticeable but should be localized or occur over a limited time period and not cause permanent or unacceptable changes; it should be addressed in an EMP and managed appropriately
20 – 50	moderate	the impact is significant and will affect the integrity of the environment; effort must be made to mitigate and reverse this impact; in addition the project benefits must be shown to outweigh the impact
50 – 100	High	the impact will affect the environment to such an extent that permanent damage is likely and recovery will be slow and difficult; the impact is unacceptable without real mitigation or reversal plans; project benefits must be proven to be very substantial; the approval of the project will be in jeopardy if this impact cannot be addressed
100 – 200	severe	the impact will result in large, permanent and severe impacts, such as local species extinctions, minor human migrations or local economic collapses; even projects with major benefits may not go ahead with this level of impact; project alternatives that are substantially different should be looked at, otherwise the project should not be approved

Two examples will help illustrate this system:

SCENARIO 1 – An industrial facility proposes discharging effluent containing a high salt content into a nearby stream. These salts will cause temporary problems for the ecosystem, but are washed downstream, diluted and will have no long term effects. The short term damage to the stream can be reversed fairly easily, but only if the ecosystem has not been seriously damaged by the salts over a long time. A mitigation measure is also proposed whereby during low flow periods (dry season) a pulse of clean water is discharged into the stream after the saline effluent, diluting the salts and pushing them downstream faster, so that the salts become so dilute as to have little or no effect.

From this scenario, the criteria are:

- nature = negative = 1
- extent = local = 2
- duration = medium = 3
- intensity = moderate = 3
- probability = very likely = 4
- mitigation = moderate = 3
- reversibility = moderate = 3,

and therefore impact significance is:

$$\begin{aligned}
 S &= N \times (E+D) \times I \times P \div \frac{1}{2}(M+R) \\
 &= 1 \times (2+3) \times 3 \times 4 \div \frac{1}{2}(3+3) \\
 &= 60 \div 3 \\
 &= 20.
 \end{aligned}$$

Note that the impact prior to mitigation is major, but that due to the mitigation and the fact that the ecosystem can recover easily from the effects of salt (high reversibility), the residual impact becomes minor/moderate.

SCENARIO 2 – The above scenario applies, except that the effluent contains metals. These metals become adsorbed onto clay and organic matter in the stream bed and are accumulative toxins within the ecosystem, getting into the food chain and concentrating upwards into predator species. Fresh water flushing will only very slightly mitigate this and ecosystem recovery will not be easy or fast.

From this scenario, the criteria are:

nature = negative = 1

extent = local = 2

duration = very long = 5

intensity = moderate = 3

probability = very likely = 4

mitigation = slight = 2

reversibility = slight = 2,

and therefore impact significance is:

$$\begin{aligned}
 S &= N \times (E+D) \times I \times P \div \frac{1}{2}(M+R) \\
 &= 1 \times (2+5) \times 3 \times 4 \div \frac{1}{2}(2+2) \\
 &= 84 \div 2 \\
 &= 42.
 \end{aligned}$$

Note that in this case, the original impact (of the metals) is more serious than the salt, but it is the limited mitigation and reversibility that also act on the residual score and result in this score being moderate.

8.2 PRELIMINARY ENVIRONMENTAL ASPECTS & IMPACTS

This section provides an overview and initial assessment of the main environmental aspects and their associated impacts related to the proposed project, the expected impact are regarded as the potential impacts resulting from the proposed project without appropriate mitigation measures employed. These expected impacts will be assessed in more detail during the detailed Environmental Impact Assessment (EIA) phase of the project and appropriate mitigation measures will be implemented to ensure these impacts are mitigated to acceptable environmental status.

Table 8-3: Environmental Impact Assessment Priority				
Construction Phase Impacts				
	Environmental and/or cultural effects	Location/ Extent	Timing / Duration	Expected Impact (+/-) & Importance
Impact on Fauna, Flora and Ecology	<p>Due to Construction related activities such as land clearing, establishment of borrow pits, temporary construction camps storage of material for construction, construction of access roads and chemical contamination of soil through machinery or vehicles. The potential impact on fauna, flora and ecology include the following:</p> <ul style="list-style-type: none"> • Loss of indigenous vegetation, threatened plant/trees • Loss of habitat for and/or displacement of animals or threatened species • The proposed establishment cause spread of alien invader plants and declared weeds. 	Local	Very long term	High
Soils	<p>The soil contamination or physical soil disturbances due to construction activities. Two types of impact could potentially result from the construction phase firstly direct impacts resulting from soils along PV panel construction sites as well as the construction roads. Indirect impacts due to soil degradation and erosion due to inadequate storm water management, soil contamination due to soils, concrete and other chemicals during construction activities.</p> <p>The potential impact on soils therefore include the</p>	Local	Very long term	Moderate

Table 8-3: Environmental Impact Assessment Priority

Construction Phase Impacts						
	<p>following:</p> <ul style="list-style-type: none"> • Soil degradation due to erosion • Soil pollution • Excavation causing soil degradation 					
Land Use	The area mostly consists of natural vegetation and historical human activities. Impact on the temporary disturbance to grazing land use during the construction period	On Site	Temporary	-		Low
Animal Life	Displacement of faunal species due to the near complete removal of natural vegetation / habitat destruction.	Site & Edge Effects	Very Long Term	-		Moderate
Ground and surface water	The impact on groundwater due to construction activities. There are no natural surface water sources in the area except man made sources on site. The PV facility has the potential to impact on groundwater quantity, but is not expected to have an impact on quality. The water use required for concrete mixing for foundations of the PV panels could potentially impact on the groundwater quantity on a localised level.	local	Medium Term	-		Moderate
Aesthetics/ Visual	Visual impact due to new Solar facility construction / infrastructure. Mostly from commuters traveling on the R359 and potentially from the Augrabies National Park.	Local	Life of facility	-		Low
Socio-Economic	Job creation, skills development and economic development. Negative impact increase security risk to farmers and livestock due to influx of job seekers.	Local	Construction and Life of facility	+ -		Moderate
Archaeology, Heritage & Culture	Disturbance to potential cultural and or historical features onsite	Site	Potentially permanent	-		Moderate
Traffic	Increase in traffic on local roads	Locally	Medium term during construction	-		Moderate

Table 8-4: Environmental Impact Assessment Priority

Operation Phase Impacts		Location/Extent	Timing / Duration	Expected Impact (+/-) & Importance
Environmental and/or cultural effects				
Fauna, Flora and Ecology	Operational related activities such as maintenance (removal and trimming of vegetation) and the presence of impermeable surfaces could potentially impact on fauna, flora and Ecology. The potential impact on fauna, flora and ecology include the following: <ul style="list-style-type: none"> Habitat transformation could cause loss of protected plant and animals species this is however limited to the access road, PV panels and associated infrastructure. 	Local (Development footprint)	Very Long Term	High
Soils	Exposed areas such as the areas where vegetation was removed as part of construction ex below PV panels surfaces etc. could be susceptible to water and wind erosion in absence of soil management and control measures.	Local	Temporary	Moderate
Land Use	The area mostly consists of natural vegetation and historical human activities. Impact on the temporary disturbance to grazing land use during the construction period	On Site	Temporary	Low
Surface and Groundwater	The area surrounding the site does not have any natural sources of flowing surface water. The PV facility will also not negatively impact the Ground water although the facility might need to use groundwater for cleaning of the PV panels and therefore cause impact on the quantity of available water resources. The major impact resulting	Local	Very Long term	Moderate

Table 8-4: Environmental Impact Assessment Priority

Operation Phase Impacts

	is on the quantity of water available and proper measures must therefore be employed as to use water efficiently.				
Aesthetics/ Visual	The solar facility and associated infrastructure is expected to be quite visible to commuters traveling on the road to skuitklip. The potential impact associated with the establishment include: change in visual character of the site and therefore affects general sense of place of the region as well as light pollution due to security lighting and safety lighting of the facility at night, however the site is already quite visually impaired as the existence of various power lines intersecting the site as well the substation.	Local – regional	Life of facility	-	Low
Socio-Economic	Employment opportunities will be created although the PV facility does not require large number of employees during operations lifespan however the employment opportunities will create long term sustainable employment to these individuals and in return the country. The presence of the PV facility could increase criminal activity to enter the site from surrounding farms, however the facility will be fence and security measures implemented to prevent these impact from occurring.	Local	Construction and Life of facility	+ and -	Moderate

9. PLAN OF STUDY FOR EIA

This plan of study has been formulated to meet the requirements for a Plan of Study for Environmental Impact Assessment (POSEIA) as set out in regulation 28(n)(i-iv) of GN R.543, promulgated in terms of chapter 5 of the National Environmental Management Act (Act No. 107 of 1998), which states:

“28(1) A scoping report must contain all the information that is necessary for a proper understanding of the nature of issues identified during scoping, and must include:

28(n)(i-iv) a plan of study for environmental impact assessment which sets out the proposed approach to the environmental impact assessment of the application, which must include

- (i) a description of the tasks that will be undertaken as part of the environmental impact assessment process, including any specialist reports or specialised processes, and the manner in which such tasks will be undertaken;
- (ii) an indication of the stages at which the competent authority will be consulted;
- (iii) a description of the proposed method of assessing the environmental issues and alternatives, including the option of not proceeding with the activity; and
- (iv) particulars of the public participation process that will be conducted during the environmental impact assessment process;”

9.1 SPECIALIST STUDIES AND REPORTING

The identification and initial assessment of environmental aspects revealed the following potentially significant environmental aspects which require further detailed assessment, to be conducted during the EIA-phase:

- Biodiversity study and impact assessment
- Archaeology and heritage impact assessment
- Visual impact Assessment
- Cumulative impact assessment study
- Soil impact assessment

9.1.1 LIST OF SPECIALISTS AND SPECIALIST STUDIES PROPOSED TO BE UNDERTAKEN

A brief list of specialists and specialist studies which are proposed to be undertaken are shown in Table 9-1 below:

