

**A PHASE 1 HERITAGE IMPACT ASSESSEMENT FOR THE PROPOSED KLIPGAT SOLAR ENERGY FACILITY (75MW), NEAR NOUPOORT, NORTHERN CAPE PROVINCE.**

**DEA REF NO.:14/12/16/3/3/2/354.**



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#### **DECLARATION OF INDEPENDENCE**

This report has been compiled by Nkosinathi Tomose, appointed Heritage Consultant, for Zone Land Solutions. The views expressed in this report are entirely those of the author (in his personal capacity as a freelancer) and no other interest was displayed during the decision making process for the project.

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**CONTACT PERSON:** Nkosinathi Tomose

## **EXECUTIVE SUMMARY**

Zone Land Solutions (Pty) Ltd was appointed by Savannah Environmental (Pty) Ltd in terms of NEMA, 107 of 1998 (as amended & applicable EIA Regulations of 2010) to conduct a Heritage Impact Studies for the proposed development of Klipgat Solar Energy Facility, located ~20 km north-west of Noupoot, within Umsobomvu Municipality, Northern Cape Province, South Africa. Nkosinathi Tomose (archaeologist & heritage consultant) was instructed by Zone Land Solutions (in term Section 38 of NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations) as well as other applicable legislations) as an archaeologist and heritage specialist to conduct Heritage Scoping in June 2012 which was then submitted and approved by SAHRA. The SAHRA Review Comment requested an HIA to be conducted for the footprint of the proposed Klipgat Solar Energy Facility on Farm Klipgat 802/80 as per project scoping phase recommendations. This report is the result of the above integrated processes from the various fields of speciality and involvements. The following results, conclusions and recommendations are made about the identified heritage resources based on the existing literature about the project area, a preliminary site survey of the PDA conducted during the project Scoping Phase, SAHRA minimum standards for assessment and/or grading of archaeological (and other heritage) resources as well as the NHRA, No 25 of 1999 for the protection, conservation and management of the Nation Estate (Section 3 of the NHRA, No 25 of 1999):

The survey of the PDA yielded 3 heritage resources sites, namely: Klipgat-1, Klipgat-2 and Klipgat farmstead. This project phase made the following conclusions and recommendations:

- > That there were no "Heritage Sensitive Areas" identified only areas that have the potential to yield archaeological resources.
- > It was concluded that there are no heritage "No Go Area" within the site and that the development should go ahead as planned.

SAHRA granted a positive Review Comment to allow the project to pass into the EIA phase and requesting an HIA in terms of heritage management.

This Phase 1 HIA attempts to address SAHRA Review Comments recommendation in order to positively manage heritage resources within the project development footprint. However, it has to be noted that there was no secondary survey of the project area and project

footprint and that observation of this Phase 1 study are solely reliant on the preliminary survey of the scoping phase. In the light of this limitation the following recommendations are made about the project development footprint area, the area to be covered by the PV layout (*Figures: 14-15*).

- > The project scoping phase yielded limited resources about the PDA (the broader study area) – based on this it is the authors’ opinion that it is very unlikely that more resources will be yielded within the PV footprint with exception to the area marked as archaeological/heritage resources potential yielding area marked in year circle in both Figure 14 and 15.
- >
- > With the fulfilment of this recommendation and based on its results and recommendations and any mitigation measures proposed regarding the management of heritage resources that will potentially be yielded - there should be no reason as to why the project construction phase should not go ahead as planned.

**Note**

*Refer to Conclusions and recommendations section of this report for full conclusions and recommendations.*

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## ABBREVIATIONS

<b>Acronyms</b>	<b>Description</b>
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DoE	Department of Energy
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Late Stone Age



LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NEMA	National Environmental Management Act
PHRA	Provincial Heritage Resources Agency
PHRA-FS	Provincial Heritage Resources Agency-Free State
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SPV	Special Purpose Vehicle
VIA	Visual Impact Assessment

## TERMS & DEFINITION

### *Archaeological resources*

This includes:

- i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- ii. rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- iii. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;

- iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

### ***Cultural significance***

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

### ***Development***

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- ii. carrying out any works on or over or under a place;
- iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- iv. constructing or putting up for display signs or boards;
- v. any change to the natural or existing condition or topography of land; and
- vi. any removal or destruction of trees, or removal of vegetation or topsoil

### ***Heritage resources***

This means any place or object of cultural significance

## **1. INTRODUCTION**

### **1.1. Project Background**

#### **1.1.1. Developer and the Proposed Project**

Klip Gat Solar Energy (Pty) Ltd proposes the establishment of a commercial photovoltaic solar energy facility on a site located some 20km north-west of the Karoo town of Noupoort, within Emthanjeni Municipality, Northern Cape Province, South Africa.

The proposed project is known as Klip Gat Solar Energy Facility, it includes photovoltaic (PV) solar panels and associated infrastructure with a total power generating capacity of ~ 75MW. The maximum amount of power to be generated at the proposed facility has been kept at megawatts level in line with the Depart of Energy (DoE) competitive bidding process for procuring renewable energy from Independent Power Producers in South Africa. DoE stresses a threshold amount of megawatts per project entered into bid, and the power generating threshold for a single solar PV facility for submission into a bid has been set at 75 MW. To comply with the above thresholds, the proposed Klip Gat Solar Energy Facility will have a capacity of up to 75MW. (*Refer – Appendix 1, Notice of EIA Process Public Participation Process*).

### **1.1.2. Proposed Project Aims**

The objective of the proposed PV facility is to evacuate the generated power into the Eskom electricity grid within that province.

This forms part of Eskom strategies to boost its electricity power generation and supply capacity, in the process, providing unlimited energy in the province like the Northern Cape with accelerated growth and development.

### **1.1.3. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist**

Because of the nature and size of the proposed development, commercial photovoltaic solar energy facility (75MW) to be known as Klip Gat Solar Energy Facility and the associated infrastructure to be built in an area covering approximately 845 ha, a Scoping and EIA processes were required in terms of the Section 24 and 24D of the NEMA, No. 107 of 1998 as read with the EIA Regulations of the GN R543-R546.

Savannah Environmental (Pty) Ltd, the lead Environmental Impact Practitioner, appointed by Klip Gat Solar Energy (Pty) Ltd to manage the Environmental Scoping, the EIA process and associated impact studies. Savannah Environmental appointed Zone Land Solutions

(Pty) Ltd to conduct both the Heritage Scoping and HIA studies (as well as the VIA) for the proposed development as part of specialist's impact assessment studies required to fulfil the Environmental Scoping and EIA process and their requirements. Nkosinathi Tomose (lead archaeologist & heritage consultant) was sub-contracted by Zone Land Solutions to conduct a Heritage Scoping Study (in June 2012) for the proposed Klip Gat Solar Energy Facility (75MW) proposed on the Farm Klip Gat 802/80, 20km north-west of the Town of Noupoort within Emthanjeni Municipality, Northern Cape Province (*Figure 1*). Following a positive SAHRA Review Comment on the project scoping phase – Zone Land Solutions instructed Nkosinathi Tomose (on freelance basis as it was with the scoping) carryout a Phase 1 HIA study of the site in order to fulfil SAHRA Review Comments recommendations which this report attempts to address. The appointment of an archaeologist and heritage specialist is in terms of both the NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations) as well as other applicable legislations. The SAHRA Review Comments submitted to Savannah Environmental in September 2012 are also considered. Following a conference call on the night of the 27 of November between Johann Claassen of Zone Land Solutions, Umeshree Naicker of Savannah Environmental and Nkosinathi Tomose in his personal capacity it was also agreed that Mr Tomose would need to address some of the SAHRA review comments under the premise that the area marked with a yellow circle in both Figure 14 and 15 will need an investigation before the commencement of the project construction phase. This therefore, forms part of Terms of Reference for the specialist to be involved in this project phase.

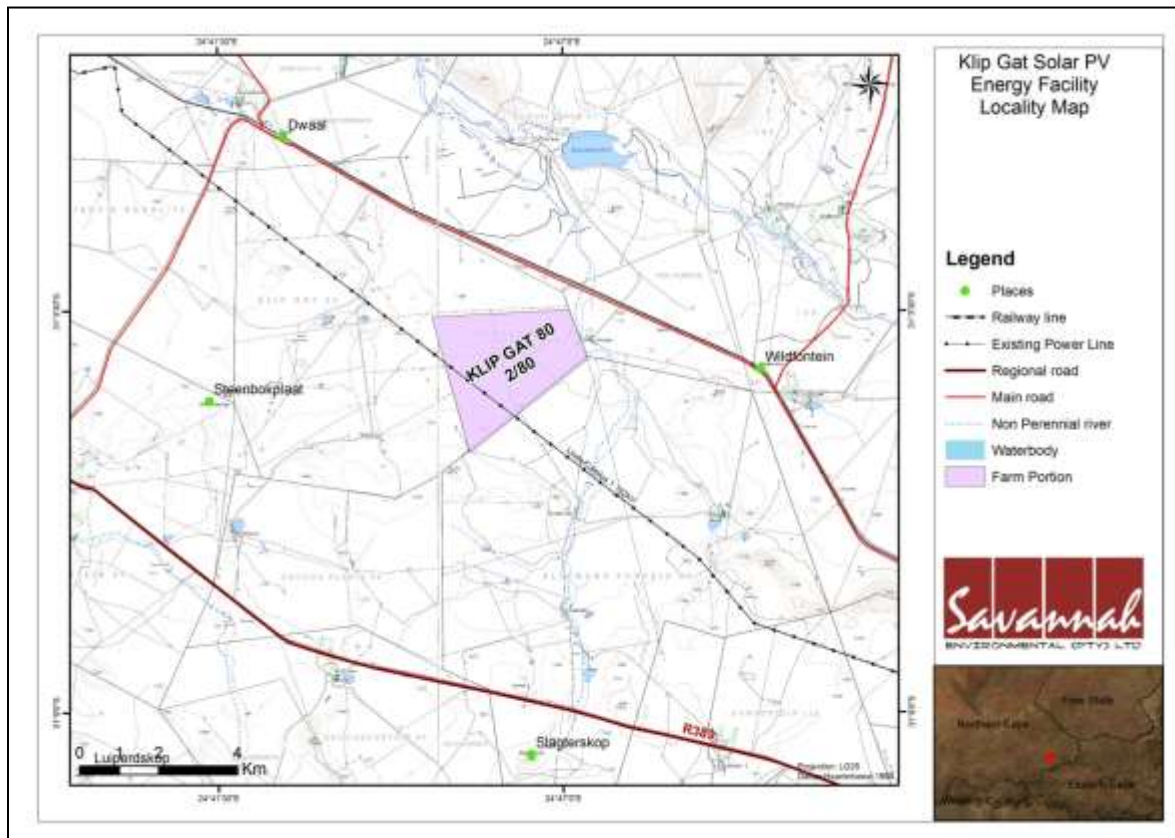


Figure 1 – Propose area of development for the proposed Klip Gat Solar Energy Facility (75MW). @ Savannah Environmental, 2012.

## 2. BACKGROUND OF THE STUDY AREA

### 2.1. Description of the affected environment

The study area is located in a low laying landscape characterised by two or more small ridges, Koppies /small outcrops in western section. It is generally flat and dry with plenty of potential agricultural potential fields. It is ensconced between three roads (national and regional roads) – the R389 in the south, Dwaai to Wildfontein road in the north and other

splits from Dwaai and extends south-west of the PDA, west of Steenbokplaat to the Town of Hanover.

A railway line is observed north to east of the PDA along the road from Dwaai to Wildfontein. A 132 V Line, Linde/Carolus 1, cuts through the PDA from west to south-east.

Not much of agricultural activities were observed in the study area - few horses were observed in the nearby farmstead located in the eastern end of the PDA towards the railway line.

Based on the above observations the area in which the PDA is located can be defined as a "less active geography" in terms of development activities - a geographic landscape/environment that is less developed with only significant development being in form of roads and the observed railway line with few village towns and farmsteads.

