

Archaeological Impact Assessment

For the proposed AEP Bloemsmond Solar 1 PV project, Keimoes, Northern Cape

Prepared For

Savannah Environmental (Pty) Ltd

By



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EXECUTIVE SUMMARY

Site name and location: The proposed AEP Bloemsmond Solar facility is located approximately 10 km north-east of Keimoes in the Northern Cape. The proposed facility consists of two Phases, namely AEP Bloemsmond Solar 1 and AEP Bloemsmond Solar 2; this report will only make reference to AEP Bloemsmond Solar 1. AEP Bloemsmond Solar 1 is located on portion 5 and 14 on the farm known as Bloemsmond 455, situated in the Registration Division of Gordonia RD, ZF Mgcawu District Municipality, Northern Cape Province.

1: 50 000 Topographic Map: 2821CA.

EIA Consultant: Savannah Environmental (Pty) Ltd.

Developer: AEP Bloemsmond Solar 1 (Pty) Ltd

Heritage Consultant: Heritage Contracts and Archaeological Consulting CC (HCAC).

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Date of Report: 17 August 2015. Revised 21 October 2015.

Findings of the Assessment:

Savannah Environmental (Pty) Ltd, on behalf of AEP Bloemsmond Solar 1 (Pty) Ltd, appointed Heritage Contracts and Archaeological Consulting CC (HCAC) to conduct an Archaeological Impact Assessment for the proposed AEP Bloemsmond solar energy facility. The proposed facility consists of two phases (phase 1 & 2) and alternatives; this report focuses on phase 1 for the proposed project.

It is important to note that the entire farm was not surveyed but only the footprint of the proposed solar facility that was surveyed on foot and by vehicle. In terms of the built environment (Section 34 of the NHRA), no features of significance were recorded in the study area. In terms of the archaeological component of Section 35, isolated Middle Stone Age (MSA) artefacts were recorded scattered over both the preferred and alternative sites. These artefacts are scattered too sparsely to be of any significance apart from noting their presence, which has been done so in this report. Furthermore these artefacts are not *in-situ* (washed) and no organic remains were noted. A ephemeral LSA site was recorded marked by exposed bedrock with !gorras (hollows where water collects) in the proposed preferred site (area 2). The site is of low – medium significance and must be excluded from the development footprint with a 20 meter buffer zone.

No buildings exist on the site and no cultural landscape elements were noted. Visual impacts to scenic routes and sense of place are not assessed to be high from a heritage perspective but are assessed independently by a visual specialist as part of the EIA process.

There were no red flags identified during the AIA and subject to approval from SAHRA there is from an archaeological point of view no reason why the development should not proceed if the recommendations as made in this report are adhered to.

General

Due to the subsurface nature of archaeological material and unmarked graves, the possibility of the occurrence of such finds cannot be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find/s.

Disclaimer: *Although all possible care is taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked*

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- » The technology described in any report;
- » Recommendations delivered to the Client.

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ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BIA: Basic Impact Assessment
CRM: Cultural Resource Management
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Plan
ESA: Early Stone Age
GPS: Global Positioning System
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA: National Environmental Management Act
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

** Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.*

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1 BACKGROUND INFORMATION

Heritage Contracts and Archaeological Consulting CC (HCAC) was appointed to conduct an Archaeological Impact Assessment for the commercial photovoltaic solar energy facility, referred to as AEP Bloemsmond. The facility consists of two phases and this report focuses on phase 1 of the proposed project. The proposed project is located on the farm Bloemsmond 455 Portions 5 and 14, situated in the Registration Division of Gordonia RD, ZF Mgcawu District Municipality, Northern Cape Province (Figure 1)

The aim of the study is to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, a desktop study (van der Walt 2015) that includes collection from various sources and consultations; Phase 2, the physical surveying of the study area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey an ephemeral LSA site was identified together with a number of find spots consisting of isolated MSA flakes. General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report.

This report must also be submitted to the SAHRA for review.

1.1 Terms of Reference

Desktop study

Conduct a brief desktop study where information on the area is collected to provide a background setting of the archaeology that can be expected in the area.