Table 9-1: List of Specialists and Specialist Studies		
Specialist Study		Specialists
1	Environmental Legal Review	Hanre Crous and Roelof Letter (ESA)
2	Biodiversity and wetland assessments	Simon Todd (Simon Todd Consulting and Willem de Frey (Ecolnfo); Support: Hanre Crous (ESA)
3	Archaeology and Heritage Impact	Mr Anton Pelsler (Archaeos)

	assessment	Consultants)
4	Visual Impact Assessment / GIS / 3-D visualizations	Emmanuel Tshuma (ESA) and Kotie Geldenhuys (Propaganda Studios)
5	Soil Impact Assessment	Prof. A. Claassens (Soil science and plant nutrition consultant)
6	Cumulative impact assessment	Roelof Letter and Theo Fisher (ESA)
7	Environmental reporting, public participation, project management	Roelof Letter and Hanre Crous (ESA)

9.1.1.1 FAUNA AND FLORAL IMPACT ASSESSMENT

The impact assessment will be conducted according to the guidelines for Impact Assessment as detailed in the EIA regulation by the Department of Environmental Affairs and Tourism (April 1998) in terms of the National Environmental Biodiversity act and the environmental conservation Act No. 73 of 1989. The faunal component of the study will not only focus on mammals and birds but also on reptiles and other fauna that could be affected by the development. This includes the following:

An indication of the methodology used in determining the significance of potential environmental impacts;

- A description of the environmental issues that were identified during the environmental impact assessment process;
- An assessment of the significance of direct, indirect and cumulative impacts in terms of standard criteria;
- A description and comparative assessment of all alternatives identified during the environmental impact assessment process;
- Recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Plan;
- An indication of the extent to which the issue could be addressed by the adoption of achievable mitigation measures;
- A description of any assumptions, uncertainties and gaps in knowledge;
- An environmental impact statement which contains:
 - A summary of the key findings of the environmental impact assessment,
 - An assessment of the positive and negative implications of the proposed activity,
 - A comparative assessment of the positive and negative implications of the distribution line alternatives,
 - A comparative assessment of the positive and negative implications of the access road alternatives.

9.1.1.2 VISUAL IMPACT ASSESSMENT

It is the intent of the visual specialist, Mr. Kotie Geldenhuys of Propaganda Studios, to execute the Visual Impact Assessment. Adequate explanations of the processes and their subsidiary components will be presented, accompanied by clear and palatable graphs, for stakeholders who might be less familiar with the methodology of Visual Impact Assessment (VIA).

It is proposed that 2 sets of guidelines will be used for undertaking the VIA, namely:

- Department of Environmental Affairs' Environmental Management Guidelines in 2010 (DEA, 2010), and,

- “Guideline for involving visual & aesthetic specialists in EIA processes: Edition 1”, published for the CSIR, particularly pertaining to sensitive areas in the Western Cape Province, but also applicable throughout (and not limited to) the Republic of South Africa.

It is the intent of the visual specialist to focus on the following principles, requirements and evaluation criteria in the execution of a comprehensive Visual Impact Assessment:

- An awareness that 'visual' implies the full range of visual, aesthetic, cultural and spiritual aspects of the environment that contribute to the area's sense of place;
- The consideration of both the natural and the cultural landscape, and their inter-relatedness;
- The identification of all scenic resources, protected areas and sites of special interest, together with their relative importance in the region;
- The nature and location of any cultural heritage sites, and areas of special or historical interest;
- An understanding of the landscape processes, including geological, vegetation and settlement patterns, which give the landscape its particular character or scenic attributes;
- The need to include both quantitative criteria, such as 'visibility', and qualitative criteria, such as landscape or townscape 'character';
- The need to include visual input as an integral part of the project planning and design process, so that the findings and recommended mitigation measures can inform the final design, and hopefully the quality of the project.

It is proposed that the following evaluation criteria will be employed to evaluate the Visual Impact Assessment process:

- Provision of a full description of the environment and the project;
- Consideration of the project within its wider context;
- Provision of a clear methodology using accepted conventions for visual assessment;
- Presentation of all sources of information and references;
- Clear presentation of graphics, including maps and visual simulations;
- Inclusion of both quantitative and qualitative criteria;
- Consideration of cumulative visual impacts;
- Determination of the relative compatibility or conflict of the project with the surroundings;
- Evaluation and consideration of alternatives;
- Explanation of significance ratings, related to bench-marks;
- Inclusion of long term sustainable development objectives;
- Practical and sensible recommendations for visual mitigation;
- Identification and description of monitoring programme recommendations;
- Consideration of the best practicable environmental options;
- The addressing of all the visual issues raised in the scoping;

- Provision of a clear summary of mitigation measures, including essential and optional measures.

In addition to the above, a cumulative impact assessment will be done, as well as mitigation measures suggested with regards to layout of surface structures and suggestions with regards to rehabilitation.

The full VIA will encompass the following components:

- Background research and quantification modelling: This includes an onsite photographic audit, as well as
- identification of landscape types, landscape character and sense of place, generally based on geology, landforms, vegetation cover and land use;
- Identification of viewsheds and view catchment areas (based on the degree to which topography will impact on rendering the proposed development visible or invisible);
- Identification of important viewpoints and view corridors within the affected environment (including sensitive receptors, high traffic areas and places of interest);
- Indication of distance radii from the proposed project to the various view points and receptors;
- Determination of the visual absorption capacity (VAC) of the landscape, usually based on vegetation cover or urban fabric in the area;
- Determination of the relative visibility, or visual intrusion, of the proposed project.
- Determination of the relative compatibility or conflict of the project with the surroundings;
- 3 dimensional modelling and texturing of surface infrastructures
- View Simulations of potential visual impacts, including rendering elevations and 3 vantage points
- Immersed Imagery.
- Reporting on the visual impacts predicted will include:
 - A summary impact assessment table, using the defined impact assessment and significance rating criteria;
 - Indications of whether impacts are irreversible or result in an irreplaceable loss to the environment and/or society;
 - Statement of impact significance for each issue specifying whether a level of acceptable change has been exceeded and whether the impact presents a potential fatal flaw;
 - Identification of beneficiaries and losers from the proposed development;
 - Summary of key management actions that fundamentally affect impact significance;
 - Identification of the best practicable environmental option, providing reasons;
 - Identification of viable development alternatives not previously considered
 - Landscape end use planning (alternative options) and rehabilitation proposal

9.1.1.3 HERITAGE AND ARCHAEOLOGY IMPACT ASSESSMENT

Heritage specialist input in the EIA process is essential to ensure that management of development conserves our heritage. It plays a positive role in the development process by enriching our understanding of the past and recognizing its contribution to the present it's also a legal requirement for certain categories of development in relevant heritage legislation. The heritage impact assessment (HIA) is undertaken as part of this EIA to determine whether the proposed site consist of any heritage resource whether aesthetic, historical, architectural, social, scientific, spiritual or technological in order to effectively concern these valuable resources.

The HIA will fulfil the requirements of Section 38 (3) of the National Heritage Resources Act, namely the identification and mapping of heritage resources and the assessment of the significance thereof, an assessment of the positive and negative impacts of the proposals, the results of consultation with I&APs, the consideration of alternatives and plans for the mitigation of any adverse impacts.

The purpose of the HIA report is to verify and assess the absence and/or presence of features of heritage significance that may be affected, to recommend mechanisms to manage impacts and thereby to enable the relevant heritage resources authorities to consider and approve the proposed project, based on the information contained in the report. The plan of study for the HIA will consist of the following as part of the comprehensive EIA phase to be conducted:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located in the areas of development.
2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value.
3. Describe the possible impact of the proposed developments on these cultural remains, according to a standard set of conventions.
4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources.
5. Review applicable legislative requirements.

The methodology that will be followed to conduct the HIA is as follows:

Survey of literature

A survey of literature will be undertaken where still required in order to obtain background information regarding the cultural (archaeological and historical) heritage of the different development areas.

Field survey

The surveys will be conducted according to generally accepted HIA/AIA practices and will aim at locating all possible objects, sites and features of cultural (archaeological and historical) heritage significance in the areas of proposed development. The location/position of any site will be determined by means of a Global Positioning System (GPS), while photographs will also be taken where needed.

Surveys will be conducted mainly on foot, although certain portions will be travelled by vehicle.

Oral histories

People from local communities are sometimes interviewed in order to obtain information relating to the surveyed area. It needs to be stated that this is not applicable under all

circumstances. When applicable, the information is included in the text and referred to in the bibliography.

Documentation

All sites, objects, features and structures identified are documented according to the general minimum standards accepted by the archaeological profession. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality.

9.1.1.1 DESKTOP PALEONTOLOGICAL IMPACT ASSESSMENT

Paleontological significance of the affected area will be evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature. The study will be undertaken by Bruce Rubidge from the University of the Witwatersrand on the farm Konkoonsies 91 in the Pofadder area.

9.1.1.2 SOIL IMPACT ASSESSMENT

A desktop soil assessment of the site will be undertaken, and will include the following:

- Identification of the soil form present on site
- The size of the area where a particular soil form is found
- A detailed map indicating the locality of the soil forms within the specified area
- Size of the site
- Exact locality of the site
- Possible land use options for the site
- Detailed description of why agriculture should or should not be the land use of choice
- Impact of the change in land use on the surrounding area

9.1.1.3 CUMULATIVE IMPACT ASSESSMENT STUDY

9.1.1.3.1 LEGAL REQUIREMENT

NEMA 2010 Regulations, R543 states: "cumulative impact", in relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area;

9.1.1.3.2 INTERPRETATION

A cumulative impact is an instance where that occurs as a result of the addition of many similar smaller impacts. These smaller impacts may occur from similar or very different developments and individually they may each be within the assimilative capacity of the environment, but together they reach a threshold that then cause serious damage.

9.1.1.3.3 METHODS

Cumulative impacts will be explicitly assessed in instances where additional burden/impact will be caused by the proposed development.