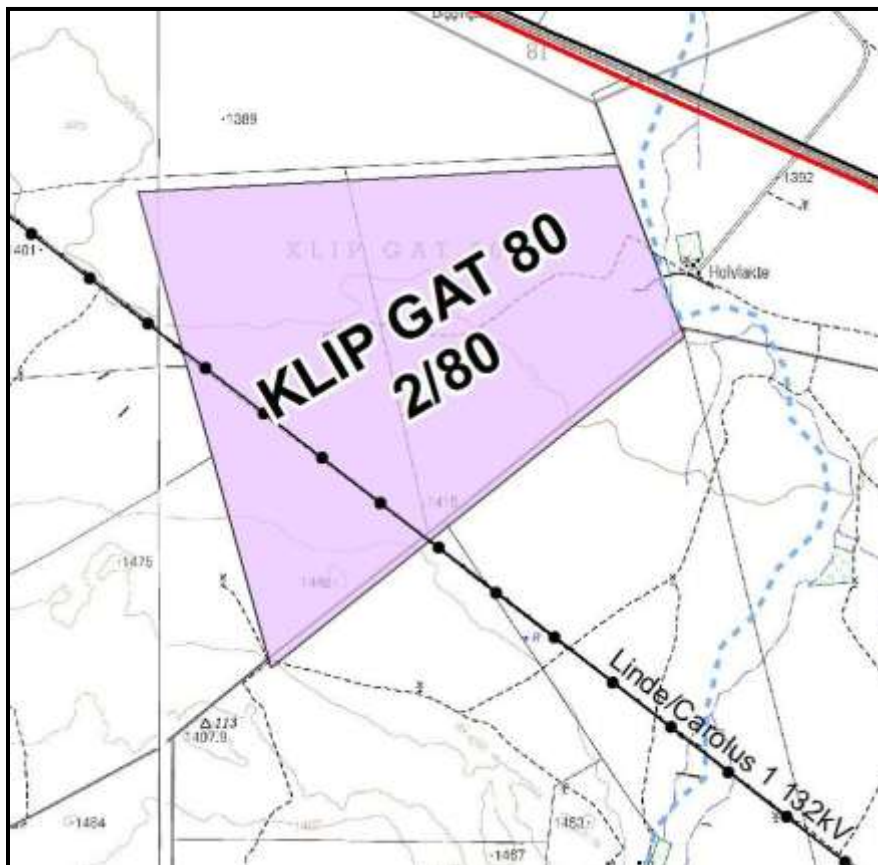


Figure 2- A close-up topographic view of the PDA. Note the existing national road, power lines, railway line and the dirty roads. Also note the contour line for the highest point is the south (note beacons marking the highest points).



*Figure 3- a south-eastern view of the PDA – note the mountains in the background and a typical example of ridge found in the and around the PDA in close proximity.*



*Figure 4 - General site condition - shrubs of tough grass define the PDA.*



*Figure 5-Dried up water course located with the PDA. Note the Eskom 132kV Line in the background.*



## **2.2. Desktop Study: Archaeological and Heritage**

The heritage of South Africa is rich and diverse varying from the natural to cultural heritage. The natural heritage of the country include among other things: palaeontological, geological and the various plant and animal species. Cultural heritage on the other hand (i.e. dating as far back as 2.5 million years ago (m.y.a)) includes: Stone Age Archaeology, Iron Age Archaeology, Historical and Industrial Archaeology, the "Political/Historic" geographies. The current Heritage Scoping study concerns itself with the cultural aspect of this rich and diverse heritage with a particular focus in one of South Africa's regions – the Northern Cape region also known to provide a rich archaeological and historical canvass to archaeologists and historians alike as well as the palaeontological past to palaeontologists.

### **2.2.1. Stone Age Archaeology:**

The Stone Age archaeology of southern Africa is divided into three categories, namely: the ESA, MSA and the LSA. These Stone Age industries are well documented throughout the southern Africa regions (i.e. in countries that form the political geography of SADC). The Northern Cape forms one of the sub-regions of the SADC and is located within South Africa. Below are detailed summaries of the traits that characterises each industry artefact and/or material culture – reference will be drawn directly towards the Northern Cape where the PDA is located.

#### ***ESA – Early Stone Age:***

The ESA in South Africa is dated between 2.5m.y.a and 250 k.y.a (thousand years ago). During this period predecessors of *Homo Sapien Sapiens* started making stone artefacts. The earliest known Stone Age industry is referred to as the *Olduwan Industry*. It derives its name from the first known Stone Age industry recorded in Olduvia Gorge, Tanzania north-east Africa. Stone artefacts associated with this industry are often described as "crude and rudimentary in making" – they define the earliest form of Stone Age technological innovation. The Olduwan is replaced, in the archaeological records, by the *Acheulian Industry* some 1.5 m.y.a. The Acheulian is characterised by large cutting tools (also referred to as *bifaces*) - hand axes and cleavers are the dominant forms of artefacts found in this industry.

In the Northern Cape some of the earliest known ESA industry is the Victoria West Stone Industry which also spreads to the Free State Province, but is dominant in the Northern Cap. The Victoria West Stone Industry was first recorded and defined by R. A., Smith in 1915 and in the Free State region it is found along the Vaal River basin. Tools found in this industry included hand axes and what Smith refers to as '*Tortoise Cores*' (Smith, 1920). The "*Tortoise Cores*" are most probably Smith's reference to the peculiar feature or morphology of *Prepared Cores* – where different pieces are chipped off from a single piece of parent material to make way for the ultimate removal or shaping of a specific tool and most likely a well-defined hand axe. A. H. J., Goodwin (1935) defines the Victoria West Industry as an industry that is with and without cores. Meaning that hand axes and cleavers could have been produced without necessarily having to prepare a parent material to a point to which a single definable tool could be produced. The absence of prepared cores in relation to hand axes and cleaver did not mean the end to this stone tool manufacturing techniques for it becomes a dominant and defining feature towards the end of the ESA into the MSA (Middle Stone Age). What first became known as '*Tortoise Cores*' was later defined as the transition marker between the ESA and the MSA. Therefore, the *Prepared Cored* of the Victoria West industry can be taken as the markers of transitional period in the Stone Age industry from Acheulian into the MSA, a second clearly defined phase in Stone Age technological innovation. Lycett (2009) sees the Victoria West as an evolutionary step towards the *Levallois Prepared Core Technique* which signifies the outwards spread of the Stone Age technology.

Stone artefacts dated to the above ESA industries are commonly found in open sites as secondary occurrences and/or scatters and not within their primary context.

### ***ESA Predicted sites yielding areas:***

It is, therefore, argued here that it is important during the survey to pay special attention to open air areas that may potential yield some of these artefacts. The other areas that require special attention during surveys include, but not limited: gullies, sodic soils, dams, furrows, dried-up water courses and river banks – because during land disturbance stone artefacts that were initially covered by soil get exposed to the surface.

## **MSA – Middle Stone Age:**

During the MSA smaller and sizeable stone artefacts replace the dominant large and often imposing hand axes and cleavers that characterise the ESA. This distinction or transition in archaeological records has been dated to 250 k.y.a. During this period, smaller artefacts define the archaeological records and the most dominant ones are flake and blade industry. As such, this technological period has been defined by some in 'archaeological circles' as a period that signifies a secondary step towards the modern human behaviour through technology, physical appearance, art and symbolism (e.g. Binnemanet *al.* 2011). This innovation is suggested to have been at its most probable peak during the last 120 k.y.a. With surface scatters of the flake and blade industries found throughout the southern Africa regions (e.g. Thompson & Maream, 2008). They often occur between surface and approximately 50-80cm below ground. At times, in some sites, fossil bones are found in association with the MSA stone artefacts. The flakes and blade industries are often found in secondary context as surface scatters and occurrence like their predecessor industries. Malan (1949) defines the earliest MSA stone industry as the Mangosia and its distribution stretching across the Limpopo, the Griqualand in Northern Cape, Natal, and the Cape Point as well as the Free State Province. Griqualand is located some hundreds of kilometres north of the current study area and presents one of the cultural and political geographic landscape forming part of the South African heritage puzzle (refer to *Figure* for historic Griqualand boundaries). The Prepared Core Technique which had become the defining technological technique of the MSA is in this industry replaced by the Micro Lithics that become a dominant feature or trait in the LSA (Late Stone Age). In the Northern Cape Province artefacts associated with the Mangosia industry are known to have been made from indurate shale raw material (Binnemanet *al.* 2011). They mostly occur as surface scatter. The MSA tools include flakes, blades and points. Their time sequence is often not known because they mostly occur in surface. Other industries within the MSA include:

- The Howieson's Poort which is known to have wide distribution throughout southern African including the Northern Cape Province.
- The Orangia 128 to 75 k.y.a.
- Florisbad and Zeekoegat industries dated between 64 and 32 k.y.a -Florisbad is dominant in the Free State Province but also found in the Northern Cape.

Most of the MSA stone artefacts are made from the following materials: fine grain quartzite, quartz, silcrete, chalcedony and hornfels (Binnemanet *al.* 2011, see also Binnemanet *al.* 2010a). Like the ESA artefacts, the MSA stone artefacts occur in secondary context owing to a variety of reasons. One is due to natural events and/or activities such as erosion and being wash down by water and riverine activities, animal and human disturbances and so forth.

***MSA Predicted sites yielding areas:***

It would, therefore, be in the best interest of the author (i.e. the involved archaeologist and heritage consultant) to pay special attention to exposed surfaces, disturbed pieces of land and along any gullies and down slopes during the survey process of the EIA. Sodic soils, dams and dried-up water course are also other potential areas that may yield archaeological resources or artefacts dated to the MSA.

***LSA (Late Stone Age) Archaeology & Rock Art:***

The southern Africa LSA is known to span a period from 30 k.y.a to the historical time i.e. the last 500 years to 100 years ago (e.g. Mitchell & Whitelaw, 2000). It is associated in archaeological records with the San hunter-gathers (*ibid*). This is particular important for the last 10 k.y.a whereby the San material culture dominate the archaeological records - mostly in rock shelters, caves as well as open air sites in both the interior and coastal regions (*ibid*). However, the San open air sites are not always easy to find because they are in most cases covered by the various forms and types of vegetation and the other contributing factor is the mobility nature of these people. They were not sedentary people like their Iron Age counter parts who needed to settle the land for ploughing and long term seasonal grazing periods etc. In the coastal regions, sand dunes sometimes become impediments in locating LSA sites. Owing to all these factors the preservation state of the LSA archaeology is often poor and not easily disenable (Deacon & Deacon 1999). Caves and rock shelters provide a more substantial preservation record of pre-colonial record of indigenous people's archaeology. This is in form of stone artefacts, rock art and other material culture such as beads etc. It has recently emerged that the LSA archaeology was not solely dominated by the San hunter-gathers particularly in the last half -in some 2 k.y.a the southern Africa landscape was penetrated by the Khoekhoe pastoralist introducing

sheep, cattle and goat along with them (e.g. Hall & Smith, 2000; Sadr). Ceramic vessels are some of the material culture that signifies the Khoekhoe material culture in archaeological records – including the depiction of sheep and cattle often found in San hunter-gather rock art (ibid). Smith and Hall (2000) give detailed descriptions of potential relations that could have taken place between the San, the Khoekhoe and the Iron Age farmers. They also argue that the material culture of the Khoekhoe herders included among other things the art of making rock art. Binneman (*et al.* 2011) suggests that the diet of this new group of people would have also included muscle collected along the muddy river banks, coastal line and riverine and terrestrial foods. Other than the material culture such as artefacts found within the LSA industries, burials or human remains become dominant in the landscape. In the coast they are often found buried underneath middens (dumpsites) (e.g. Deacon & Deacon 1999). While in the interior regions they are sporadic and can occur across various features in the landscape.

The LSA archaeology is therefore rich and varied consisting of stone artefacts, other forms of material cultures such as beads (ostrich egg shell beads are dominant), pottery, rock art in form of paintings and engravings with engraving dominating the central low land interior regions but also found elsewhere. The Northern Cape Province is known for some of its splendid rock art sites in predominantly in form of engravings, which in a way make it distinct from other South African rock art regions. Paintings are also found in this region - for example, Ouzman defines Korana rock art in the region (2005). Among some of the well known engraving sites in this province are Wildebeest Kuil and Driekop Eiland near Kimberly. In the composition of stone artefacts, bifaces still continue and are supplemented by tanged barbed arrow heads made from the various materials found with the southern Africa regions. Humphrey (1969) defines the dark or black fine grained chalcedony as the most preferred form of material in the Karoo (Northern Cape regions), the Free State Province and Lesotho for stone tools.