Field study

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with Heritage legislation and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.2. Archaeological Legislation and Best Practice

Phase 1, an AIA or a HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of a heritage specialist input is to:

- » Identify any heritage resources, which may be affected;
- » Assess the nature and degree of significance of such resources;
- » Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- » Assess the negative and positive impact of the development on these resources;
- » Make recommendations for the appropriate heritage management of these impacts.

The AIA or HIA, as a specialist sub-section of the EIA, is required under the National Heritage Resources Act NHRA of 1999 (Act 25 of 1999), Section 23(2)(b) of the NEMA and section s.39(3)(b)(iii) of the MPRDA.

The AIA should be submitted, as part of the EIA, BIA or EMP, to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the EIA, BIA/EMP, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level).

Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIAs are primarily concerned with the location and identification of sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for from SAHRA by the client before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999) is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare.

Authorisation for exhumation and reinternment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

1.3 Description of Study Area

1.3.1 Location Data

The study area is located 10 km north-east of Keimoes and to the west of the Orange River. There are various drainage lines draining the study area all flowing in an easterly direction to the Orange River. The topography of the area is relatively gentle sloping in a south easterly direction towards the Orange River, apart from a small hill (Rooiberg) close to the north eastern border of the farm.

The climate can be described as arid to semi-arid with rainfall occurring from November to April. The study area is currently used for grazing of cattle. The study area falls within a Savannah Biome as described by Mucina et al (2006) with the vegetation described as Bushmanland Arid Grassland.