Several considerations apply to CEA and some of these are discussed below:

- Cumulative effects are not only calculated from those currently occurring, but also past impacts that still have an effect. An area that is already degraded must not be evaluated from that degraded state, but must be evaluated from its pristine state, even if that was centuries ago.

- Cumulative effects are both direct and indirect impacts – anything that will add to the effect being considered. However, the number of effects being considered will generally have to be limited. For example, every species in a given area cannot be assessed for the effect that the impact will have on it. A decision must be taken to select perhaps a few species including the most likely to be affected species, the rarest species, iconic species or those that are well understood for which baseline or dose-response data exists.
- Cumulative effects may occur across political and ownership boundaries. The assessment must not stop at those boundaries and should rather use natural boundaries, such as catchments or changes in vegetation type, and so on.
- Cumulative effects can be of many types. Every attempt must be made to incorporate and, if possible, synthesize these impacts and effects where they may occur.
- Cumulative effects must be forecast as far as possible into the future to try and sense the possibility of severe effects that may only occur in the long term.

Cumulative Environmental Assessment can be done using various methods, some of which are explained below in Table 9-2 below.

Table 9-2: Cumulative Effects Assessment	
analysis method	description
checklist	common projects with easily anticipated impacts can be assessed using a checklist
questionnaire	systematic interviewing with experts or locals with good knowledge of the area and environment
network	diagrams illustrating flows and other relationships between components; good for illustrating cause and effect
interactive analysis	assessment of additive and synergistic effects of various configurations of multiple projects
biogeographically analysis	ecosystem analysis at landscape and larger levels, emphasizing patterns, processes and structure of the ecosystem
carrying capacity analysis	determination of the total resource base that can be used by humans whilst maintaining a sustainable natural environment in the long term
ecological modelling	mathematical modelling using computers, where areas are data rich and ecosystems are well understood
GIS (geographic information system)	computerized mapping system for spatial data allowing sophisticated spatially related querying and presentation

The outputs of a CEA can be the identified sources of cumulative impacts, the sequence of events from source to effect, or the resultant effects. Ideally all three of these should be mentioned, but in some cases it may not be necessary for the aim of the study to investigate all three aspects in detail. For instance, if it is known that air quality in a certain area is dangerous to human and environmental health, it is probably more important to quantify the sources and try and limit these, than to go doing a detailed study of the exact health effects and environmental risks from the poor air quality. The latter may be interesting, but will not really attack the cause of the problem.

9.2 PROPOSED SCOPING AND EIA TIMELINE INCLUDING KEY AUTHORITY CONSULTATION (DEA)

EScience proposes that the following course of action is followed:

- 1) Submit five (5) copies of scoping report to DEA and make Scoping report available to all registered I&AP's.
- 2) Comments will then be collated from public and from DEA (and other government departments), and then a final scoping report will be submitted to DEA and public (as per the regulations requirement)
- 3) If there are SUBSTANTIVE changes that need to be made to the report, then the process will start from point 1 (as above) again.
- 4) However, if no substantive changes are needed, the reports should be processed accordingly – a meeting on the need for these “substantive changes” may be required.

Please also refer to Figure 2-4 of the EIA process flow diagram.

Table 9-3: Anticipated Key Dates		
Process Phase	Details	Estimated Date
Application	Lodge application and declaration of interest to DEA	Submitted on 12 September 2011.
	Receive confirmation of application from DEA	Received on 17 November 2011.
Scoping phase	Submit draft scoping report to DEA and to public for review	20 April 2011
	Submit final scoping report to DEA	10 May 2012
Amendment of scoping report	Submit draft amended scoping report to DEA and stakeholder review for 30 days.	6 September 2012
	Submit final amended scoping report to DEA	6 October 2012
	Review and decision by DEA on final amended Scoping report, expected	10 November 2012
EIA phase	Review of draft Environmental Impact Assessment Report (EIR) by DEA and stakeholders	10 December 2012
	Lodge final EIR with DEA	12 December 2012
	Decision on application by DEA	31 March 2013

9.3 PUBLIC PARTICIPATION PROCESS FOR EIA PHASE

The proposed public participation process for the remainder of the Environmental Impact Assessment will consist of:

9.3.1 ADVERTISING AND REPORT COMMENT PERIODS

- Presenting all registered Interested and Affected Parties, stakeholders and government departments with the opportunity to read and comment on environmental impact assessment reports, including all specialist reports;
- Presenting registered Interested and Affected Parties, stakeholders and government departments with the opportunity to read and comment on draft environmental management plans;
- Presenting registered Interested and Affected Parties and stakeholders with the opportunity to read and comment on the final reports submitted to DEA.

9.3.2 PUBLIC MEETINGS AND OPEN DAYS

The need for a public meeting will be determined depending on the relevant interest from stakeholders in the project.

10. CONCLUSIONS

Based on the independent evaluation and assessment of the proposed project during the Scoping Phase by the Environmental Assessment Practitioner (EAP), a Plan of Study for Environmental Impact Assessment (PoSEIA) has been developed. The POSEIA includes the scope of further specialist studies to be conducted, which would inform the accurate assessment and mitigation of potential environmental impacts that may arise from the proposed project. This would result in the compilation of a detailed EIA Report, which would allow the competent authorities (DEA) to make an informed decision regarding the authorisations needed for the proposed Photo-voltaic Solar Power generation project and components thereof.

In conclusion, it is felt that the scoping study has highlighted numerous areas that will need to be properly evaluated during the EIA phase due to the sensitivity of the site that will need to be addressed at EIA phase. It is felt that the scoping study has been undertaken thoroughly and that authorization be granted to continue with the full Environmental Impact assessment to adequately quantify and assess the impacts of the proposed Solar Facility on the receiving environment.

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Rison groundwater Consulting, 2012: HYDROGEOLOGICAL baseline ASSESSMENT AT THE proposed Konkoonies solar POWER STATION. Prepared by Adrian van Bart (Pr. Sci. Nat.) Consulting Hydro geologist.

Krige, G: 2012: A BASELINE HYDROLOGICAL AND SURFACE WATER STUDY PERTAINING TO A PORTION OF THE FARM KONKOONSIES 91, THE PROPOSED LOCATION OF A SOLAR POWER PLANT, IN THE NORTHERN CAPE PROVINCE, SOUTH AFRICA

Siyanda District Municipality Environmental Management Framework Report, 2008. South Africa.

Ubuntu Local Municipality, 2010: Integrated Development Plan

UKEA 2004 Environmental Risk Management and Strategic Environmental Assessment Guidance Note, United Kingdom Environmental Agency, version 6, 07/09/2004. www.environment-agency.gov.uk/commondata/103599/risk_man_v6_850000.doc

Visser, D.J.L. (1989): The geology of the Republic of South Africa, Transkei, Bophutatswana, Venda, Ciskei and the Kingdoms of Lesotho and Swaziland. Geological Map 1:1000 000, Geological Survey.

Western Cape Department of Environmental Affairs and Development Planning, 2005:
Visual And Aesthetic Specialists Guideline: Guideline For Involving Visual And Aesthetic
Specialists in EIA Processes.

12. APPENDIX 1: LOCALITY PLANS AND MAPS

13. APPENDIX 2: PV PLANT TECHNOLOGY DESCRIPTION

14. APPENDIX 3: DEA ACKNOWLEDGMENT OF RECEIPT OF EIA APPLICATION, DRAFT SCOPING REPORT AND REJECTION LETTER OF FINAL SCOPING REPORT

15. APPENDIX 3: PUBLIC PARTICIPATION REPORT

Appendix 3A – Proof of site notice



Site notice on Konkoonsies site boundary fence 1



Site notice on Konkoonies site boundary fence Paulputs substation



Site notice on Konkoonies site boundary fence at Paulputs substation



NOTIFICATION OF SCOPING & ENVIRONMENTAL IMPACT ASSESSMENT AS WELL BASIC ASSESSMENT PROCESSES FOR THE PROPOSED INSTALLATION OF PHOTO-VOLTAIC SOLAR POWER GENERATION PLANTS AT TWO LOCATIONS IN THE NORTHERN CAPE, SOUTH AFRICA

NOTICE is given in terms of Regulation 54 of the regulations gazetted in Government Notice No. R543 promulgated under 24(5), 24M and 44 of the National Environmental Management Act, 1998 (NEMA) (Act No. 107 of 1998) to all interested and affected parties (I&APs) that BioTherm Energy (Pty) Ltd (in partnership with Aurora Power Solutions) proposes to assess the potential to install photo-voltaic solar power generation facilities at 2 different sites in the Northern Cape.

The proposed project would include activities identified in terms of the NEMA 2010 EIA Amendment Regulations (R543) of 18 June 2010. There are listed activities which will be triggered by the projects in terms of GN. R. 544 and GN R545, promulgated under Section 24(5) of the National Environmental Management Act (Act 107 of 1998), which requires that a detailed Basic Assessment (BA) and Scoping and EIA (S&EIA) processes must be undertaken to assess the potential impacts thereof on the environment.

BioTherm Energy is proposing to investigate the feasibility of a 100 MW photo-voltaic facility on farm Konkoonies and a 300 MW photo-voltaic facility on farm Kleinzwart Bast, therefore according to GN R545 (Listing Notice 2); S&EIA process is required for the 100MW and 300MW photo-voltaic solar facilities.

Site 1: Kleinzwart Bast: Approx 36km's south west of Kenhardt, (S 29° 29'40" and E 20° 47'20")

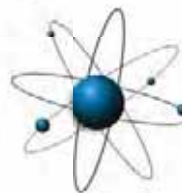
Site 2: Konkoonies: Approx 32 km's north-east of Pofadder, (S 23° 52'55" and E 19° 33'53")

Name of proponent: BioTherm Energy (Pty) Ltd (in partnership with Aurora Power Solutions)

Environmental Assessment Practitioner: EScience Associates (Pty) Ltd

In terms of the requirements of the EIA Regulations, all stakeholders and other interested and affected parties (I&APs) must be provided with opportunities to participate in the EIA process. This would include the opportunity to attend briefing meetings, review all reports generated and/or submit comments during the BA and S&EIA process. To make sure that you are identified as an interested and/or affected party, please submit your name, contact information and interest in the project to the contact person given below, by Monday 24 April 2012. This will ensure that you are continuously informed of progress with the processes, availability of reports for review etc. Any other queries with respect to these projects can also be directed to the person below.