Smithfield settlement sites are concentrated among hills and ridges in preference to flat and mountains. Smithfield was divided into three phases using scrapper size and shape (Goodwin & Van Riet Lowe 1929).

- > Smithfield A – large scappers
- > Smithfield B – long and narrow scappers
- > Smithfield C – small thumbnail scappers.

As a result of the various groups known to have existed hand by hand during the LSA up-to the historic period in the last 500 years ago – we get multiple layers of material culture and artefacts associated with the LSA. For example, archaeologists talk of burials, the art and symbolism (rock paintings and engravings), beads, stone artefacts or tools, bones associated with the material culture in rock shelters and caves etc.

***LSA predicted sites yielding areas:***

The surveys need to pay special attention to these various forms of material culture and artefacts as defined above. Areas deemed to be suspect, with a potential to yield any of the above mentioned resources need to be investigated. The areas that have the potential to yield such resources include, but not limited: sodic soils, disturbed areas and gullies. The most likely stone age sites or artefacts to be found will be inform of stone artefact scatters like what other studies have found in the area (e.g. Table 1). Rock Art sites in form of engravings are also more likely to be found in exposed rocks, boulders, caves and shelters



*Figure 6 - Example of an engraving in Wildebeest Kuil. @ <http://www.wildebeestkuil.itgo.com/> (16/07/2012).*

*Table 1-List of HIA done within the broader geography of the proposed development area*

<b>Year of Study &amp; Author</b>	<b>Project Name</b>	<b>Archaeological &amp; Rock Art Sites</b>	<b>Built Environment &amp; Landscape</b>	<b>Grave Sites</b>
2011, Booth &	A Phase 1 Archaeological Impact Assessment for the Proposed Establishment of the Amandla Welanga Solar Energy Facility on the Remaining Extent of the Farm Rietfontein 140, Near Noupoot, Northern Cape Province	4 x stone artefact surface scatters	-	-
2011, Booth	A Phase 1 Archaeological Impact Assessment (AIA) for the Proposed Kleinfontein Solar Energy Facility on the Farm Caroluspoot, Portion 4 Of 167, Situated Near Noupoot, Northern Cape Province	2 x stone artefacts surface scatters	-	-

### **2.2.2. Iron Age Archaeology:**

The Early Iron Age communities first appear in southern African archaeological records in the 1<sup>st</sup> Millennium AD. During this time it is known that most of the southern Africa was occupied by the LSA hunter-gathers and the newly emerged agro-pastoralist known as the Khoekhoe herders. These early Iron Age communities selected specific routes in entering the southern African landscape. This becomes evident when one assesses the archaeological records associated with these communities. For example, the eastern

regions of the country are argued to have been their preferred regions because of their rainfall patterns – summer rainfall climates conducive for ploughing and growing crops like sorghum and millet (e.g. Huffman, 1982 see also Huffman, 2007). In the interior regions of the country the former Transvaal (i.e. Limpopo and Gauteng Province) were preferred with some penetrating the through the western end of the country in areas such as the North West Province. Distinction between the various Iron Age communities have been made based on the material culture, language streams as well as their socio-cultural and spiritual believes (their world views and how they interact with it). From the eastern regions of the country the Nguni Speakers are found, the Ndebele's, Sotho-Tswana's groups are known for the central and western regions. In the Northern Cape there is less research dedicated to the Iron Age communities partly because of lack of evidence suggesting their long existence in the region. One of the few research publications suggesting the presence and influence of Iron Age ideas in this part of the country is by Humphreys (1988) titled "*A Prehistoric Frontier in the Northern Cape and Western Orange Free State: Archaeological Evidence in Interaction and Ideological Change*". The frontiers and exchanges that Humphreys refers to in the Western Orange Free State and the Northern Cape may have come as a result of the Free State activities - dated to the 16<sup>th</sup> and 18<sup>th</sup> when the Iron Age communities moved across the Vaal River coming into contact with the San hunter-gather people (Klatzow 1994). Numerous stone wall structures and pottery dating to this period have been recorded and lie on the frontier zone where the San people come into contact with agro-pastoralist (Thorp 1996).

Stonewalls are one major characteristic of the Iron Age people – Humphreys (1988) study yielded such sites in the Northern Cape. However, stone walling is not the only characteristic of features of the Iron Age communities. Huffman (1982) described cattle dug, both vitrified and unverified, as one of the Iron Age traits. He also included pits and burials, with some located inside the cattle kraals (ibid).

Among the well-known and documented areas with evidence of the Iron Age farmers is the Free State along the Caledon River Valley -known to have been settled by the Fokeng group of Iron Age speakers (the Sotho Speakers). The Fokeng are suggested to have later settled in Metlaeeng, after dwelling the foothill of Ntsuana-tsatsi between Frankfort and Vrede (Walton 1953). However, these groups are less likely to have moved as far as the Northern Cape provinces although their ideas may spread across as suggested by Humphreys (1988).



North of the Vaal River in what is today known as the Limpopo Province the Iron Age communities are known to have also practice the tradition of making rock art, especially during the last period of the Iron Age characterised by the different encounters between these communities and the colonial settlers. The Makgabeng rock art is known to have depict conflict scenes associated with the Malebogo Wars – war between Chief Malebogo of the Hananwa people and President Kruger of the ZAR (e.g. Eastwood, Van Schalkwyk & Smith, 2002). In the Northern Cape rock art that may date to this period or later is associated with the Korana Raiders (e.g. Ouzman, 2005).

***Iron Age predicted sites yielding areas:***

There are not predicted Iron Age sites within the proposed study area

**2.2.3. Colonial and Industrial Archaeology:**

The Colonial or Historical archaeology is a period in archaeological records that refers to the last 500 years when European settlers and colonialists entered into southern Africa. Noupoot is one of the interior towns that were established by the European settlers of Dutch descent – the Afrikaans communities after the Trekked from the then Cape Colony to avoid British Administration. Various monuments, statues and memorials associated with this period are found across the Northern Cape Province. The same is true with architectural structures resembling different styles and vernacular found in some of the still standing farmsteads and town buildings. Events also associated with colonial archaeology are two South African Wars commonly known as the Anglo-Boer Wars – the First South African War (1860s) and the Second South African War (late 1890s to early 1900s). The 19<sup>th</sup> Century Industrial Revolution is also closely linked to these wars and visa-versa.

Below are some of the industrial initiatives of South Africa and war events that took place in region in which the study area is located.

### **2.2.3.1. Industrial Archaeology: the South African Railway Industry and Implication for Klip Gat**

It has always been a common belief that the first operational southern Africa railway lines developed in the Cape Colony. However, when one assesses the events and some of the prominent figures within this industry one gets a different side (&understanding) to this commonly held notion - because the first operation railway line in the Cape Colony only started operating in 1864. This came after the establishment of the Cape Town Railway and Dock Company in 1852, with Mr Lathom Brown appointed as its first Managing Director. By 1857 the company is suggested to have elected Mr William George Broungert as its first Construct ion Engineer (e.g. *Internet source - No.6*) and was awarded the contract to build the first railway line in the Cape Colony in 1858 on the 6<sup>th</sup> of August. This first railway line was proposed between Cape Town and Wellington – the line was to cover a total distance of 45 miles (ibid; see also *Internet sources-No.7*). The objective to erect this line was to logistically assist the growing wine industry (e.g. *Internet source-No.6*; see also Burman, 1984). There line was therefore commercial industrial base. Construction work of this line only began in 1859 (31 of March) with the first trains starting to run on it in 1864. During the same year (i.e. 1864) the Wynberg Railway Company, established in 1861 with endeavour to build a line from Cape Town to Wynberg, opened its line between Cape Town and Wynberg in December. For the Cape to Wellington railway line the running trains did not cover the whole planned railway line, but a portion of it – from Cape Town to Eersterivier because the Wellington one only opened in 1865 (*Internet source-No.6*).

The above, therefore, eliminates the notion that the Cape Colony was the first government in southern Africa to successfully run the first railway line. The first operational railway line in the country and in the SADC (southern Africa) region was constructed in the Natal Colony along the Bluff in Durban, the Capital Town of what is today KwaZulu-Natal Province then Natal. This line was constructed from Point to Durban following the establishment of the Natal Railway Company in 1859- the line was to cover a total distance of 2 miles way less than the 45 miles proposed for the Cape of Good Hope. The Durban railway line was officially opened on the 26<sup>th</sup> of June 1860 – four years earlier than the Cape to Wellington railway line could become operational. However, the Durban line was at first not hauled by a steam locomotive, but by oxen and later by steam locomotive which still stands (today) at the main building of the Durban station.

The Cape would still need to be awarded or given the credentials for the development of ideas to build and operate railway lines in what is today the SADC region/southern Africa. By 1845 the Chairman of the Cape of Good Hope Western Railway, who was banker and a merchant by profession, Mr. Harrison Watson announced that his company's had plans to develop a railway (Burman, 1984). He stated that "This Railway is calculated to be of immense benefit to this flourishing Colony; and as it is confined to the more populous districts in the neighbourhood of Cape Town, the enterprise is certain to return ample remunerative profits to the shareholders" (ibid). Reaction to this notice was not positive but rather negative; for example, the Attorney General of the Cape Colony the Hon. William Porter is suggested to have advised Mr Harrison Watson not to associate him with a venture of this kind (ibid). As a result of this negative response the Cape of Good Hope Western Railway did not go ahead as planned.

The question that then arises is did the study area, Klip Gat, get involved with the above mentioned events?

Following the successful operation of the railway line systems in both Natal and the Cape it was eventually decided by the Cape Government to form a railway company, the Cape Government Railways, that would Link-Up the Cape with the then two Boer Republics of the ZAR (Zuid Afrikaansche Republiek, later Transvaal and now the Gauteng & Limpopo Provinces) and the Orange Free State. And the Natal Colony in order to extend the British Imperial Sovereign Power over the southern tip of southern Africa. This was to prove not an easy task to accomplish because it is suggested that the ZAR government had strong anti-railway sentiments (e.g. Kleinsgeld, 2003). There were also many frontier wars during this period for the construction activities to go smooth as planned.

The recorded date for the first concessions to build a railway line in the ZAR is 1872 (on the 26 August) – a concession issued by Mr George Pigot Moodie. The first proposed railway line was to cover a total distance of 16 miles (way longer than the Natal first railway line and shorter than the first Cape Town) between Johannesburg metropolis and coal mines (Kleinsgeld, 2003; Richardson & Van-Helten, 1980). The line was completed in 1890 and named the Rand Tram, but was in actual fact a fully flagged railway line (ibid). In the same year the line extended to Krugersdorp, some 20 miles west of Johannesburg and from Boksburg to springs. Two year later (in 1892) the 'Railway Link-Ups' between the Cape, the Orange Free State and the ZAR were to begin (Kleinsgeld, 2003). By September 1892

the Cape Government Railways had built two railway lines starting from Port Elizabeth and East London on the east coast of the Cape Colony and they had advanced as far as Bloemfontein of the Orange Free State (e.g. see Figure 11 for Eastern Central & Far Eastern Railway Lines as well as the Cape Western Line). According to Kleinsgeld (2003) both the Bloemfontein and Cape Town lines reached the Transvaal of the ZAR opening three ports in the Rand gold fields. Burman (1984) gives an interesting insight into the idea of developing the eastern lines into Bloemfontein. For example, he argues that these lines were to serve among other Cape Colony objectives: the eastern frontier with the network for military forts and strategically, the port of East London was chosen partly for being the closest port to the frontier for landing and transporting troops. This railway line passes directly through the Town of Noupoot in the Northern Cape Province and this is in close proximity to the study area, some 20km south-east of Klip Gat. This provides indirect association of the site of Klip Gat to these events which took place through the Town of Noupoot because of its close proximity to Noupoot. This construction of this railway line began with the Molteno Government Administration in 1873 and finally reaching Queenstown in 1880 as a result of continuous frontier disruption.

It is, therefore, argued here that the railway line and/or junction in Noupoot need to be understood within the arguments raised by Burman 1984 – that railway line developments needed to serve certain parameters and/or objectives of governments of the time.