1.3.2. Location Map

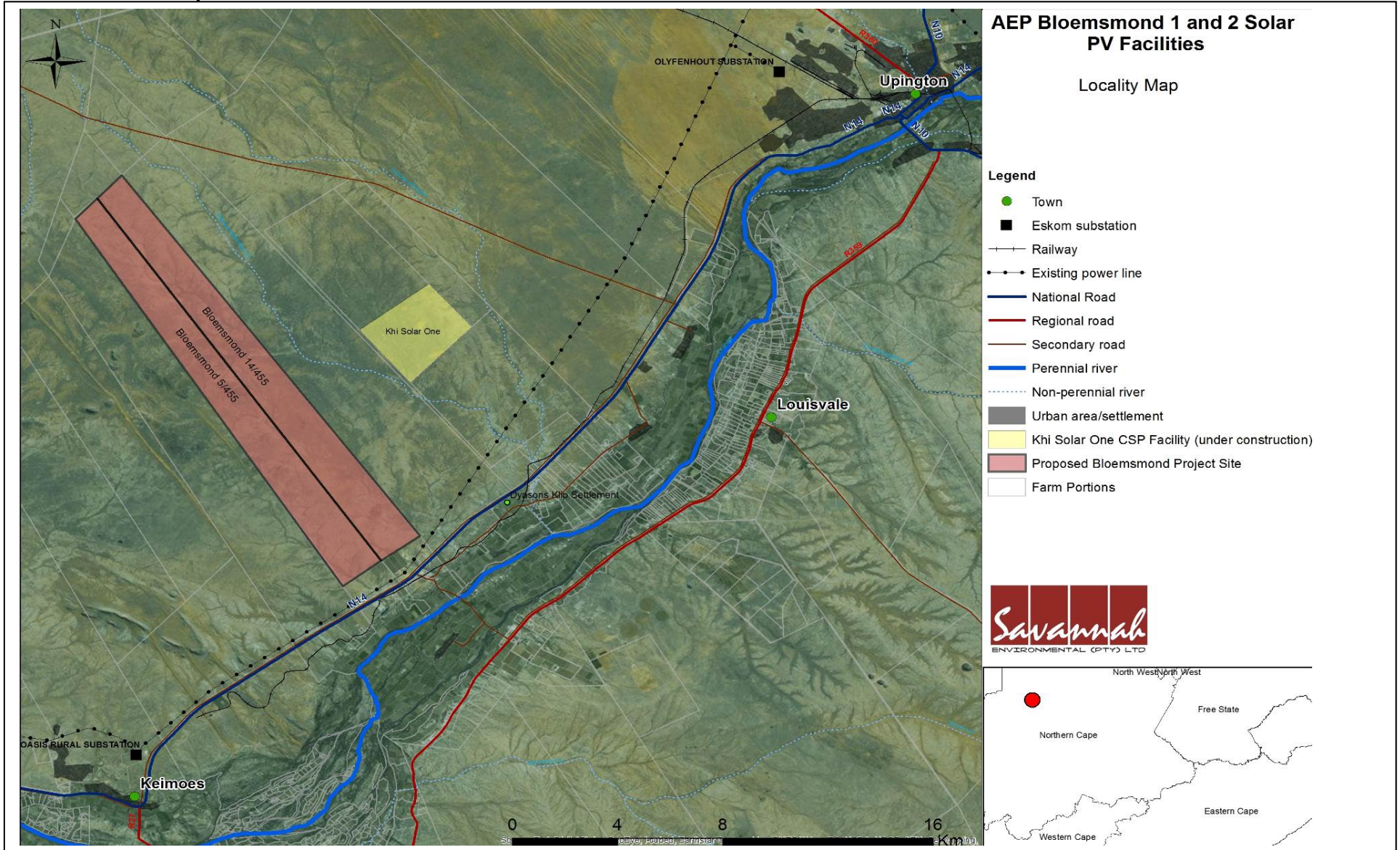


Figure 1: Location map

2. APPROACH AND METHODOLOGY

The aim of the study is to cover archaeological databases to compile a background of the archaeology that can be expected in the study area followed by field verification; this was accomplished by means of the following phases.

2.1 Phase 1 - Desktop Study

The first phase comprised a scoping study, scanning existing records for archaeological sites, historical sites, graves, architecture (structures older than 60 years) of the area (van der Walt 2015). The following approach was followed for the compilation of the scoping report.

2.1.1 Literature Search

Utilising data for information gathering stored in the national archives and published reports relevant to the area. The aim of this is to extract data and information on the area in question.

2.1.2 Information Collection

SAHRIS was consulted to collect data from previously conducted CRM projects in the region to provide a comprehensive account of the history of the study area.

2.1.3 Consultation

No public consultation was done during the study as this was done as part of the EIA. No heritage related issues were raised during this process.

2.1.4 Google Earth and Mapping Survey

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located.

2.1.5 Genealogical Society of South Africa

The database of the Genealogical Society was consulted to collect data on any known graves in the area.

2.2 Phase 2 - Physical Surveying

Due to the nature of cultural remains, the majority of which occurs below surface, a field survey of the study area was conducted over 3 days. The study area was surveyed by means of vehicle and extensive surveys on foot during the week of 27 July 2015. The survey was aimed at covering the proposed infrastructure, but also focused on specific areas on the landscape that would be more likely to contain archaeological and/or other heritage remains like drainage lines, rocky outcrops as well as slight elevations in the natural topography. These areas were searched more intensively, but many other areas were walked in order to confirm expectations in those areas. Track logs of the areas covered were taken (Figure 2 & 3).