Contact: **Roelof Letter**
EScience Associates (Pty) Ltd
 Tel: +27 (0)11 718 6380
 Fax: +27 (0)865 994 687
 E-mail: roelof@escience.co.za



EScience Associates (Pty) Ltd

Site notice wording

Appendix 3B – Written notices issued to identified I&AP's

Roelof Letter

From: Brian Gardner
Sent: 16 March 2012 02:30 PM
To: hub@siyanda.gov.za; fpr@siyanda.gov.za; info@namakwa-dm.gov.za; willema@namakwa-dm.gov.za; brandb@kaigarib.co.za; davyj@kheis.co.za; lesley@khaima.gov.za; enquiries@agrinc.gov.za; jandup1@telkomsa.net; oberholster@webmail.co.za; se@museumsnc.co.za; spothil@gmail.com; sahranc@iafrica.com; conradb@dwaf.gov.za; snydersl@dwaf.gov.za; northerncapetourism@telkomsa.net; kheismun@lantic.net; straussf@kaigarib.co.za; north.western@eskom.co.za; pngidi@environment.gov.za; tgnvisser@telkomsa.net; latrivier@lantic.net; sonderhuis@gmail.com; pinaar.magda@gmail.com; gabriel_viljoen@yahoo.com; mazwir@dwa.gov.za; AbrahamsA@dwa.gov.za; conradb@dwaf.gov.za; snydersl@dwaf.gov.za; AnnelizaC@nda.agric.za; tmakaudi@half.ncpe.gov.za; north.western@ekom.co.za; se@museumsnc.co.za; spothil@gmail.com; sahranc@iafrica.com; jsinthumulel@ncpgg.gov.za; dBruinER@eskom.co.za; cebekhulum@dwa.gov.za; abbotth@dwa.gov.za; tmaswime@environment.gov.za; mgalimberti@sahra.org.za
Cc: 'Simon Haw'; tonderai munthumbira; Roelof Letter; Brian Gardner
Subject: BIOS: Invitation to comment and register as an interested and Affected Party: PV Solar Power plants in the Northern Cape
Attachments: BIOS draft BID both sites 20120314 1415 BG.pdf
Importance: High

Dear Sir/Madam,

You and/or your organisation has been identified as a potential Interested Party / Stakeholder to participate in the Environmental Impact Assessment and Basic Assessment Processes for the proposed development of solar power (photovoltaic) generation plants on the Farms Konkoonsies near Pofadder and Klein Zwart Bast near Kenhardt. The development of these solar power generation plants require a full Scoping and EIA process to be undertaken.

Please find attached an introductory Background Information Document (BID) for your information and comment. Please feel free to forward this information to any other persons/organisations who you feel may be interested. If you would like to register as an interested and affected party and give comments (if any), please do so by Tuesday 17 April 2012.

Please do not hesitate to contact me if you have any questions with regards to these projects.

Kind regards,

Brian Gardner



ESscience Associates (Pty) Ltd
 E-mail: brian@es-science.co.za
 Web: www.es-science.co.za
 PO Box 2950, Saxonwold, 2132
 9 Victoria Street, Oaklands, Johannesburg, 2192
 Tel: +27 (0)11 718 6390

Email sent on 13 February 2012 to originally identified list of I&AP's

PROPOSED PHOTO-VOLTAIC SOLAR POWER GENERATION FACILITY ON THE FARM KONKOONSIES

List of REGISTERED LETTERS
Lys van GEREGISTREERDE BRIEWE
 (with an insurance option/met 'n versekeringsopsie)



Full tracking and tracing/Volledige volg en spoor

Name and address of sender:
 Naam en adres van afsender: **ESCIENCE ASSOCIATES (PTY) LTD**
PO BOX 2950
SIXTON WOLD 2132

Enquiries/Navrae
 Toll-free number
 Tolvry nommer
0800 111 502

No	Name and address of addressee Naam en adres van geadresseerde	Insured amount Versekerde bedrag	Insurance fee Versekeringsgeld	Postage Postgeld	Service fee Diensgeld	Affix Track and Trace customer copy Plak Volg-en-Spoor-kliëntafskrif
1	NICHOLAS BRAND PO Box 81, Potadder 8890					REGISTERED LETTER <small>Wanneer 'n dokumente geregistreer word, word dit deur 0800 111 502 nagaan en volg.</small> RD 744 501 123 ZA CUSTOMER COPY 301028
2	FANIE UD HEWER PO Box 59, Potadder, 8890					REGISTERED LETTER <small>Wanneer 'n dokumente geregistreer word, word dit deur 0800 111 502 nagaan en volg.</small> RD 744 501 127 ZA CUSTOMER COPY 301028
3	DRIES VAN ZYL PO Box 89, Potadder 8890					REGISTERED LETTER <small>Wanneer 'n dokumente geregistreer word, word dit deur 0800 111 502 nagaan en volg.</small> RD 744 501 145 ZA CUSTOMER COPY 301028
4	BGM BOUTJSEN PO Box 85, KENHARDT 8900					REGISTERED LETTER <small>Wanneer 'n dokumente geregistreer word, word dit deur 0800 111 502 nagaan en volg.</small> RD 744 501 154 ZA CUSTOMER COPY 301028
5	SOUBERT VAN DER WERSTHUIZEN PO Box 93 KENHARDT, 8900					REGISTERED LETTER <small>Wanneer 'n dokumente geregistreer word, word dit deur 0800 111 502 nagaan en volg.</small> RD 744 501 168 ZA CUSTOMER COPY 301028
6	NICO KERSTEN PO Box 64 Heimeas 8860					REGISTERED LETTER <small>Wanneer 'n dokumente geregistreer word, word dit deur 0800 111 502 nagaan en volg.</small> RD 744 501 182 ZA CUSTOMER COPY 301028
7	MS. KOKOANO SHUPENG PO Box 24, VAN ZYLSRUS, 8467					REGISTERED LETTER <small>Wanneer 'n dokumente geregistreer word, word dit deur 0800 111 502 nagaan en volg.</small> RD 744 501 171 ZA CUSTOMER COPY 301028
8						
9						
10						

Number of letters posted 7
 Getal briewe gepos 7
 Total
 Totaal R R R R

Signature of client
 Handtekening van klient

Signature of accepting officer
 Handtekening van aanneembeemple

The value of the contents of these letters is as indicated and compensation is not payable for letters received unconditionally. Compensation is limited to R100.00. No compensation is payable without documentary proof. Optional insurance of up to R 2000.00 is available and applies to domestic registered letters only.

Die waarde van die inhoud van hierdie briewe is soos aangedui en vergoeding sal nie betaal word vir 'n brief wat sonder voorbehoud ontvang word nie. Vergoeding is beperk tot R100,00. Geen vergoeding is sonder dokumentêre bewys betaalbaar nie. Opsionele versekering van tot R2000,00 is beskikbaar en is slegs op binnelandse geregistreerde briewe van toepassing.



701248

Proof of sending BID via post to those IAPs who do not have email addresses.

Appendix 3C – Proof of newspaper advertisements

14-MAR-2012 17:03 Front To: 0865122366 Page 1/2

16 MAART 2012 DIE GEMSBOK BLAD 19

Coedof Caffer

Eet van ons leiers wat die vergadering vol verwagting bygewoon het, het hierdie foto's en opmerkings aan die Gembok gestuur:

"Daarom sal stasie se woordeboek vir die groot en oerweldigende sukses van die Noud-Kaapse Provinsie, wat die bodities van die uitdaging op die byeenkoms. Daarom is dit met groot verwagting uitgesien na die finale byeenkoms van die Departement van Ekonomiese Ontwikkeling en Toerisme wat op Woensdag 7 Maart 2012 by Roodale gehou is.

Die ATKINS High Management en die Departement het die gemeenskap gemaak. Die volgende inligting was besonder belangrik. Daar is ook kritiese kritiek op die oorsake van die Noud-Kaapse Provinsie. Die belangrikste inligting het toe toe gekom en dit is besonder belangrik vir die verhouding van die Noud-Kaapse Provinsie.

Aanstellings by Rietfontein Kliniek

Gemeenskap se noodkreet beantwoord

RIETFONTEIN: Met 'n onlangse besoek aan Rietfontein Kliniek, was ek verbaas met die uitgebreide personeelsaamstelling en gesondheid van die kliniek. Hierdie kliniek is 'n voorbeeld van 'n suksesvolle gemeenskaplike onderneming.

Hierdie aanstellings het die verhouding van stasie bestuur en gemeenskaplike onderneming verbeter. Hierdie aanstellings het die verhouding van stasie bestuur en gemeenskaplike onderneming verbeter.

KENNISGEWINGS

Waarom is dit belangrik dat die gemeenskaplike onderneming 'n voorbeeld is van 'n suksesvolle gemeenskaplike onderneming. Hierdie aanstellings het die verhouding van stasie bestuur en gemeenskaplike onderneming verbeter.

Ekonomiese Ontwikkeling en Toerisme byeenkoms was 'n groot mislukking

NOTICE OF ENVIRONMENTAL IMPACT ASSESSMENT PROCESS PUBLIC PARTICIPATION PROCESS PROPOSED PHOTOVOLTAIC (PV) SOLAR FACILITY ON A SITE NORTH-EAST OF UPINGTON, NORTHERN CAPE PROVINCE

DEA Ref No. 12/12/2012/169

African Rainbow Energy (Pty) Ltd submitted an application for authorisation for the construction of a plant on a site north-east of Upington, Northern Cape Province.

You are all notified that the Department has granted African Rainbow Energy (Pty) Ltd authorisation for the project. The environmental assessment (EIA) report is available for public inspection at the Department of Environmental Affairs, 100 Water Street, Cape Town, from 15 March 2012 to 15 April 2012.