It is a known fact that the Cape Colony was encouraged to expand the Cape Western line to Kimberley following the discovery of diamonds and subsequently the Kimberley rush in 1871 (e.g. Kleinsgeld, 2003). The work to construct this line began in 1873, reaching Kimberley in 1887. The same is true for the Cape Eastern lines (i.e. the Port Elizabeth and East London lines respectively) which eventually reached Bloemfontein and later the Transvaal (ibid). Burman (1984) is correct to link the lines to frontier, but it argued here that they were mostly directed at serving the commercial interest which came about with the discovery of mineral resources in both the Northern Cape town of Kimberley and the Transvaal gold fields – particularly with the discovery of gold in the Transvaal in 1886 setting off the Witwatersrand Gold rush (e.g. Richardson & Van-Helten, 1980). Following the discovery of gold in the Witwatersrand, the Cape government and the government of the Orange Free State (OFS) reached an agreement by which the Cape Government Railway would build and operate a railway line through the Orange Free State to the rapidly-growing city of Johannesburg (ibid). This line reached Bloemfontein (the capital of the OFS) in 1890,

and the first trains operated from Cape Town to Johannesburg in 1892 (ibid). The agreements signed between the Cape Government and the Free State under the leadership of Prime Minister John Molteno who planned an enormous network of railway lines to connect the Cape Colony many ports to its interiors and importantly its diamond and later gold fields (ibid). The discovery of the Witwatersrand and the mining concession/rights is among some of the reasons that fuelled the Second South African War whose events are discussed below.



Figure 7 -Prime Minister John Molteno.  
[@http://en.wikipedia.org/wiki/Cape\\_Government\\_Railways#CITEREFBurman1984](http://en.wikipedia.org/wiki/Cape_Government_Railways#CITEREFBurman1984)  
(16/07/2012)

### **2.2.3.2. The South African War**

In November 1899 the Boers moved southward from the areas of their strong hold, the Orange Free State and the Transvaal into the central regions of the modern day South Africa. On the 1<sup>st</sup> of November 1899 a small detachment of Boers ("the Free Staters") from the Orange Free State had seized the railway bridge over the Orange River at Norvalspont. This bridge was at the time guarded by only six policemen who were quickly overcome by the Boers and made prisoners. On the same day Hans Swanepoel of Smithfield and Floris du Pooy of Bethulie with a combined commando of 900 men and two guns crossed the Bethulie bridges over the Orange River and headed for Naauwpoort and Stormberg (Meinjes, 1969). The Naauwpoort referred to is located some 20 km south-east of the

study area, south of the Town of Noupoot – it is therefore possible that these events did influence Klip Gat in one way or the other especially judging from the fact that there is a railway line running pass the eastern and northern portions of the study area. However, no direct association can be asserted at this point. Up until this time the Boers are argued to have deliberately avoided and neglected to occupy some of the principal railway junctions in the Colony, notably: De Aar (located north-west of the present study), Naauwpoort and Stormberg (ibid). The idea to deliberately neglect these junctions is argued to have been aimed at offending the Schreiner Ministry based on an agreement made between Steyn and Schreiner, which Steyn withdrew in consultation with President Kruger of the Transvaal after it became apparent that the Cape could play a significant role in the war. Steyn had issued proclamations in which parts of the British Bechuanaland and the Northern Cape were annexed to the two Boer Republics, the Transvaal and the Orange Free State. The reason behind these annexations is that, they were made to "... permit commandeering of men and supplies was well as to protect rebels who annexed territories of the Cape Colony and the Protectorate would be guilty of High Treason and perhaps be punishable by execution" (Meintjes, 1969: 10).

When hostility between the British and the Boers across the Orange River started it is suggested that the British had small garrisons in the following areas: Stormberg Junction, Albert Road, Aliwal North, and Norvalspont, in Colesberg, Arundel and in Naauwpoort (Meintjes, 1969). The reason for many garrisons along some of the railway line and stations is that, the railway lines formed an integral part of the British offensive for the following reasons: for bringing up man and supplies, as well as for directions where maps were often unavailable or marred with inaccuracy. During the war they, therefore, played a significant role throughout South Africa and their disruption became a major target for the Boers; for example, during the capture of armoured train at Kraaipan by De le Ray where the first shots of the war were fired. These were some of the tactical strategies used for the advancement of each side during the war. Below is a detail description of other tactics used during the Second South African war.

### ***Different Tactics Used:***

Following the breakdown of the second South African war in 1899 as a result of power dynamics that culminated as a result of gold mining industry disputes between the British and the Boers, different fighting strategies were employed for the advancement of each side

in the war. The Boer commandos employed and used guerrilla strategies for the advancement of their side in the war; this devastated the British who were not able to fight the Boer small and mobile guerrilla units. The Boer units were set up to be administered by commandos who had knowledge and experience of the different country sides and/or regions; for example in the eastern Transvaal the men in charge was General Louis Botha, De la Rey in the west, with De Wet preparing for fresh invasion of the Cape by the Free State commandos, P. J Jubert in Natal (Richardson & Van-Helten 1980). During this period of guerrilla warfare "...the Boers were able to achieve remarkable success in evading capture, seizing British supplies, disrupting railway communication (135 train-wrecking incidents were recorded between December 1900 & September 1901) and inflicted, sometimes, quite startling casualties on the British army of occupation" (Richardson & Van-Helten 1980:61). The strategic tactics/methods of fighting they employed and used is argued to be something that had not been expected by the British forces. And the British high command had totally not been prepared for this type of warfare; the army intelligence gathering and scouting was also weak, and far too few mounted men were available to combat the new Boer tactics effectively"(idem). Seeing that they were now losing the war and that they were not able to apprehend the mobile Boer commando's, the British employed rather harsh and/or cruel methods of inflicting pain to their counter parts under the direction of Lord Kitchener, who in many of the Anglo-Boer literature is describe as a rather cruel and absurd men. When he came into power, Kitchener had succeeded Roberts as a Commander-in-Chief of the British army at the end of November 1900. This was a late in the war. Like the Boer's he divided the British forces into smaller-mobile column with each relying on accurate intelligence, arguably often provided by African scouts, to track down the so called 'elusive commandos'. Kitchener's methods included: first the burning of farms and the destruction of crops and livestock in districts that were viewed as commando holds. Secondly, he built a vast network of block-houses connected by barbed-wire. The first justification for building block-houses and barbed wire barricade, the English argued, was to protect the railways; however, we know that this exercise ended up being used as a militaristic tectonic of dividing the republics into large squares aimed at systematically clearing off supplies and the guerrilla groups within them. They were also at first argued to be reprisal against Boer attacks on communication, but were soon used as means of denying the commandos access to shelter, food, draught animals and fresh horses (Richardson & Van-Helten 1980). The British argued that through the application of these scrupulous methods they could and would be able to restrict the areas in which the guerrilla could operate. However, the results of these methods proved to be very devastating at the

end, with, many families left destitute without food, shelter and basic immunities some are suggested to have been left in the veld; many of these were women and children not directly involved in the war. The result of this act was force inhabitancy, of women and children, including surrendered burghers, in the British, heavily guarded, concentration camps aimed at restricting any contact or communication with the burghers and commandos who were in war and whose wives and children had been captured in the camps by the British. By the end of war it is reported that there were **+/- 8000 block houses** and 3700 miles of barb-wire barricades Richardson & Van-Helten 1980). With more than 30 000 farmsteads destroyed. Many of the civilians, both white and black, were removed from the devastated country-sides and put in concentration camps; it is here that dreadful loss of life occurred as a result of many disease and sicknesses. As many as 26 000 Boer women and children, and 14 000 African, are reported to have perished in the overly crowded, unsanitary and ill-organized British concentration camps. In November 1901, white concentration camps were transferred from military to civilian administration, and a decrease in the mortality rate afterwards took place. This could have resulted as a result of caring nature of non-military personnel. The method of **block houses** and concentration camps as mean of restricting and fighting guerrilla fighters had been earlier tried by the Spanish in Cuba, and by the colonists against the African opponents in South Africa, in areas like KwaZulu-Natal. During the Anglo-Boer war some of the earliest camps were built in western Transvaal (Mafikeng) and in the Cape Colony during the time of Robert's; by the time of his departure in South Africa about nine such camps had been built.

A peculiar form of rock art is associated with this period, if we use the 100 year period to distinguish rock art and graffiti – this art is in a form of war Inscriptions often found in mountainous or hill site where soldiers involved in the war would have found defence and inscribed their names on the rocks as either their pastime activities or document their frustration with the status core at the time.

### ***Colonial & Industry Archaeology predicted sites yielding areas:***

Naauwpoort and Noupoot are mentioned in many events associated with the Second South African War because it is where the Naauwpoort Junction linking the port in East London with the interior regions is located. This junction therefore played a significant role during the war. Because Naauwpoort was used as a strategic placement area for the British garrison forces it is anticipated that block houses would have been built in the area to



protect the railway lines. This would have extended to areas located outside the Noupoort town-lands such as Klipgat. It is, therefore, anticipated that historical archaeological materials such as bullet cartridges, canon shells and remains of concentration camps if any were built in this area will be found in the area in and around the town of Noupoort including area of Klipgat some 20 km north-west of Noupoort. As such, one needs to be weary of these sites during the survey of Klip Gat regardless of its distance from Noupoort

### **3. METHODOLOGY**

#### **3.1. Legislative Requirements**

The NEMA, No. 107 of 1998 9 (as amended) stipulates that for any development in South African to be granted permission to go ahead an impact assessment of the potential impacts of the proposed development on both the natural and cultural environment need to be conducted. As such this Heritage Scoping Study fulfils the requirements of NEMA (in terms of Section 24 & 24D as amended & read with the EIA Regulations of GN R543-R546) and is conducted in line with Section 38 (1) of the NHRA, No. 25 of 1999. Because of the nature of the proposed development – energy related development the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002) is also applicable.

#### **3.2. Methodology**

This chapter outline the methodologies used in conducting this study, the Phase 1 HIA. This HIA report is compiled by Nkosinathi Tomose (in his personal capacity as a freelancer) for the proposed Klip Gat Solar Energy Facility. The following steps were following in conducting the study:

Step I – Literature Review:

- The background information of the proposed area of development following the receipt of the Notice of Environmental Impact Assessment Process Public Participation Process and site map from the client was during the project scoping

phase. Sources used included, but not limited to published academic papers and HIA studies conducted in and around the PDA and the Northern Cape region at large where the current proposed development will take place. The current study makes use of this background information search.

- Internet sources were also used. Among sites used include the Cape Government Online Archives (through Wikipedia) and the SA History Online.
- Map Archives: Historical maps of the proposed area of development and its surround were searched for at the National Archives in Pretoria but no such maps were yielded – the reason given is that Pretoria repository centre only house former Transvaal Archives and that one would need to visit Cape Archives repository centre to access such maps. Therefore, internet sources containing archival maps were used to get minimum information about the proposed study area and different activities and events that took place in the area.

#### Step II – Physical Survey:

- A preliminary physical survey of the PDA was conducted by a qualified archaeologist in June 2012. The survey was in two fold – some areas of the proposed development area were covered on foot while others were traverse in a car. The objective of this was to located and identify sites in the landscape, record them using necessary and applicable tools and technology. The other objective was to then map these sites in the landscape in order to influence the decision making regarding the development footprint in the EIA process and map heritage sensitive areas as part of the scoping study.
- This study (Phase 1 HIA) makes use of this survey data and observations made about the PDA during the scoping phase of the project.
- The following technological tools were deemed important for documenting and recording located and/or identified sites:
  - Garmin GPS – to take Lat/Long coordinates of the identified sites
  - Lenovo ThinkPad aided Garmin Basecamp Software – to plot the identified sites and assess site boundaries
  - Samsung – to take photos of the affected environment and identified sites

#### Step III – Data Consolidation and Report Writing:

- The final step involved the consolidation of the data collected using the various sources as recommended above.
- This involved the manipulation of the recorded GPS coordinates for plotting of GIS maps of the identified heritage sites within and adjacent to the PDA.
- Assessing the field significance (including site **density, uniqueness & context**) of the identified sites in terms of their field rating. No impacts were assessed (in terms HIA) in this report except for field rating of the sites in order to influence the decision process in the EIA stages of the project.
- Discussion of finds and recommendations on what the HIA phase of the project needs to do in order to manage and mitigate any potential impacts after the development footprint has been decided on were also included and aided with tables that gave detailed study plans for the HIA during the EIA.
- The current study attempts to address the scoping recommendations and SAHRA Review Comments in the best possible it can owing to some limitations on how it has been conducted.