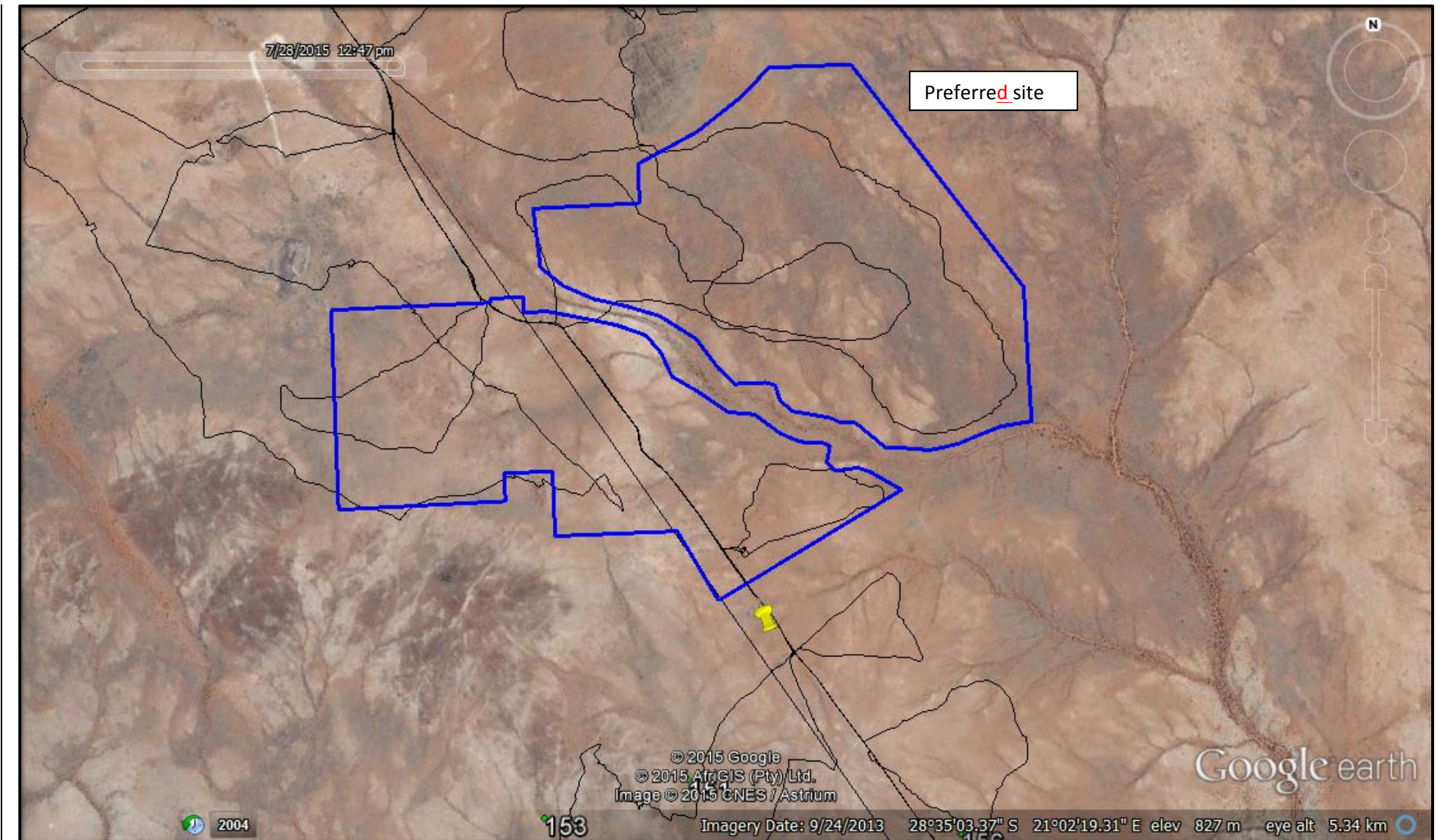


Figure 2: Track logs of the areas surveyed indicated in black with the preferred site indicated by a blue polygon.