You are all notified that the Department has granted African Rainbow Energy (Pty) Ltd authorisation for the project. The environmental assessment (EIA) report is available for public inspection at the Department of Environmental Affairs, 100 Water Street, Cape Town, from 15 March 2012 to 15 April 2012.

For more information, please contact the following person at the Department:

Mr. M. Th. Zwaan, Senior Legal Administration Officer (General), Tel: 021 233 2025, Fax: 021 233 2025

Please note that you must submit your appeal via fax (021) 233 2025, or by post to Private Bag 5037, Paarl, 6017, before 15 April 2012. Appeals should be submitted to the appropriate Director, Environmental and Sustainable Future.

Savannah Environmental (Pty) Ltd
 Tel: +27 21 524 5257
 Fax: +27 21 524 5247
 Email: info@savannah.com
 Website: www.savannah.com

INTERMEDIÛRE SKOOL ORANJE-OEWER

Vakante Pos: Graad 4-Departementeel

Wolk: Afrikaans Graad 4
 Lewenswetenskap Graad 4
 Sosiale Wetenskap Graad 4

Pos aansoeksaak: 10 April 2012

Stellingsdatum: Dinsdag 20 Maart 2012

Vir meer inligting: 086 512 2366

NAMAQUALAND DIAMOND FUND TRUST

It is proposed that in terms of the Trust Act (Trust Act of 1950)

PROPOSAL FOR THE ASSET SERVICES OF THE NAMAQUALAND DIAMOND FUND TRUST

The Board of Trustees of the Namaqualand Diamond Fund Trust is in receipt of an application for authorisation to provide asset services to the Namaqualand Diamond Fund Trust.

Particulars of the proposed asset services are set out in the attached prospectus. The prospectus is available for inspection at the office of the Trust.

PROPOSAL FOR THE ASSET SERVICES OF THE NAMAQUALAND DIAMOND FUND TRUST

The Namaqualand Diamond Fund Trust is a registered trust in terms of the Trust Act of 1950. The Trust is currently in liquidation and the liquidator is seeking to realise the assets of the Trust.

PROPOSAL FOR THE ASSET SERVICES OF THE NAMAQUALAND DIAMOND FUND TRUST

The Namaqualand Diamond Fund Trust is a registered trust in terms of the Trust Act of 1950. The Trust is currently in liquidation and the liquidator is seeking to realise the assets of the Trust.

EnTherm

NOTICE OF SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT PROCESS PROPOSED PHOTOVOLTAIC (PV) SOLAR FACILITY ON A SITE NORTH-EAST OF UPINGTON, NORTHERN CAPE PROVINCE

NOTICE OF SCOPING AND ENVIRONMENTAL IMPACT ASSESSMENT PROCESS PROPOSED PHOTOVOLTAIC (PV) SOLAR FACILITY ON A SITE NORTH-EAST OF UPINGTON, NORTHERN CAPE PROVINCE

The proposed project would involve the construction of a 100 MW photovoltaic (PV) solar power plant on a site north-east of Upington, Northern Cape Province. The project is being developed by African Rainbow Energy (Pty) Ltd.

The proposed project would involve the construction of a 100 MW photovoltaic (PV) solar power plant on a site north-east of Upington, Northern Cape Province. The project is being developed by African Rainbow Energy (Pty) Ltd.

The proposed project would involve the construction of a 100 MW photovoltaic (PV) solar power plant on a site north-east of Upington, Northern Cape Province. The project is being developed by African Rainbow Energy (Pty) Ltd.

For more information, please contact the following person at the Department:

Mr. M. Th. Zwaan, Senior Legal Administration Officer (General), Tel: 021 233 2025, Fax: 021 233 2025

Please note that you must submit your appeal via fax (021) 233 2025, or by post to Private Bag 5037, Paarl, 6017, before 15 April 2012. Appeals should be submitted to the appropriate Director, Environmental and Sustainable Future.

Savannah Environmental (Pty) Ltd
 Tel: +27 21 524 5257
 Fax: +27 21 524 5247
 Email: info@savannah.com
 Website: www.savannah.com

NAMAQUALANDSE DIAMANTFONDSTRUST

It is proposed that in terms of the Trust Act (Trust Act of 1950)

PROPOSAL FOR THE ASSET SERVICES OF THE NAMAQUALAND DIAMOND FUND TRUST

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Proof of advertizing in Die Gembok Newspaper on 14 March 2012



NOTIFICATION OF SCOPING & ENVIRONMENTAL IMPACT ASSESSMENT AS WELL BASIC ASSESSMENT PROCESSES FOR THE PROPOSED INSTALLATION OF PHOTO-VOLTAIC SOLAR POWER GENERATION PLANTS AT TWO LOCATIONS IN THE NORTHERN CAPE, SOUTH AFRICA

NOTICE is given in terms of Regulation 54 of the regulations gazetted in Government Notice No. R543 promulgated under 24(5), 24M and 44 of the National Environmental Management Act, 1998 (NEMA) (Act No. 107 of 1998) to all interested and affected parties (I&APs) that BioTherm Energy (Pty) Ltd proposes to assess the potential to install photo-voltaic solar power generation facilities at 2 different sites in the Northern Cape.

The proposed project would include activities identified in terms of the NEMA 2010 EIA Amendment Regulations (R543) of 13 June 2010. There are listed activities which will be triggered by the projects in terms of GN. R. 544 and GN R545, promulgated under Section 24(5) of the National Environmental Management Act (Act 107 of 1998), which requires that a detailed Basic Assessment (BA) and Scoping and EIA (S&EIA) processes must be undertaken to assess the potential impacts thereof on the environment.

BioTherm Energy is proposing to investigate the feasibility of establishing two 19 MW photo-voltaic solar power generation facilities on farms Konkoonsies and Kleinzwart Bast; as well investigate the possibility of a 100 MW photo-voltaic facility on farm Konkoonsies and a 300 MW photo-voltaic facility on farm Kleinzwart Bast, therefore according to GN. R. 544 (Listing Notice 1); BA processes are required for both 19 MW photo-voltaic facilities and in terms of GN R545 (Listing Notice 2); S&EIA process is required for the 100MW and 300MW photo-voltaic solar facilities. The Basic assessment processes and Scoping and EIA processes on each site will be running concurrently.

- Site 1:** Kleinzwart Bast: Approx 36km's south west of Kenhardt, (S 29° 29'40" and E 20° 47'20")
- Site 2:** Konkoonsies: Approx 32 km's north- east of Pofadder, (S 28° 52'55" and E 19° 33'53")

National Department of Environmental Affairs reference numbers for these projects can be obtained from EScience Associates contact person below on request.

Name of proponent: BioTherm Energy (Pty) Ltd
Environmental Assessment Practitioner: EScience Associates (Pty) Ltd

In terms of the requirements of the EIA Regulations, all stakeholders and other interested and affected parties (I&APs) must be provided with opportunities to participate in the EIA process. This would include the opportunity to attend briefing meetings, review all reports generated and/or submit comments during the BA and S&EIA process. To make sure that you are identified as an interested and/or affected party, please submit your name, contact information and interest in the project to the contact person given below, by Friday 17 April 2012. This will ensure that you are continuously informed of progress with the processes, availability of reports for review etc. Any other queries with respect to these projects can also be directed to the person below.

Contact: **Roelof Letter**
 EScience Associates (Pty) Ltd
 Tel: +27 (0)11 718 6380
 Fax: +27 (0)86 512 2366
 E-mail: roelof@escience.co.za



EScience Associates (Pty) Ltd

Newspaper advert wording

Appendix 3D –Communications to and from I&AP’s

A there were no registration on the proposed project the availability of the draft scoping report was send to all initial identified I&Ap for comment. A commenting period was given from 23 April 2012 to the 23 May 2012.

Roelof Letter

From: Roelof Letter
Sent: 23 April 2012 10:11 PM
To: Roelof Letter (Roelof@escience.co.za)
Cc: 'sarely@sanparks.org'; 'müller@in-toto.co.za'; 'pienaar.magda@gmail.com'; 'gabriel_viljoen@yahoo.com'; 'oberholster@webmail.co.za'; 'louisehope4life@gmail.com'; 'mjsenokwanyane@gmail.com'; 'vries@khalma.gov.za'; 'mazwir@dwa.gov.za'; 'north.western@eskom.co.za'; 'straussf@kaigarib.co.za'; 'kheismun@lantic.net'; 'willema@namakwa-dm.gov.za'; 'fpr@siyanda.gov.za'; 'snydersl@dwaf.gov.za'; 'conradb@dwaf.gov.za'; 'enquiries@agrinc.gov.za'; 'zide@zyde.co.za'; 'Kevin.leask@eskom.co.za'; 'ronald.marais@eskom.co.za'; 'MashuduMa@daff.gov.za'; 'ThokoB@daff.gov.za'
Subject: FW: APSP - Draft Scoping Report Comment - proposed Photo-Voltaic Solar Power Generation Plant on the Farm KleinZwart Bast close to Kenhardt in the Northern Cape
Attachments: image001.jpg
Importance: High

Dear Stakeholders

Notice is hereby given that the **draft Scoping Report (SR)** for the proposed **Photo-Voltaic Solar Power Generation Plant on the Farm KleinZwart Bast close to Kenhardt in the Northern Cape** is **available for public comment from Monday the 23rd of April 2012**. Please follow the link to our website where you can download electronic copies of the report and appendices:

http://www.escience.co.za/Pro_Environmental%20Impact%20Assessments.php (Please note the project is listed under Ref: APSP on the website no. 25). Note that a 30-day comment period is available from **Monday 23 April until Wednesday 23 May 2012**. A copy of the report can also be requested from the Environmental Assessment Practitioner's office at 9 Victoria Street, Oaklands, Johannesburg.