### 3.3. Assessment of site significance

The following site significance was used in order to ascertain the importance of each site identified and how it has a potential to influence the choices around the selection of development footprint which has subsequently been selected as shown in Figures 14 and 15.

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context)
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
  - Density of scatter (dispersed scatter)
    - Low - <10/50m<sup>2</sup>
    - Medium - 10-50/50m<sup>2</sup>
    - High - >50/50m<sup>2</sup>
- **Uniqueness** and
- **Potential** to answer present research questions.

#### *Site Significance*

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by the ASAPA for the SADC region were used for the purpose of this report.

*Table 2- Site significance classification standards as prescribed by SAHRA*

<b>FIELD RATING</b>	<b>GRADE</b>	<b>SIGNIFICANCE</b>
National Significance (NS)	Grade 1	-
Provincial Significance (PS)	Grade 2	-
Local Significance (LS)	Grade 3A	High Significance
Local Significance (LS)	Grade 3B	High Significance
Generally Protected A (GP.A)	-	High / Medium Significance
Generally Protected B (GP.B)	-	Medium Significance
Generally Protected C (GP.A)	-	Low Significance

#### **4. ASSUMPTIONS AND LIMITATIONS**

The following assumptions and limitations exist in terms of the present study:

- > The current study is an HIA study based on the preliminary observations made during the Scoping Phase of the project. No second survey of the project development footprint (PV layout area) took place as part of this study.
- > During the Scoping Phase a historical and archival desktop study as well as a preliminary field survey were undertaken to identify tangible heritage resources located in and around the proposed area of development.

- > No archival maps that can potential yield more information about the site were identified – as such this limits us some information about the documented historical events of the area.
- > There were no semi-formal discussions that took place with the farm owners or potential Interested and Affected parties as part of this study- therefore there was no heritage based Social Consultation Process.
- > The Deed search at the National Archives in Pretoria, undertaken during the Scoping Phase, did not yield any information about previous farm owners of the Farms Klip Gat 802/80 – this may limit the study in terms of understanding the different cultural activities that took place in the affected farms and why such activities took place. As such some of the area’s intangible heritage and stories maybe be missing.

## 5. FINDINGS

### 5.1. Maps

The following observations were made about the site during the scoping phase of the project – they are still applicable in this phase of the project:

- > A number of observations are made about the PDA and it surrounding landscape. The farm in which the PDA site is located does not show any significant developments and it is (as a result) difficult to assert any significant evolution ideas about this landscape over time and space. It may have changed hands or subdivided in the past - from time to time.
- > The first map is an archival map (circa 1882 Map) of the Cape Government Railways showing the different railway lines that existed in the Cape Colony in the late half of the 1800s.
- > One of the three railway lines (the Cape Western Line, Central Eastern Line & Far Eastern Line) passed through Town of Noupoort some 20 km south-east of Klip Gat.
- > The railway line which passes the study area in the northern and eastern sections is more likely to form part of the railway lines that feed into Noupoort Junction.
- > The line passing through Noupoort would have either been the Central Eastern or Far Eastern Line, but the idea of the Far Eastern Line is more supported than the Central Eastern Line (*Figure 9*).

- > Noupoort is not shown in this map, but one need to use this map against the backdrop of information provided in the background information section of this report about the establishment and development of the railway industry in the Cape Colony and its link-ups with the two Boer Republics of the Orange Free State and the Transvaal.
- > The existence of the railway lines in the Karoo region in which the current study area, Klip Gat Solar Energy Facility PDA, is located is further supported by the archival picture provided below showing a construction camp of a railway line by the Cape Government Railways *Circa-1870s (Figure 8)*.
- > The map in *Figure 9* (supported by picture in *Figure 8*) is primarily used to show the three railway trajectory routes/lines that the Cape Government Railways used since it does not give details of the towns and/or farms that they passed in the Karoo region.
- > The second map is a recent topographic map supplied by the client showing different features that characterise the study area and the PDA to be specific.
- > Various features are observed in this map and vary from natural landmarks such a continuer lines (informing us of the landscape), a railway line is shown north to east of the PDA, a132kV Powerline, regional roads and dirt roads (*Figure 10*).
- > The archival map and picture, therefore, provides the earliest date of the known railway system in this region.



*Figure 8 - A picture showing a construction camp of a railway line in the Karoo by the Cape Government Railways in 1870s.*

[http://en.wikipedia.org/wiki/Cape\\_Government\\_Railways#CITEREFBurman1984](http://en.wikipedia.org/wiki/Cape_Government_Railways#CITEREFBurman1984)  
(16/07/2012)

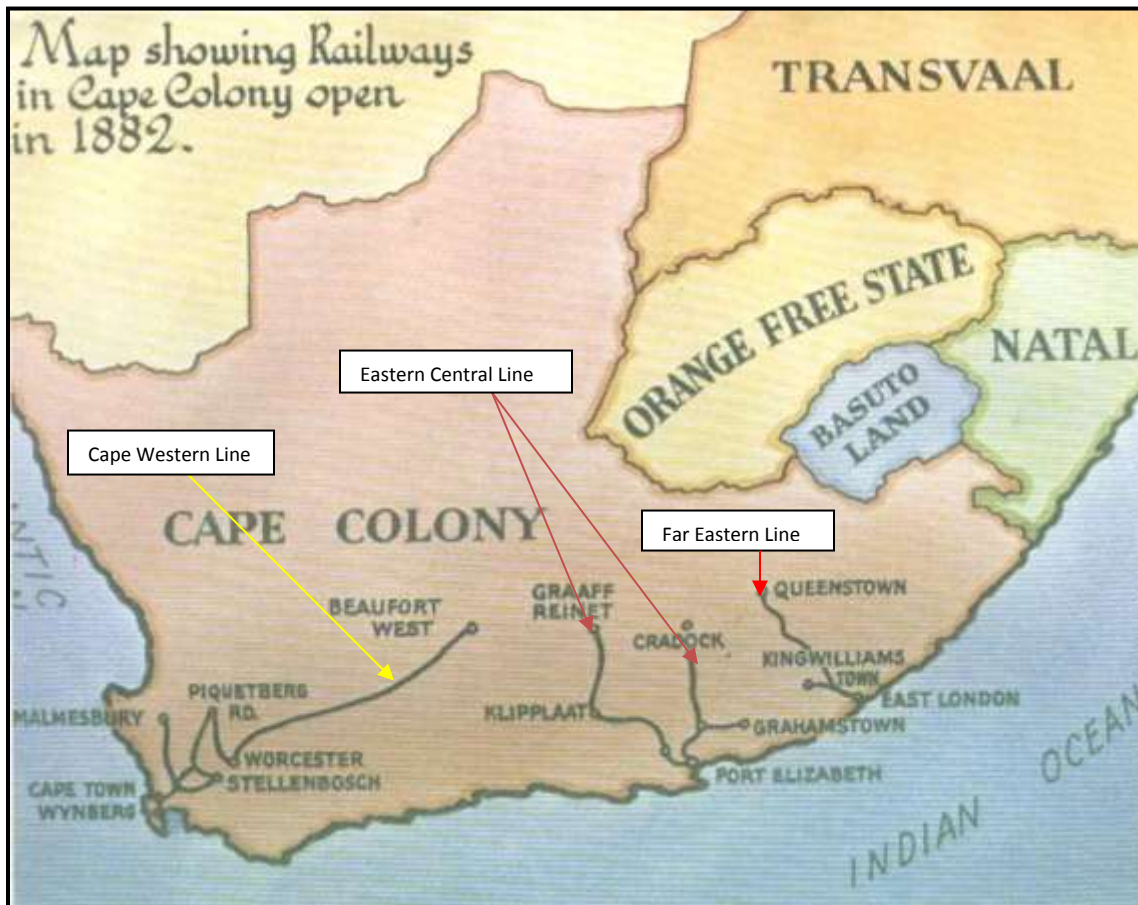


Figure 9- Map showing the early spread of the railway system by the Cape Colony Government into the then Orange Free State and the Transvaal. The Noupoot Junction form part of these railway lines. [@http://en.wikipedia.org/wiki/Cape\\_Government\\_Railways#CITEREFBurman1984](http://en.wikipedia.org/wiki/Cape_Government_Railways#CITEREFBurman1984) (16/07/2012)



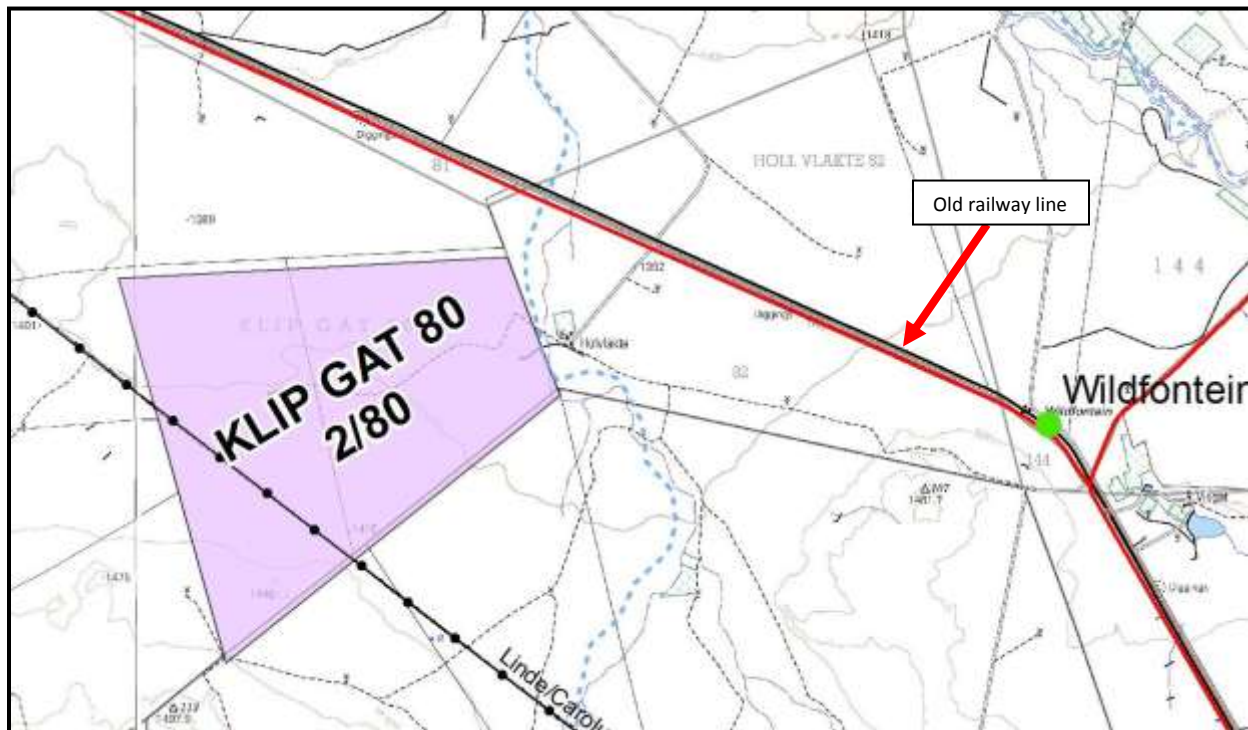


Figure 10- - Map showing the PDA and the different features that exist in and around it - e.g. railway lines, powerlines, roads, dirty roads, etc.

## 5.2. Deeds Search:

There was no deeds search conducted as part of the HIA as recommended in the Scoping Phase. The search conducted for the Scoping Phase of Klip Gat 802/80 which took place at the National Archive in Pretoria is deemed sufficient. The Scoping Phase search yielded the following results:

- > The archives yielded links about the farm however there were no archival records at the Pretoria repository centre and it was suggested that one would need to contact the Cape repository to get the actual archival documents.
- > Internet search of the Town of Noupoort located some 20km south-east of Klip Gat provides insight into the immediate vicinity of the study area. The town of Noupoort was laid out on a portion of the farm Caroluspoort. It was administered by a village management board from 1937 and attained municipal status in 1942.
- > The name itself derives its meaning from an Afrikaans word for 'narrow pass', the name referring to a gap in the Carlton Hills located some 10km from the town itself.