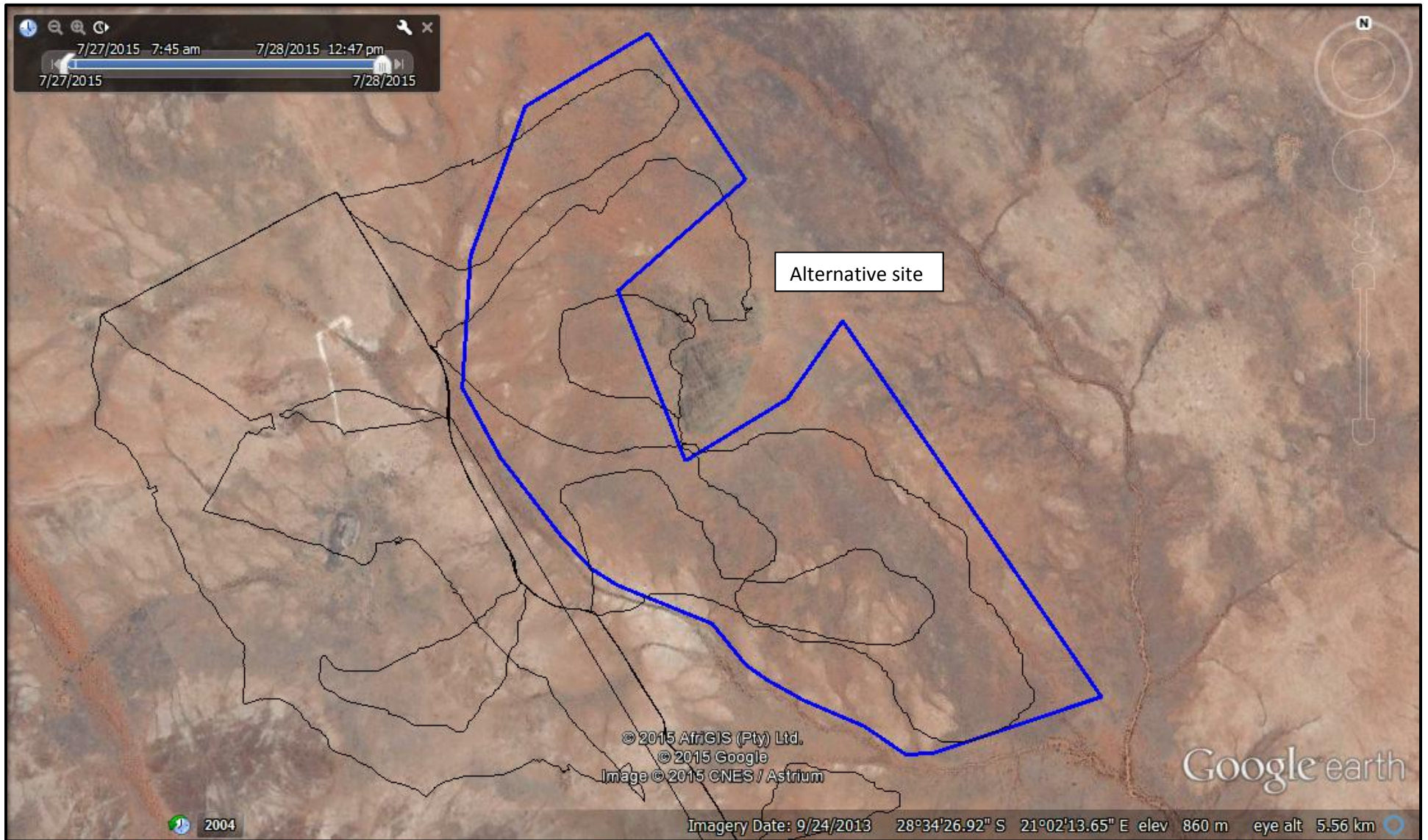


Figure 3: Track logs of the areas surveyed indicated in black with the proposed alternative indicated by a blue polygon.

2.3. Restrictions

Due to the fact that most cultural remains may occur below surface, the possibility exists that some features or artefacts may not have been discovered/ recorded during the survey. Therefore the possible occurrence of unmarked graves and other cultural material cannot be excluded. Only the footprint of the project was surveyed as indicated in the location map, and not the entire farm.

It is assumed that information obtained for the wider region is accurate and applicable to this study. This report does not claim to have recorded every single artefact cluster due to the size of the area and the occurrence of cultural material throughout. Sufficient information was recorded to establish the cultural sequence of the area and to mitigate the anticipated impacts resulting from the development. This study did not assess intangible heritage or the paleontological component of Section 35.

Although HCAC surveyed the area as thoroughly as possible, it is incumbent upon the developer to stop operations and inform the relevant heritage agency should further cultural remains, such as stone tool scatters, artefacts, bones or fossils, be exposed during the process of development.

3. NATURE OF THE DEVELOPMENT

The proposed AEP Bloemsmond Solar projects will have a net generating capacity (contracted capacity) of 75 MWAC (maximum 86.25 MWDC installed) and will include the following infrastructure:

- » Gate house and security, ± 6m x 6m
- » Control Centre, ± 31m x 8m
- » Office Building, ± 22m x 11m
- » Warehouses (x2), 50m x 20m
- » Canteen & Visitors Centre, 30m x 10m
- » Substation, ± 120m x 100m
- » Staff Lockers, ± 22m x 11m

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

A detailed scoping report was compiled for this project (van der Walt 2015). The scoping comprised a complete desktop study and below is a short summary of the findings.

4.1 Databases Consulted

SAHRA Report Mapping Project

Several previous heritage studies were conducted in the general study area (SAHRA report mapping project V1.0 and SAHRIS) mostly to the west and south west of the study area (Beaumont 2005 & 2008, Van Ryneveld 2007a & 2007b, Dreyer 2006, Van Schalkwyk 2011, Gaigher 2012, van der Walt 2014 Morris 2012, Fourie 2014). These studies identified Early and Middle Stone Age assemblages as well as historical structures. Graves can also be expected anywhere on the landscape.