Please feel free to forward this information to any other persons / organisations who may be interested. Any comments on the report, or further queries regarding this matter, can be directed to me at the contact details below. ESA would like to thank you for your participation in the EIA process to date and look forward to receipt of your comments on the draft Scoping Report.

If you require any additional information please don't hesitate to contact me in this regard.

Kind regards,

Roelof Letter



EScience Associates (Pty) Ltd
 E-mail: roelof@escience.co.za
 Web: www.escience.co.za
 PO Box 2950, Saxonwold, 2132
 9 Victoria Street, Oaklands, Johannesburg, 2192
 Tel: +27 (0)11 718 6380
 Fax: 0865 994 687
 Cell: +27 (0) 83 562 6455

The final scoping report was send to all initial identified I&Ap for comment. A commenting period was given from 14 June 2012 to the 14 July 2012.

RE: BIOS - Final Scoping Report Comment - proposed Photo-Voltaic Solar Power Generation Plant on the Farm KONKOONSIES close to Pofadder in the Northern Cape

Roelof Letter

This message was sent with High importance.

Sent: Thu 2012/06/14 05:33 PM

To: Roelof Letter

Cc: 'jandup1@telkomsa.net'; 'oberholster@webmail.co.za'; 'se@museumsnc.co.za'; 'spothil@gmail.com'; 'sahranc@iafrica.com'; 'conradb@dwaf.gov.za'; 'snydersl@dwaf.gov.za'; 'northerncape@tourism@telkomsa.net'; 'kheismun@lantic.net'; 'straussf@kaigarib.co.za'; 'north.western@eskom.co.za'; 'pngidi@environment.gov.za'; 'tgnvisser@telkomsa.net'; 'latrivier@lantic.net'; 'sonderhuis@gmail.com'; 'pienaar.magda@gmail.com'; 'gabriel_viljoen@yahoo.com'; 'dngxanga@siyanda.gov.za'; 'admin@kaigarib.co.za'; 'tourism@northerncape.org.za'; 'envhelp@eskom.co.za'; 'vries@khaima.gov.za'; 'mazwir@dwaf.gov.za'; 'north.western@eskom.co.za'; 'straussf@kaigarib.co.za'; 'kheismun@lantic.net'; 'willema@namakwa-dm.gov.za'; 'fpr@siyanda.gov.za'; 'snydersl@dwaf.gov.za'

Message BIOS final Scoping Report Konkoonsies.pdf (1 MB)

Dear Stakeholder

Notice is hereby given that the **final Scoping Report (SR)** for the proposed **Photo-Voltaic Solar Power Generation Plant on the Farm Konkoonsies close to Pofadder in the Northern Cape** is available for public comment from **Thursday the 14th of June 2012**.

The **Final Scoping Report** for the above mentioned project have been submitted to the Department of Environmental Affairs (DEA), along with requisite specialist assessments necessary to fully inform the process. Also a low resolution copy of the Final Scoping Report is attached hereto for your reference. Due to the size of the file, the appendices to the report have been omitted, if you require these appendices please send such a request and we will be happy to supply to you this. Please forward your comments directly to Mr Takalani Maswime of the Department of Environmental Affairs (Private Bag X447 Pretoria 0001) as well provide us with your comment before 14th July 2012 at the latest, as per the 30 days comment period stipulated in the EIA regulations, 2010.

Please feel free to forward this information to any other persons / organisations who may be interested. Any comments on the report, or further queries regarding this matter, can be directed to me at the contact details below. ESA would like to thank you for your participation in the EIA process to date and look forward to receipt of your comments on the Final Report.

If you require any additional information please don't hesitate to contact me in this regard.

Kind regards,

Roelof Letter



EScience Associates (Pty) Ltd

E-mail: roelof@escience.co.za

Web: www.escience.co.za

PO Box 2950, Saxonwold, 2132

9 Victoria Street, Oaklands, Johannesburg, 2192

Tel: +27 (0)11 718 6380

Fax: 0865 994 687

Cell: +27 (0) 83 562 6455

VAT No: 473 025 4416

Reg No: 2009/014472/07

Additional Public Participation Requirements from the DEA:

The following stakeholders have been included in the process, they will be provided a 30 day comment period on the draft and final amended scoping report These stakeholders will be informed on all aspect regarding the proposed development:

Table 15-1: Additional Key commenting stakeholders included in the EIA process.		
Eskom (Grid connectivity)	Kevin Leask	Kevin.leask@eskom.co.za
Eskom (Grid connectivity)	Ronald Marais	ronald.marais@eskom.co.za
SANPARKS – Environmental Manager	Sarel Yssel	sarel.yssel@sanparks.org
SANPARKS – Arid region Environmental Manger	Dries Englebrecht	dries.engelbrecht@sanparks.org
SKA office	Dr Adrian Tiplady	atiplady@ska.ac.za

Appendix3E – Minutes of any public and/or stakeholder meetings

N/A – No Meeting was held, as the interest from I&APs was very low.

Appendix 3F - Comments and Responses Report

Comment	Response
<p>Jacolline Mans (NC DAFF)</p> <p>3. The DAFF is mainly concerned about the potential impact on protected tress species. See the National forest Act, Act 84 of 1998 (NFA) as amended section 12(1)(d) read with s15(1) and s62(2)©. The list of protected tree species was published in GN 734 of 16 September 20122. Please ensure that the anticipated impact (if any) on protected trees are properly assessed during the EIA phase.</p> <p>4. The final scoping report pointed out that a biodiversity assessment will be conducted during the EIA phase. Please send a copy of this report to the DAFF as soon as it becomes available for comment. .</p>	<p>Noted</p>

Appendix 3G – Copy of the register of I&APs

Register of initially identified I&AP's

Name	Surname	Organisation
Teboho	Zide	Zyde Investments (Pty) Ltd
Sarel	Yssel	South African National Parks (Planning and Environment)
Lee	Muller	In-Toto solutions
Magda	Pienaar	AS Viljoen & Seuns Boerdery (Edms) Bpk
Gabriel	Viljoen	AS Viljoen & Seuns Boerdery (Edms) Bpk
Louise	Hugo	Thope For Life (NGO) for Khai-mai municipality near Pofadder
James	Seenokwanyane	
Nicholas	Brand	Konkoonsies surrounding landowner
Dries	van Zyl	Konkoonsies surrounding landowner
Gerrit	Visser	Konkoonsies surrounding landowner
Raquel (Nosie)	Mazwi	DWA Northern Cape Deputy director
Masilo	Ramapkakela	Field service centre manager (Eskom Northern Cape)
Frik	Strauss	Kai!Garib Municipality
Julius	Thys	Kheis Municipality
Willem	Andre	Namakwa District Municipality (Env Health)
LJ	Snyders	DWAF (Regional director)
Bettie	Conradie	DWAF
		Northern Cape DENC (Upington office office)

Register of I&AP's who officially registered for the process

Name	Surname	Organisation
Teboho	Zide	Zyde Investments (Pty) Ltd
Sarel	Yssel	South African National Parks (Planning and Environment)
Lee	Muller	In-Toto solutions
Magda	Pienaar	AS Viljoen & Seuns Boerdery (Edms) Bpk
Gabriel	Viljoen	AS Viljoen & Seuns Boerdery (Edms) Bpk
Louise	Hugo	Thope For Life (NGO) for Khai-mai municipality near Pofadder
James	Seenokwanyane	
Nicholas	Brand	Konkoonsies surrounding landowner
Dries	van Zyl	Konkoonsies surrounding landowner
Gerrit	Visser	Konkoonsies surrounding landowner
Raquel (Nosie)	Mazwi	DWA Northern Cape Deputy director

AMENDED SCOPING REPORT

Masilo	Ramapkakela	Field service centre manager (Eskom Northern Cape)
Frik	Strauss	Kai!Garib Municipality
Julius	Thys	Kheis Municipality
Willem	Andre	Namakwa District Municipality (Env Health)
LJ	Snyders	DWAF (Regional director)
Bettie	Conradie	DWAF
		Northern Cape DENC (Upington office office)

Government departments		
Raquel (Nosie)	Mazwi	DWA Northern Cape Deputy director
A	Abrahams	DWA Northern Cape
Bettie	Conradie	DWAF
LJ	Snyders	DWAF (Regional director)
Mrs. Anneliza	Collett	DAFF: Directorate: Land Use and Soil Management
Tshlo Makaudi		Northern Cape Department of Environment and Nature Conservation
Masilo	Ramapkakela	Field service centre manager (Eskom Northern Cape)
Suzanne	Erasmus	WESSA NC
Tania	Anderson	WESSA NC
Elizabeth	Manong	SAHRA (NC)
Kathy	Smuts	SAHRA
MJ	Sinthumule	Heritage Northern Cape
Rene	De Bruin	Eskom Snr Supervisor land rights - Northwestern region
Christopher	Cebekhulu	DWA Northern Cape
Henry	Abbott	DWA Northern Cape

List of government departments and representatives that were sent the hardcopies of the draft and final scoping report. The draft and final amended scoping report will also be submitted to these parties.

Northern Cape Department Agriculture, Forestry and Fisheries (DAFF)	Mrs. Jacoline Mans	054 338 5839	JacolineMa@nda.agric.za
Northern Cape Department of Environment and Nature Conservation	Mr. Tshlo Makaundi	053 807 7464	tmakaudi@half.ncape.gov.za
Department of Water Affairs (DWA)	Mr. A Abrahams	053 830 8802	AbrahamsA@dwa.gov.za
Khai Ma Local Municipality	Mr. W. Andre	054 933 1000	New Street, Pofadder, 8890
Namakwa District Municipality	Mr. A Richards	027 712 8000	Private Bag X20, Springbok, 8240

Proof of sending and proof of delivery of hardcopy of the draft Scoping report to relevant government departments

Include

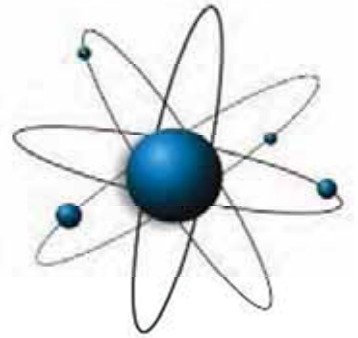
Proof of sending and delivery of hardcopies of the final Scoping report to relevant governmental departments.