### 5.3. Field Survey:

The preliminary field survey of the PDA was undertaken during the project Scoping Phase and it yielded the following information about the PDA:

- > 2 MSA stone scatter resources sites and a farmstead which all have low potential to inform the decision making in the EIA process -refer to Figure 14 for the location of these features or sites within the PDA.
- > These resources However, they are located outside the project development footprint (*Figure 14* –area marked in white).
- > These scatter sites are named and numbered as Klipgat-1 and Klipgat-2 and Klipgat farmstead. Below is the description of each site, and field significance rating.

#### 5.3.1. Identified: Sites their description and evaluation

Klipgat-1

**Site Type:** MSA stone artefact scatter

**GPS:** S31 03 50.2 E24 46 38.1 (WGS -84)

**Site Description:**

This is not a site in terms of site density measure but a scatter of approximately 8 or more MSA stone artefacts.

**Approximate Age:** +/- 250 k.y.a

**Section of the NHRA, No 25 of 1999:** Section 35

Heritage Significance	Site Density	Uniqueness	Context
Generally Protected C (GPC)	Low	Not Unique	Secondary



*Figure 11–MSA stone scatter of approximately 8 or more stone artefacts. Please note the artefacts were collected and put together for purposes of photography.*

Klipgat-2

**Site Type:** MSA stone artefacts scatter

**GPS:** S31 03 45.9 E24 46 36.3 (WGS-84)

**Site Description:**

This is a scatter of three MSA retouched stone artefacts.

**Approximate Age:** +/- 250 k.y.a

**Section of the NHRA, No 25 of 1999:** Section 35

<b>Heritage Significance</b>	<b>Site Density</b>	<b>Uniqueness</b>	<b>Context</b>
Generally Protected C (GPC)	Low	Not Unique	Secondary



*Figure 12- MSA stone scatter of approximately 3 stone artefacts. Please note the artefacts were collected and put together for purposes of photography.*

Klipgat farmstead

**Site Type:** Late ESA or Early MSA "occurrence and possible site"

**GPS:** S31 03 54.6 E24 47 27.3 (WGS-84)

**Site Description:**

The farmstead is located immediately north-east of the study area. It is not directly located within the PDA, but just outside on the boundary line.

**Approximate Age:** Greater than 60 years old **Section of the NHRA, No 25 of 1999:**  
Section 34

<b>Heritage Significance</b>	<b>Site Density</b>	<b>Uniqueness</b>	<b>Context</b>
Generally Protected C (GPC)	N/A	N/A	N/A



*Figure 13–Klipgat farmstead, located on the Farm Klip Gat 802/80*

## 6. DISCUSSION

The table below (Table -3) is the evaluation of potential impacts associated with the construction phase of the proposed Facility 75MW Solar Energy Facility to be known as Klip Gat Solar Energy Facility 20km north-west of the Town of Noupoort, Umsobomvu Municipality, Northern Cape Province.

The survey of the study area, broader PDA during the Scoping Phase, yielded 3 heritage resources sites – 2 located within the PDA (Klipgat-1 & Klipgat-2), the other a farmstead referred to as Klipgat farmstead is located just outside the PDA (*Figure 14*). These sites, however, fall outside the project development foot print as indicated in Figure 14 (the white marked area in the map) - also refer Figure 15 for the development footprint and proposed infrastructure within it. The identified sites are further categorised into 2 categories - 2 archaeological sites (i.e. Klipgat-1 & Klipgat-2) and a built environment and landscape site (i.e. Klipgat farmstead).

These sites were rated in terms of their field significance (including their density, uniqueness and context) in order to inform the decision making process regarding Heritage Sensitive Areas, any No Go Areas based on the identified sites heritage value and significance.

The areas circled yellow which will still need a walk down by an archaeologist before the project construction phase – it is the authors view that the project can still be granted a go ahead in terms of heritage resources management. Partly because there were not significant archaeological and other heritage resources identified in the area in which the PV layout footprint is located during the preliminary survey. It is, however, acknowledged that a detailed pre-construction survey of the areas circled yellow in both Figure 14 and 15 would have aided the decision making process from SAHRA project adjudication point of view. This limitation will be addressed as a precautionary measure before the project construction phase and there is no reason why the project should not go ahead provided that the developer address this challenge before the project construction phase. The resources identified will not be directly and there will also be not secondary impact to them as such not there not mitigation cumulative measures proposed.

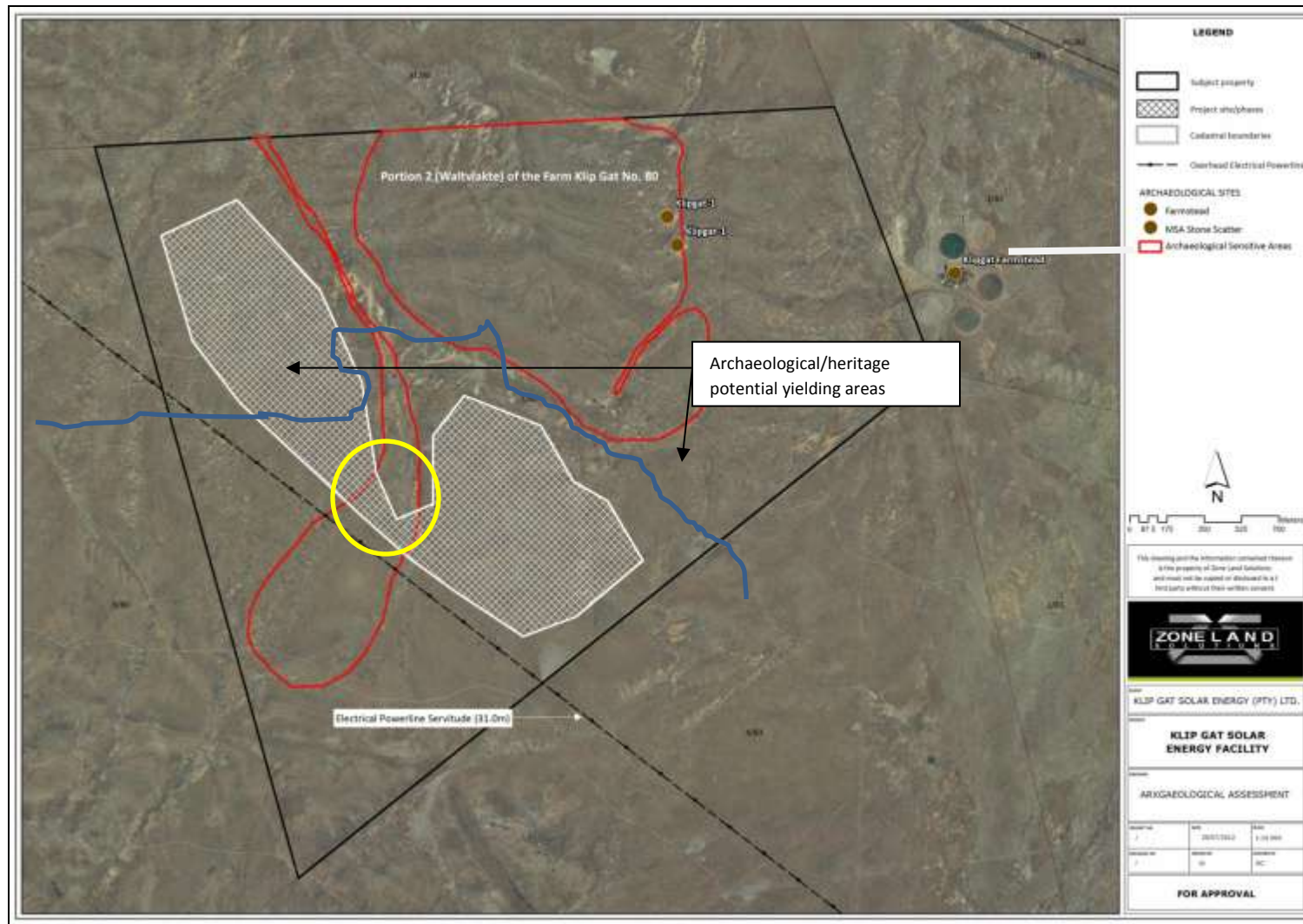
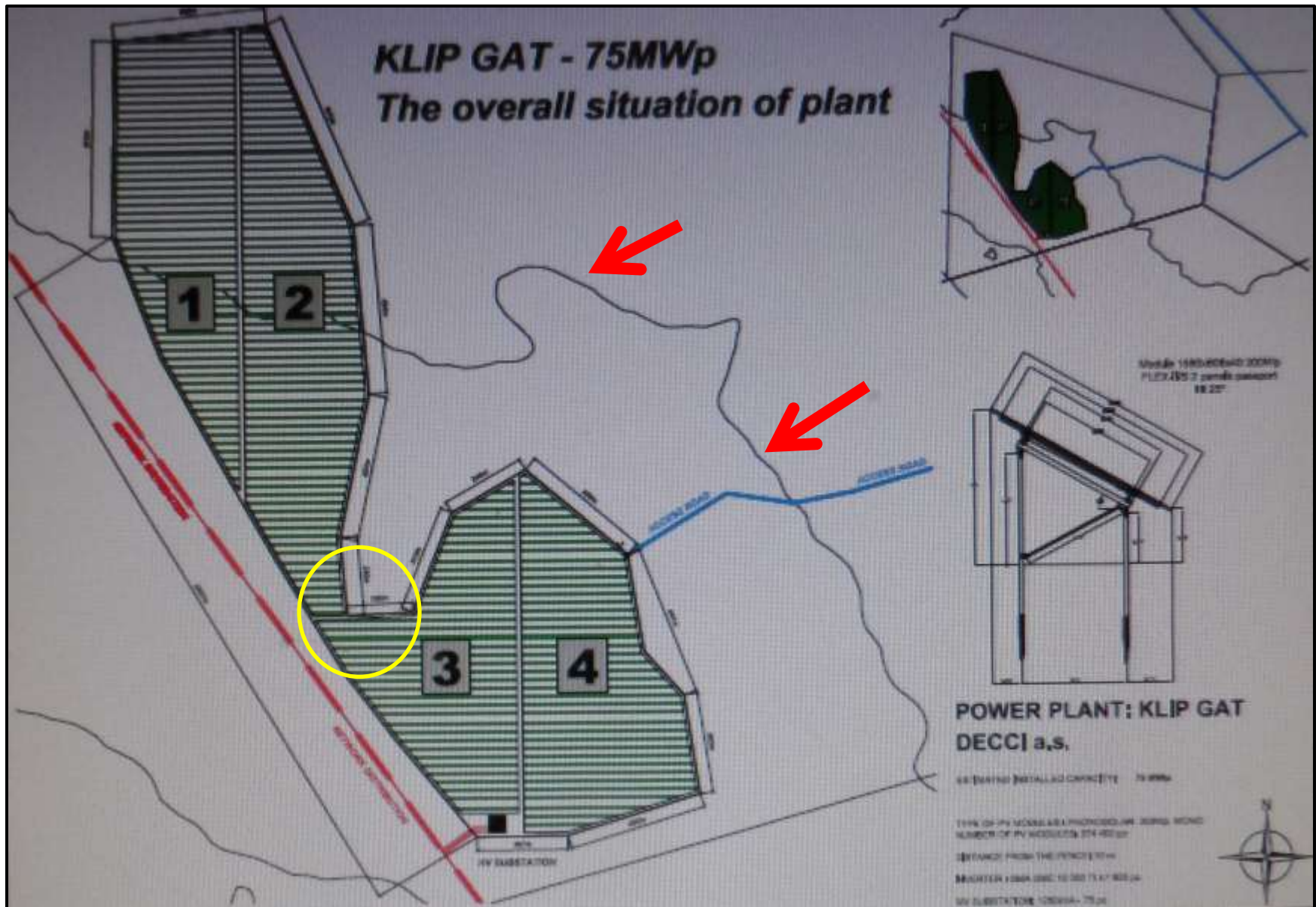