Genealogical Society and Google Earth Monuments

Neither the Genealogical Society nor the monuments database at Google Earth (Google Earth also include some archaeological sites and historical battlefields) have any recorded sites in the study area.

4.2. A Brief History of the study area

The discovery of human skeletons was one of the most important archaeological discoveries to be made in the area under investigation. T.F. Dreyer and A.J.D. Meiring excavated the so-called "Kakamas Burials" in June and July 1936. Dreyer and Meiring excavated an area stretching from the Augrabies Falls to Upington along the banks of the Orange River. They were, however, most active in the region between the falls and Kakamas. Eighty-two graves from the area were excavated and 56 skeletons were retained. From radiocarbon dating it is deduced that the Kakamas burials indicate an eighteenth century time span and some skeletons being interred at the beginning of the nineteenth century.

Some of the earliest known people to have lived in the Kakamas region were the Nameiqua people who lived at !Nawabdanas (today known as Renosterkop) during the late eighteenth century. In 1778 Hendrik Jacob Wikar and in 1779 Colonel R.J. Gordon came in contact with these people. The following descriptions of the Nameiqua and other groups of people that lived in this area are based on the accounts of Wikar and Gordon.

Although reference is made to the fact that Europeans started to move into this territory from at least the 1760's onwards, the first literate person to visit and describe the people living along the Orange River was H.J. Wikar. Wikar deserted the service of the Dutch East India Company and fled to the interior in 1775. He presented a report on his findings of the people he encountered in the interior to the Governor of the Cape with the hope that he would be pardoned and that he could return to live in the colony. In his report, Wikar, referred to the Khoi of the Orange River as Eynikkoo / Eynicqua. He divided them into four separate groups: the Namnykoo / Namikoo, who lived on the islands above the Augrabies Falls, the Kaukoo and the Aukokoo higher up the river close to Kanoneiland and the Gyzikoos in the vicinity near the present day Upington. Although these groups were closely related, the Gyzikoos were intermixed genetically and culturally with Bantu-speaking peoples from the northeast. Wikar also recorded the presence of a group of people who he called the "Klaare Kraal" people. This group of people was apparently "a strong Bushman Kraal of about twenty huts but with no cattle" (Morris, 1992)

Another European traveller that visited the same region was Colonel R.J. Gordon, who met a group of people called the Anoe Eys, roughly translated as "bright kraal" people. Gordon recorded that this group of "Bushmen catch fish and live by hunting, digging pits to trap rhinoceros at the side of the river." Morris feels it reasonable that Wikar's "Klaare Kraal" people and Gordon's "bright kraal" people are the same group (Morris, 1992). Gordon went on to describe other people living along the river too and although the spelling of the names of the various group differ between these two early travellers it can be assumed that they are indeed speaking and describing the same groups of people.

In 1813 Reverend John Campbell travelled down the Orange River and met a group of people near the Augrabies Falls but was surprised by the few inhabitants that now lived in the area. This was mainly because of a period of severe drought and there was very little water in the area to support large human settlements. In 1824 another traveller, George Thompson rode through the central Bushmanland and reached the confluence of the Hartebeest and Orange Rivers very close to the modern Kakamas. According to his writings the whole area was deserted except for a small group of !Kora close to the Falls (Morris, 1992).

The Renosterkop settlement was on one of the large islands in the Orange River. Geographically the area that the Orange River flows through from Upington to the Augrabies Falls is characterized by the river splitting into various loops thus forming islands in the river (Moolman, 1946). The settlement consisted of ten mat huts that housed about five to six people each. The Nameiqua herded cattle, sheep and to a lesser extend goats. Cattle were their most prized possession, both economically and ritually. They were also excellent hunters and would display the heads of rhino, hippo and buffalo in the centre of the settlement (Morris & Beaumont, 1991).