Appendix 3H – Comments from I&APs on the application

None was received.

Appendix 3I – Other

The following Background Information Document sent to I&AP's with regards to the development.



**ESCIENCE
ASSOCIATES
(PTY) LTD**

**SCOPING AND ENVIRONMENTAL
IMPACT ASSESSMENT (EIA) PROCESSES**

**PROPOSED DEVELOPMENT OF PHOTO-VOLTAIC
SOLAR POWER PLANTS AT TWO LOCATIONS IN THE
NORTHERN CAPE**



**POSTAL
ADDRESS:
PO Box 2950
Saxonwold
2132**

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ADDRESS:
9 Victoria Street
Oaklands
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**FAX:
086 512 2366**

BACKGROUND INFORMATION DOCUMENT (BID)

March 2012

**E-MAIL:
info@escience.co.za**

PURPOSE OF THIS DOCUMENT

The purpose of this Background Information Document (BID) is to provide introductory information to potentially Interested and Affected Parties (I&APs) on the Environmental Impact Assessment (EIA) process required, in terms of National Environmental Management Act (No 107 of 1998) and the associated EIA regulations of 18 June 2010.

The BID is the first communication regarding the EIA process for the proposed projects, and serves as an invitation to register as an I&AP and participate as a stakeholder throughout the EIA process. This would include the opportunity to attend briefing meetings, review all reports generated, and/or submit comments during the process. The BID presents the first opportunity to provide comment, and your participation will assist in identifying any environmental and socio-economic issues related to the proposed project that should be evaluated in the EIA.

To ensure that you are identified as an I&AP for the proposed EIA process, please submit your name, contact information and interest in the project to the contact person given below on or before Friday 17 April 2012. Should you have any queries with respect to the above processes, please contact the person below:

Mr Roelof Letter at EScience Associates (Pty) Ltd.

Tel: (011) 718 6380 / 083 562 6455

Fax: 086 599 4687

E-mail: roelof@escience.co.za

Post: PO Box 2950, Saxonwold, 2132

INTRODUCTION AND PROJECT DESCRIPTION

Biotherm Energy (Pty) Ltd is proposing to develop two photo-voltaic solar power plants of various sizes (greater than 20 hectares and greater than 20 Mega-Watts (MW)) on the farm KleinZwart Bast near Kenhardt and on the Farm Konkoonsies near Pofadder in Northern Cape Province.

Photovoltaic's (PVs) are materials that convert solar radiation directly into electricity. Photo-voltaic solar cells are divided into two distinct groups: Traditional crystalline silicon solar cells and thin film solar cells. The crystalline silicon solar cells are made from monocrystalline silicon or polycrystalline silicon. The thin film technologies comprise of thinner layers of semiconductor material which are produced using a splutter process. Due to the growing demand for renewable energy sources, the manufacture of solar cells and photo-voltaic modules has advanced dramatically in recent years.

Solar Photovoltaic's is growing rapidly, albeit from a small base, to a total global capacity of 67 GW at the end of 2011, representing 0.5% of worldwide electricity demand. More than 100 countries use solar PV. Installations may be ground-mounted (and sometimes integrated with farming and grazing) or built into the roof or walls of a building (building-integrated photovoltaic's) (Wikipedia, 2012). Roughly 90% of this generating capacity consists of grid-tied electrical systems. Such installations may be ground-mounted (and sometimes integrated with

farming and grazing) or built into the roof or walls of a building, known as Building Integrated Photovoltaic's. The proposed solar PV power plants will have varying sizes and capacities.

Photovoltaic solar power plants comprise of solar modules connected together to form solar arrays for the production of electricity. Direct current electricity is produced from the solar array which in turn is connected to inverters for conversion to alternating current. Power from the inverters is then stepped up via transformers to voltages suitable for injection into the national grid for distribution to consumers.

Solar power plants can either have fixed tilt systems or tracking systems as shown in the diagrams below. Modules in a fixed tilt system are mounted at an optimised angle facing the sun. With tracking systems, the surface of the arrays is moved to follow the sun resulting in large radiation gains. Systems can be set to track the sun's daily path and/or its annual path.

Photo below shows a typical example of a fixed tilt PV array. (This is an example only)



Figure 1: Fixed tilt PV array

Photo below shows a typical example of a tracking PV array. (This is an example only)



Figure 2: Tracking PV array

As there are 2 sites that will be investigated, the following environmental processes will be followed for each of the 2 sites:

Site 1: KleinZwart Bast– The site will be subject to a full Scoping and EIA process.

Site 2: Konkoonsies– The site will be subject to a full Scoping and EIA process.

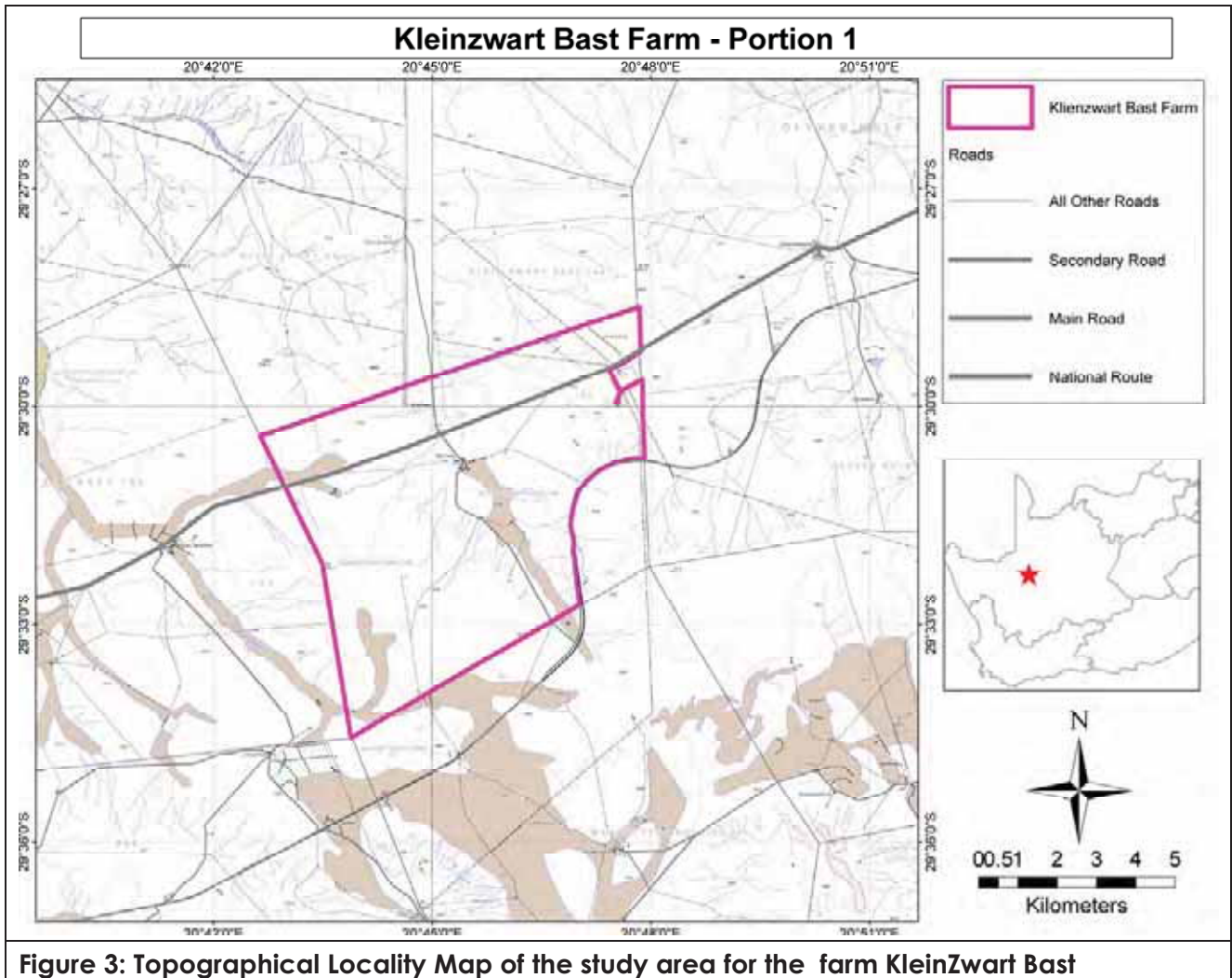
PROJECT REFERENCE NUMBERS FROM NATIONAL DEPARTMENT OF ENVIRONMENTAL AFFAIRS (DEA)

Project site	NEAS reference number	DEA reference number
KleinZwart Bast full Scoping and EIA	DEA/EIA/0000525/2011	12/12/20/2430
Konkoonsies full Scoping and EIA	DEA/EIA/0000529/2011	12/12/20/2443