Figure 14 - Distribution of heritage resources within Klipgat PDA and in relation to the proposed development footprint as marked in white. The scatter resources are located on the Farm Klip Gat 802/80. Note the blue line indicates a geographic feature in the landscape further demarcating the PV footprint from the broader PDA





*Figure 15 - PV Footprint and associated infrastructure as well as access roads. Note the black line indicated through red arrows in the blue line that separated the PV footprint area in the PDA with the area in which the scatter resources and farmstead were located. The yellow circle represents the area recommended to be an archaeology potential yield area in the scoping phase (also refer Figure 14)*



<b>Subtitle:</b>		<b>Environmental Issues, Potential Impacts of the Affected Environment &amp; Associated Heritage Resources</b>					
<b>Type of Resources</b>	<b>Existing Impacts</b>	<b>Predicted Impacts &amp; Project Phase</b>	<b>Nature of Impacts</b>	<b>Extent of Impact</b>	<b>No Go Area/Scoping Phase</b>	<b>EIA Investigation</b>	<b>Cumulative Effects</b>
Archaeological [Stone Age (ESA, MSA&LSA); Iron Age (EIA, MIA? LIA); Rock Art; & Historic Archaeology]	No direct existing significant impacts to the identified archaeological sites were defined during the scoping.	Archaeological sites will be impacted by the proposed development activities  These impacts are predicted during the construction phase, operational and decommissioning	Construction of the Proposed 75MW Solar Energy Facility to be known as Klip Gat Solar Energy Facility (75 MW)	Local	There were no "No Go Areas" identified in terms archaeological resources. All resources identified were scatters with low density	This HIA did not conduct an extensive survey of the footprint – it is developed under a premise that an archaeological walk through of the development footprint will be conducted in the area marked with a yellow circle in Figure 14- 15	No cumulative effects are predicted for both Klipgat-1 and Klipgat-2 as they fall outside the development footprint
Historical, Built Environment & Landscape (incl. Industrial)	No direct impact on the identified farmstead.	The site will not be impacted by the proposed development activities	None	None	None	The HIA did not conduct visual impacts to the farmstead as recommended in the Scoping Phase	Cumulative effects in terms of visuals or dwarfing of the farmstead are predicted during the operational phase.
Burial Grounds & Grave	No burial grounds and graves sites were identified and no impacts were defined during the scoping	Previously un-identified and un-marked graves may be impacted by the proposed activities  The impacts are predicated during the construction phase of the project.	Construction of the Proposed 75MW Solar Energy Facility	Local	None	The walk through of the development footprint should also investigate these resources and also consult farm labours about known burial sites and	None
51				© Zone Land Solutions			

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						graves.	
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*Table 3 -Evaluation of potential impacts associated with the CONSTRUCTION PHASE of the proposed Klip Gat Solar Energy Facility (75MW)*

## 7. CONCLUSIONS& RECOMMENDATIONS

This Phase 1 HIA attempts to address SAHRA Review Comments recommendation in order to positively manage heritage resources within the project development footprint. However, it has to be noted that there was no secondary detailed survey of the project area and project PV footprint and that observations of this Phase 1 study are solely reliant on the preliminary survey of the scoping phase. In the light of this limitation the following recommendations are made about the project development footprint area, the area to be covered by the PV layout (*Figures: 14-15*).

- > The project scoping phase yielded limited resources about the PDA (the broader study area) – based on this it is the authors’ opinion that it is very unlikely that more resources will be yielded within the PV footprint with exception to the area marked as archaeological/heritage resources potential yielding area marked in year circle in both Figure 14 and 15.
- > As such before the project construction phase commence’s this area needs a thorough investigation as recommended by the project scoping phase and by the SAHRA Review Comment in September 2012.
- > With the fulfilment of this recommendation and based on its results and recommendations and any mitigation measures proposed regarding the management of heritage resources that will potentially be yielded - there should be no reason as to why the project construction phase should not go ahead as planned.

It it’s the authors opinion and view that SAHRA Review Committee grant this project a go ahead into the construction phase from the premise that the area not currently surveyed as part of the SAHRA Review Comment recommendation will be full surveyed/covered before the construction activities and a short report or letter on what is found or not found should be furnished to SAHRA to fulfil its requirements. This letter short report will then be incorporated as part of this document.

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## Appendix 1

**NOTICE OF ENVIRONMENTAL IMPACT ASSESSMENT PROCESSES  
PUBLIC PARTICIPATION PROCESS**

**PROPOSED KLIP GAT SOLAR ENERGY FACILITY (75MW), NORTHERN  
CAPE PROVINCE**

**DEA REF NO.: 14/12/16/3/3/2/354**

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**Project Name:** Klip Gat Solar Energy Facility (75MW)  
**Applicant:** Klip Gat Solar Energy (Pty) Ltd  
**Proposed Activity:** Klip Gat Solar Energy (Pty) Ltd is proposing to establish a commercial photovoltaic solar energy facility (75 MW) on a site approximately 20 km north west of Noupoot Northern Cape Province.

A broader area of approximately 845 ha is being considered within which the facility is to be constructed.

The facility would include the following infrastructure:


- An array of photovoltaic (PV) panels
- A new on-site substation to evacuate the power from the facility into the Eskom
- Mounting structure to be either rammed steel piles or piles with pre-manufactured concrete footings to support the PV panels.
- Cabling between the project components, to be lain underground where practical.
- Internal access roads and fencing.
- Workshop area for maintenance, storage, and offices.

**Location:** The project is proposed on Portion 2 of Farm Klip Gat 80. This property falls within the Emthangeni Local Municipality.

In terms of sections 24 and 24D of the National Environmental Management Act (No 107 of 1998), as read with the EIA Regulations of GN R543 -R546, a Scoping and EIA are required to be undertaken for the Klip Gat Solar Energy Facility (75MW). This project has been registered with National DEA under Application Reference number 14/12/16/3/3/2/354.

**Savannah Environmental** is undertaking the required environmental assessment and public participation processes. To obtain further information and register on the project database, please submit your name, contact information and interest in the project to:

**Gabriela Wood of Savannah Environmental**  
P.O. Box 148,  
Sunninghill, 2157  
Tel: 011 234 6621  
Fax: 086 684 0547  
Email: [gabriela@savannahsa.com](mailto:gabriela@savannahsa.com)



# **Palaeontological Impact Assessment for the Proposed Klip Gat Solar Energy Facility (75MW), Emthangeni Local Municipality Northern Cape Province.**

**Prepared for:** Zone Land Solutions

<http://www.zonesolutions.co.za>

**Compiled by:** Job M. Kibii (PhD)

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29 July 2012

## **SUMMARY**

The proposed Klip Gat Solar Energy Facility is located within the Emthangeni Local Municipality, Northern Cape Province. The study area is underlain by fluvial Lower Beaufort Group sediments of the Adelaide Subgroup that comprises of mudstones with subordinate sandstones. The sediments of the Lower Beaufort Group have yielded a vast number of fossil vertebrates and fossil plants spanning the Permian and Triassic epochs. These fossils include; therapsids, gorgonopsids, dicynodonts, pareiasaur reptiles, temnospondyl amphibians, and palaeoniscoid fish. Also recovered are trace fossils of invertebrates, therapsid burrows, tetrapod trackways and vascular plant fossils of the genus *Glossopteris*.

There is a high likelihood of destruction of palaeontologically significant fossils and/or permanently sealing-in of fossiliferous mudstones through excavations for fencing, underground cabling, access roads and administrative buildings during the construction phase. The impacts are however limited to the construction phase with no adverse impacts foreseen during the operational and decommissioning phases.

Specialist palaeontological mitigation is therefore recommended prior to construction and a professional palaeontologist should be contacted in the event that any fossils are uncovered during construction.

## **INTRODUCTION**

Klip Gat Solar Energy (Pty) Ltd is proposing to establish a commercial photovoltaic solar energy facility (75 MW) on a site approximately 20 km north west of Noupoot, Northern Cape Province.

## **SCOPE OF WORK**

The proposed facility will be located on Portion 2 of Farm Klip Gat 80, within the Emthangeni Local Municipality. A broader area of approximately 845 hectares is being considered within which the facility is to be constructed (Fig. 1).

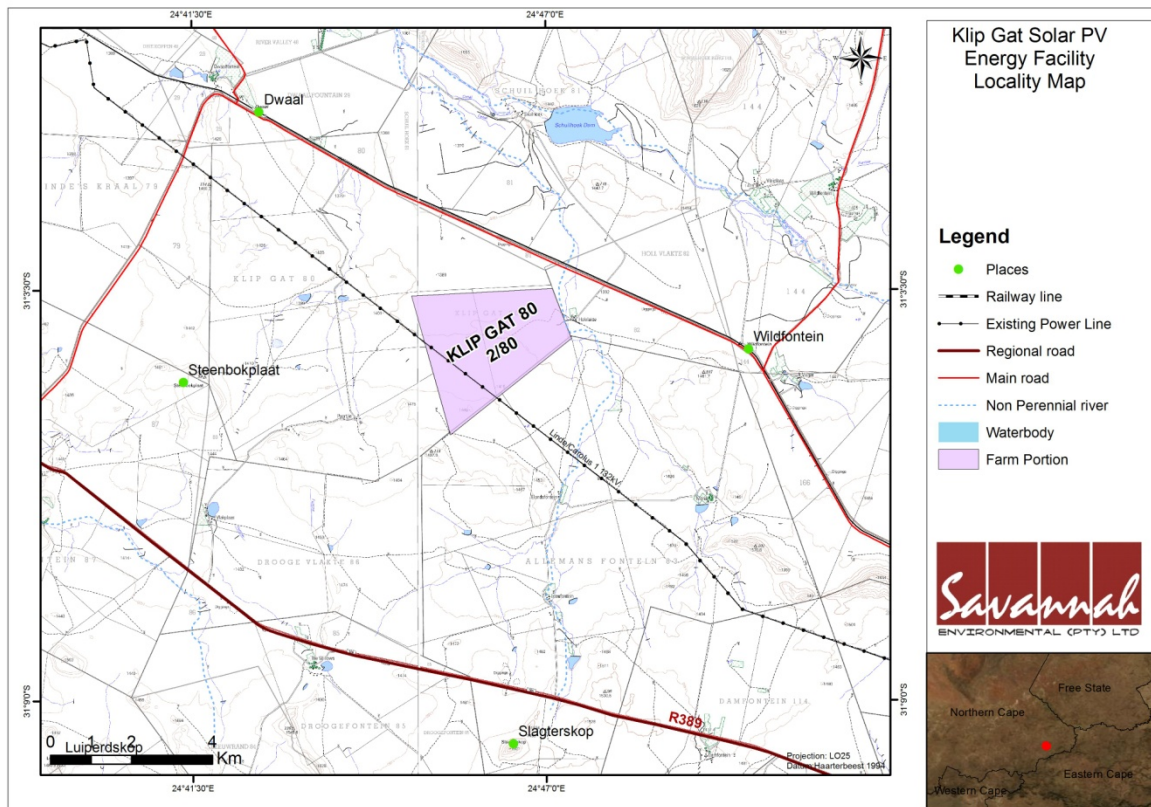


Figure 1. Extract showing the location of proposed Klip Gat Solar Energy Facility, Emthangeni Local Municipality, Northern Cape Province.

### COMPONENTS OF THE PROPOSED DEVELOPMENT

The proposed Klip Gat Solar Energy Facility will consist of the following infrastructure:

- An array of photovoltaic (PV) panels
- A new on-site substation to evacuate the power from the facility into the Eskom
- Mounting structure to be either rammed steel piles or piles with pre-manufactured concrete footings to support the PV panels
- Cabling between the project components, to be lain underground where practical
- Internal access roads and fencing, and
- Workshop area for maintenance, storage and offices.

### OBJECTIVES OF THE STUDY

The main objective of the study was to undertake a palaeontological assessment in order to:

1. Assess the potential impacts of the proposed development on palaeontological heritage during the construction and operational phases.
2. Evaluate impact criteria in order to ascertain their severity, and
3. Recommend mitigating measures aimed at minimising any predicted negative impacts.