The Nameiqua people were not the only people that stayed in the area. Away from the river in areas less suitable for pastoralism lived groups such as the Noeies, Eieis and the /Xam. These groups lived mainly from hunting and gathering. The relationships between the various groups of people that lived in this area were "peripheral" and involved "varying degrees of clientship during certain seasons, with limited

exchange in items such as pots". The Khoi peoples would sometimes also take San wives. Around the area of Upington lived the Geissiqua (Twin-folk) people. This was a mixed group of Korana-BaThaping (Tswana) group who were in regular contact with Tswana Iron Age communities to the northeast. This group of people would seemingly once a year trade with the tribes living along the river and who traded in items, such as, tobacco, ivory spoons, bracelets, knives, barbed assegais and smooth axes (Morris & Beaumont, 1991).

In the period leading up to the First Koranna War in 1869 the northwards trek of the Basters and the white farmers into the vicinity of the Orange River provided the Koranna (!Kora) people with opportunistic opportunities to steal cattle from these new settlers and flee to islands located in the river. It was inevitable that this would lead to armed conflict between these groups (De Beer, 1992). The First Koranna War was in 1869 and a second war took place from 1878 to 1879. After the second war many of the Basters went to settle north of the river. Reverend Scröder advocated for the Cape government to allow these Basters to go and settle in the area and from a buffer zone between the white settlers and the black tribes to the north of the Cape Colony (De Beer, 1992).

The irrigation of the Orange River has been central to the economic existence of the area in the vicinity of Upington since the 1880's. To the north of the river lies the Kalahari and to the south lies "Bushmanland", these two areas being some of the driest land in South Africa (Legassick, 1996). Moolman attributes the beginning of irrigation in this area to the Basters who he calls: "primitive pastoral people", who had "crude" ways to divert the river water to their "little gardens" (Moolman, 1946). According to Legassick the first person to irrigate the Orange River was one Abraham September, from whose lead the Dutch Reformed Church missionary Reverend C.H.W. Scröder and John H. Scott, the Special Magistrate for the Northern Border, stationed at Upington, would have gotten the idea to start irrigating the river on a much larger scale (Legassick, 1996).

The first 81 farms to be given out to the north of the Orange River from Kheis (opposite the present Groblershoop) to the Augrabies Falls were allocated almost exclusively to Basters in 1882. The term "Baster" refers to a group of people who have moved out of the Cape Colony to avoid social oppression and could refer to people of mixed parentage, particularly white and Khoikhoi or slave and Khoikhoi and also implies an economic category that implies the possession of property and who is culturally European (Morris, 1992). The farms bordering on the river measured in sizes ranging from 4000 to 10 000 morgen, these farms were "laid out on the basis of half an hour's ride along the river and two and a half hours' ride away from the river into the 'back country'". Once the irrigation canal was completed these farms were further divided into "water-erven" for irrigation and "dry-erven" for establishing buildings and the like (Legassick, 1996).

The district of Gordonia was established on 30 September 1885 and formed part of British Bechuanaland. It was only administrated as part of British Bechuanaland from April 1889. The Cape government instructed the Special Magistrate appointed for the area to settle the territory with "Baster farmers" living on the southern side of the Orange River. The area was soon settled with Basters, a few whites at first largely related to the Basters by marriage and some Kora, San and Xhosa people (Legassick, 1996). In 1891 the first census in the area recorded 735 whites, 1429 "aboriginal natives" and 3121 "other coloured persons" living in the area (Legassick, 1996).

Christiaan H. W. Scröder was a missionary from the Nederduits Gereformeerde Kerk in Upington, and knew all the islands and areas alongside the Orange River, stretching from his missionary station, far to the east and the west along the riverbank. He was an important figure with regards to the foundation of both the towns of Keimoes and Kakamas. Interestingly, the name Keimoes means "large eye", and an eye appears on the coat of arms of the town, which was created in 1960 (De Beer, 1992). When Scröder first came to Upington in July 1883, there were already people in the area of Keimoes that used irrigation and planted fields. It is possible that the proficient Mr Scott, who was at that time the only person in "Basterland" who understood the art of channelling water to other areas, directed this irrigation project in 1882.

By 1883 it was necessary to build a second furrow for irrigation, and this was done under the vigilance of C. H. W. Scröder. These furrows contributed to the advancement of the town and in the following years many families started moving to the area (De Beer, 1992).