LOCALITIES OF THE 2 PROPOSED SITES

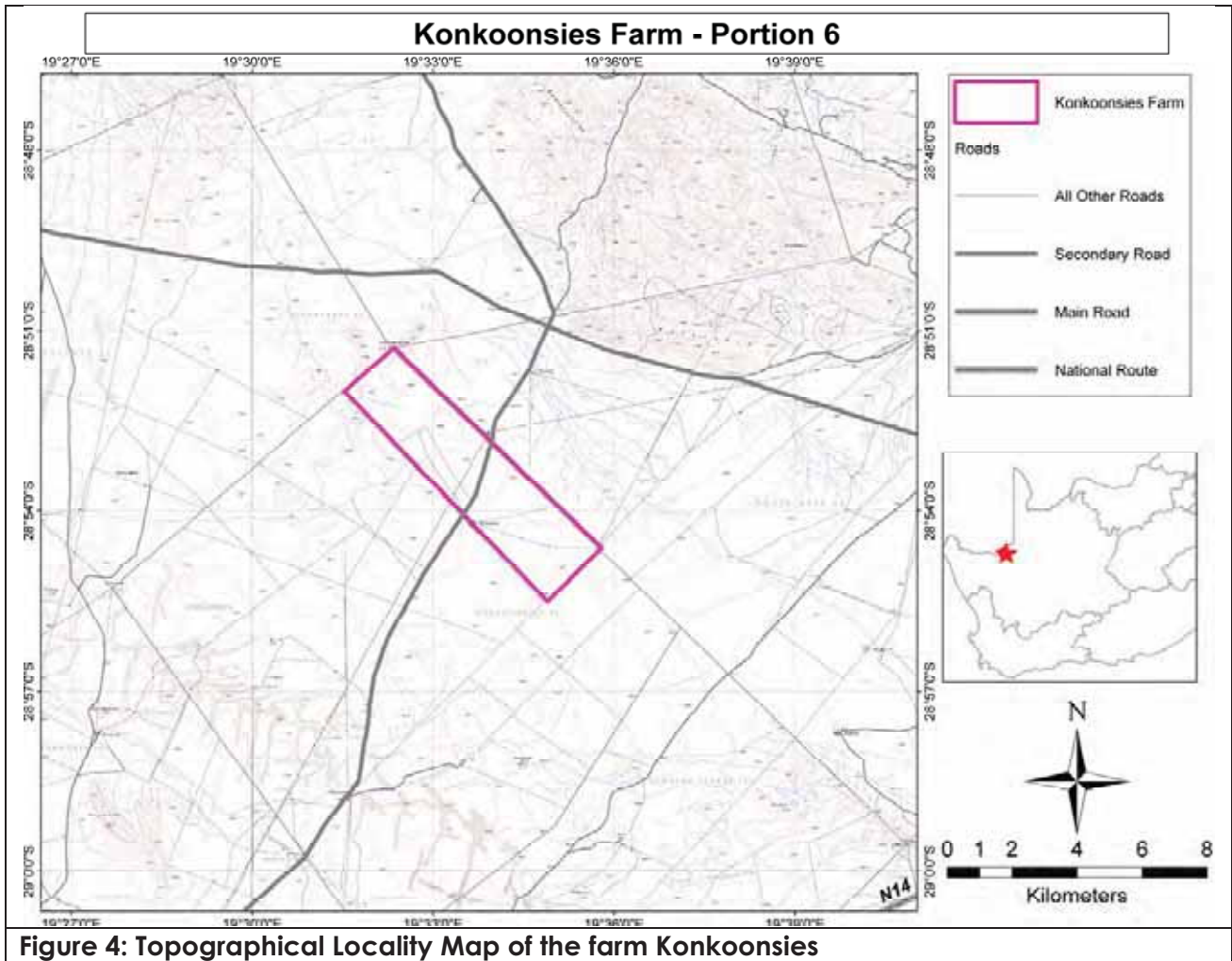
Site 1: Kleinzwart Bast (S 29°0.29'40" and E 20°0.47'20").

The site for the proposed facility lies within the Namakwa District Municipality and the Khai ma Municipality approximately 36km's South west of Kenhardt in the Northern Cape. The portion of the Farm KleinZwart Bast that is earmarked for the solar development is indicated in figure 3 below.



Site 2: Konkoonsies: Approx 32 km's north- east of Pofadder, (S 280 52'55" and E 190 33'53")

The Farm Konkoonsies is located in the Namakwa District Municipality and Khai ma Municipality Local Municipality. It is 32kms north of the town of Pofadder. The portion of the Farm Konkoonsies that is earmarked for the solar development is indicated in figure 4 below.



LEGAL & REGULATORY FRAMEWORK

The National Environmental Management Act (NEMA), (Act 108 of 1998), is South Africa's overarching environmental legislation, and contains a comprehensive legal framework to give effect to the environmental rights contained in section 24 of The Constitution. The proposed project would trigger so called "listed activities", which may not commence prior to obtaining an Environmental Authorisation in terms of Section 24 of NEMA. A full inventory of the "listed activities" can be requested from the environmental assessment practitioner (EAP). Due to the nature and/or scale of some of these activities, NEMA require that the potential environmental impacts must be considered, investigated, assessed and reported on to the competent authorities through either a Basic Assessment process or through a detailed Scoping and Environmental Impact Assessment (EIA) process, described in the NEMA 2010 EIA Amendment Regulations (R543) of 18 June 2010.

The establishment of this solar power generation facilities on the two farms will be subjected to a Scoping and EIA processes. There are various activities that will be "triggered" by the proposed development. The activities are listed in terms of Government Notice R545 of 18 June 2010.

These listing are as follows:

For the full scoping and EIA process the following are considered:

Activity 1:

The construction of facilities or infrastructure for the generation of electricity where the electricity output is 20 megawatts or more.

Activity 8:

The construction of facilities or infrastructure for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex.

Activity 15:

Physical alteration of undeveloped, vacant or derelict land for residential, retail, commercial, recreational, industrial or institutional use where the total area to be transformed is 20 hectares or more; except where such physical alteration takes place for:

- (i) linear development activities; or
- (ii) agriculture or afforestation where activity 16 in this Schedule will apply.

WHAT IS AN ENVIRONMENTAL IMPACT ASSESSMENT?

The main aim of an Environmental Impact Assessment (EIA) process is to assess the significance of potential environmental impacts of proposed projects in order to assign appropriate management measures to reduce the significance of those identified impacts, and to provide this information to the relevant Government Authorities who are responsible for making decisions on the environmental approvals that the project would require either before it may commence, or where substantial variations are proposed for already authorised activities.

An EIA is a methodical and systematic process to identify potential positive and negative impacts on the biophysical, socio-economic and cultural environment that may result from a proposed activity. The EIA aims to ensure effective compliance and governance concerning the sustainable use of environmental resources, while simultaneously focusing on key issues such as stakeholder empowerment, and providing access to relevant and concise information to enable informed decision-making. The EIA process is also used to examine alternatives and management measures to minimise negative and optimise positive impacts. The ultimate objectives of the EIA process are to prevent significant detrimental impact on the environment and to ensure sustainable development.

The EIA has to consider the different perspectives and requirements of all role players, who derive different benefits from participating in the EIA process. These can include amongst others Government authorities, developers, land owners and other interested and affected parties.

Biotherm Energy (Pty) Ltd is proposing to investigate the feasibility of establishing two photo-voltaic facilities on farm Konkoonsies and KleinZwart Bast, therefore according to GN R545 (Listing Notice 2); S&EIA process is required for the photo-voltaic solar facilities.

PUBLIC PARTICIPATION PROCESS

The public participation process during any Scoping and EIA process may consist of the following main activities:

NOTIFICATION of I&APs regarding the EIA process, consultation activities and availability of reports and decisions by the authorities, using a variety of mechanisms.

FOCUS GROUP MEETINGS with relevant sectoral groups (groups of role players with similar interest, such as the tourism and agricultural sector, local government, etc.) if required.

PUBLIC MEETINGS that will be advertised. These will provide I&APs with information and opportunities to record concerns, issues and suggestions, as well as to identify other I&APs.

COMMENT PERIODS (14 - 30 calendar days) will be communicated for both the draft Scoping and Environmental Impact assessment Reports, in order to provide registered I&APs with the opportunity to review and comment on the information compiled through the EIA process.

Everyone has the right to be involved in decisions that may affect them. Participation by I&APs is in everyone's best interest because:

It provides opportunities for I&APs and the authorities to obtain clear, accurate and understandable information about the expected environmental and socio-economic impacts of the proposed development.

It provides members of the public with the opportunity to voice their concerns and to raise questions regarding the project.

It provides I&APs with the opportunity to suggest ways for reducing or mitigating any negative impacts of the project, and for enhancing its benefits.

It will enable the project proponent to consider the needs, preferences and values of I&APs in their decisions.

It provides opportunities for the clearing up of misunderstandings about technical issues, resolving disputes and reconciling conflicting interests.

It is vital for ensuring transparency and accountability in decision-making.

It contributes toward maintaining a healthy, vibrant democracy.

You are important to the process and we urge you to participate by registering as an Interested or Affected Party (Registration Form attached). The sharing of information forms the basis of any stakeholder engagement process and offers I&APs the opportunity to become actively involved in the project from the outset. It also plays an important role in the understanding of environmental investigations, as input from I&APs helps to ensure that all potential issues are considered in the EIA.

IAP REGISTRATION FORM (Photo-voltaic solar power plants – Farms Konkoonsies and KleinZwart Bast Northern Cape)

Please complete and return to EScience Associates on or before **Friday 17 April 2012** by means of the following (or alternatively phone Roelof Letter at (011) 718 6380 / 083 562 6455): E-mail: roelof@escience.co.za or Fax: 086 599 4687; Post: PO Box 2950, Saxonwold, 2132

PERSONAL DETAILS:

Title: _____ Initials: _____ Surname: _____

Company / Organisation (if applicable): _____

Position/Nature of involvement (e.g. property owner): _____

Specific project interest (i.e. Konkoonsies, Klein Zwart Bast): _____

Street address: _____

Postal address: _____

Tel (incl. area code): _____ Cell: _____

Fax number: _____ E-mail: _____

I want to receive correspondence/updates regarding the project: YES / NO

Preferred method of communication: *Post / Phone / Fax / E-mail*

COMMENTS/QUESTIONS:

1. Do you have any specific interest in the proposed project?

2. What issues, comments and concerns would you like to raise with regard to the proposed EIA and public participation process?

3. What potential impacts do you foresee associated with the proposed project?

4. Are there any other role-players/stakeholders that you feel we should consult with?
(Please state name & contact details)?

16. APPENDIX 4: SITE PHOTO REPORT

17. APPENDIX 5: SCREENING BIODIVERSITY ASSESSMENT

18. APPENDIX 6: TITLE DEED FOR KONKOONSIES

19. APPENDIX 7: CV'S OF LEAD ENVIRONMENTAL CONSULTANTS