Specific tasks carried out:

- A desktop study of reputable sources was undertaken to provide background information for palaeontological assessment.

## GEOLOGICAL BACKGROUND

The terrain surrounding the proposed facility is generally flat to undulating (Fig. 2). According to the 1: 250 000 Middelburg geology sheet (3124 Middelburg Geological Survey, Pretoria; Smith, R. 1996), the entire study area is underlain by fluvial Lower Beaufort Group sediments of the Adelaide Subgroup, that are intruded by Early Jurassic dolerite dykes and sills. The Adelaide Subgroup (Pa) (Lower Beaufort Group, Karoo Supergroup) comprises of mudstones with subordinate sandstones (Smith 1980; Rubidge *et al.*, 1995; Johnson *et al.* 2006).

The sediments of the Lower Beaufort Group are assigned to the *Pristerognathus* Assemblage Zone that characterises the uppermost Koonap/Abrahamskraal Formation and the basal Middleton/Teekloof Formation (Rubidge *et al.*, 1995).

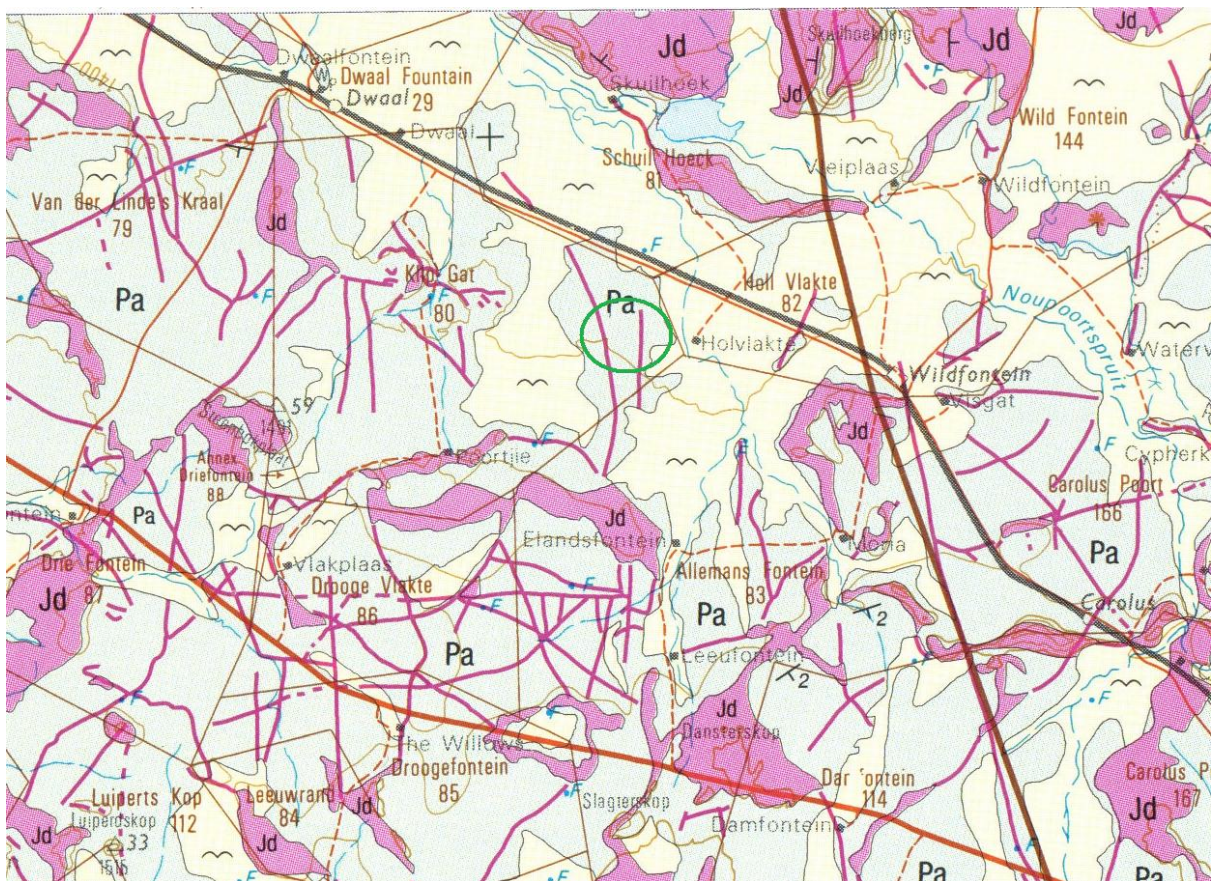


Figure 2. Extract from 1: 250 000 topographical sheet 3124 Middelburg showing the approximate location (Green circle) of the proposed Klip Gat Solar Energy Facility, Emthangeni Local Municipality, Northern Cape Province.

Rock formations within and surrounding the study area includes:

Pale green (Pa) = Adelaide Subgroup (Lower Beaufort Group)

Pink (Jd) = intrusive dykes and sills of the Karoo Dolerite Suite

## PALAEONTOLOGICAL SIGNIFICANCE OF THE STUDY AREA

The sediments of the Lower Beaufort Group have yielded a vast number of fossil vertebrates and fossil plants of Permo-Triassic age (Rubidge *et al.*, 1995). Well-preserved tetrapod fossils have been found in the mudstones, channel lag conglomerates and sandstones within this group of sediments (Smith 1980). Fossils of the Pristerognathus Assemblage Zone characterize the uppermost Koonap/Abrahamskraal Formation and the basal Middleton/Teekloof Formation (Fig. 3). These fossils include; therapsids (mammal-like reptiles), gorgonopsian predators/scavengers and herbivorous dicynodonts, pareiasaur reptiles, temnospondyl amphibians, and palaeoniscoid fish (Rubidge 2005; Nicolas & Rubidge 2010). Trace fossils of invertebrates, therapsid burrows, tetrapod trackways and vascular plant fossils of the genus *Glossopteris* have been found (*ibid.*)

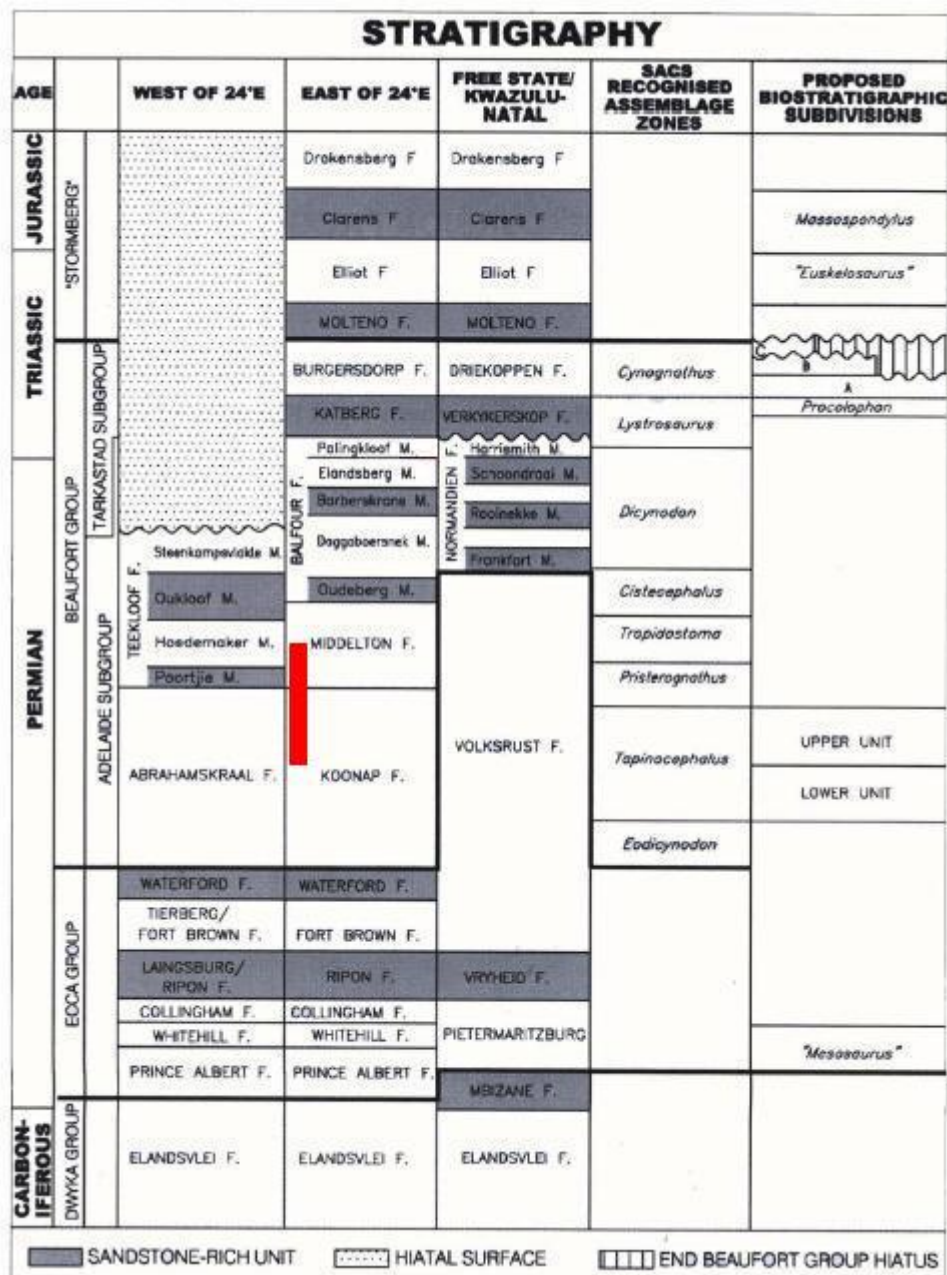


Figure 3. Karoo stratigraphy and biostratigraphy (after Smith *et al.*, 2012). Red line indicates stratigraphic interval impacted by the proposed development.



## ASSESSMENT OF POTENTIAL IMPACT OF PROPOSED DEVELOPMENT

The proposed Klip Gat Solar Energy Facility is located in an area that is underlain by potentially fossiliferous sedimentary rocks. The construction phase will entail excavations for fencing, underground cabling, access roads and administrative buildings. These activities may adversely affect paleontological heritage within the proposed area by permanently sealing-in fossiliferous mudstones and/or destroying important fossils. The impacts are however limited to the construction phase and no adverse impacts on palaeontological heritage are foreseen during the operational and decommissioning phases.

## CONCLUSIONS & RECOMMENDATIONS

The entire area proposed for Klip Gat Solar Energy Facility is underlain by highly fossiliferous Lower Beaufort Group of sediments that have revealed various trace fossils, silicified woods and rare vertebrate remains (therapsids) of the Middle Permian Pristerognathus Assemblage Zone, as well as calcretized rhizoliths (root casts) and possible invertebrate burrows.

It is therefore likely that fossils may be exposed or permanently sealed-in during the construction phase of the development. Specialist palaeontological mitigation should be taken prior to construction and a professional palaeontologist should be contacted in the event that any fossils are uncovered during construction.

Table 1: Impact table summarising potential impacts of Klip Gat Solar Energy Facility on palaeontological heritage.

<b>Nature of impact:</b>		
Potential impact of the proposed development on paleontological heritage.		
	<b>With mitigation</b>	<b>No mitigation</b>
Extent	Local	Local
Duration	Long term	Long term
Magnitude	Low	High
Probability	Probable	Definite
Irreplaceable loss of resources?	Low	High
Can impacts be mitigated?	Yes	
<b>Mitigation:</b>		
<ul style="list-style-type: none"><li>• Specialist palaeontological mitigation is undertaken prior to construction.</li><li>• Professional palaeontologist is contacted in the event that any fossils are uncovered during construction.</li></ul>		

## References

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## Declaration of Independence

I, Job Kibii, author of this Palaeontological Impact Assessment: Desktop Study, hereby declare that I am an independent consultant appointed by Zone Land Solutions to provide specialist input on the proposed Klip Gat Solar Energy Facility Emthangeni Local Municipality, Northern Cape Province. I hereby confirm that I have no business, financial, personal or other interest in the activity, application or appeal in respect of which I have been appointed other than fair remuneration for work performed in connection with the activity and application. All opinions expressed in my specialist report are my own.



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