By 1886, the committee in charge of the settlement realized the necessity of building a school for the inhabitants of Gordonia. In 1887 a school was opened, with Pieter Rossouw as its first teacher. The school was closed again in 1899, due to the start of the Anglo-Boer War (De Beer, 1992). The construction on the church at Keimoes was started in 1888 and was completed in 1889. During the construction of the church, Scröder lived in Keimoes. The church can still be seen next to the main street running through Keimoes (De Beer, 1992).

Between 1889 and 1899, more and more white people started moving to the Gordonia area and by 1900 some 13 Afrikaner families had settled at Keimoes (De Beer, 1992). After the Anglo-Boer War, many farmers were forced to move to other areas, in search of greener pastures after their farms and livelihoods were destroyed during the war. Settling next to the Orange River was an obvious choice, due to the possibility of irrigating one's crops. Many of the farmers who came to the Gordonia area opted rather to settle in Keimoes than in Kakamas, since it was only possible to buy land in the former town. When farmers did not have the means to buy properties of their own, they often became *bywoners* to other landowners, paying a rent to live and work on the land.

4.3. Stone Age History

South Africa has a long and complex Stone Age sequence of more than 2 million years. The broad sequence includes the Later Stone Age, the Middle Stone Age and the Earlier Stone Age. Each of these phases contains sub-phases or industrial complexes, and within these we can expect regional variation regarding characteristics and time ranges. For Cultural Resources Management (CRM) purposes it is often only expected/ possible to identify the presence of the three main phases.

Yet sometimes the recognition of cultural groups, affinities or trends in technology and/or subsistence practices, as represented by the sub-phases or industrial complexes, is achievable (Lombard 2011). The three main phases can be divided as follows:

- Later Stone Age; associated with Khoi and San societies and their immediate predecessors. Recently to ~30 thousand years ago
- Middle Stone Age; associated with Homo sapiens and archaic modern humans. 30-300 thousand years ago.
- Earlier Stone Age; associated with early Homo groups such as Homo habilis and Homo erectus. 400 000-> 2 million years ago.

The region is well-known as one that produced the largest sample (n = 56) of prehistoric skeletons in South Africa (Morris 1995). Excavated in 1936, known as the 'Kakamas Skeletons', and currently housed in the National Museum in Bloemfontein, they are considered the 'type' specimens of Khoi morphology (1992). Grave locations can be expected along the Gariiep (perhaps up to 35 km from its shore), and on the Gariiep Islands between Upington and the Augrabies Falls. They are often marked with stone burial cairns, dug into the alluvial soil or into degraded bedrock above the alluvial margin. Graves can be isolated or grouped in small clusters, sometimes containing up to eight graves (Morris 1995). Burial cairns can be elaborately formed, some with upright stones in their centres, but they are often disturbed. Cairns from near the Gariiep Islands are often characterised by their high conical shapes, and the grave shafts filled with stones. Those closer to Augrabies Falls, however, are low and rounded with ashes in the grave shaft. The placing of specularite or red ochre over the body was common, but other grave goods are rare (Morris 1995).

Where dating was possible, most of the skeletons were dated to the last 200 years-or-so, but association with archaeological material from up to about 1200 years old is possible. The grave sites show parallels to those of recent Khoi populations (Morris 1995).

Apart from the grave locations, archaeological sites of this period in the region have been further divided into Swartkop and Doornfontein sites.

Doornfontein sites are mostly confined to permanent water sources. The assemblages contain a consistently large complement of thin-walled, grit-tempered, well-fired ceramics with thickened bases, lugs, bosses, spouts, and decorated necks or rims. Lithics are often produced on quartz, and dominated by coarse irregular flakes with a small or absent retouched component (Beaumont et al. 1995; Lombard &

Parsons 2008; Parsons 2008). Late occurrences contain coarser potsherds with some grass temper, a higher number of iron or copper objects, and large ostrich eggshell beads. These assemblages are mostly associated with the Khoi (Beaumont et al. 1995).

Post-Wilton

Swartkop sites can be almost contemporaneous with, or older than, the Doornfontein sites. They are usually characterised by many blades/bladelets and backed blades. Coarse undecorated potsherds, often with grass temper, and iron objects are rare. These sites are remarkably common throughout the region. They usually occur on pan or stream-bed margins, near springs, bedrock depressions containing seasonal water, hollows on dunes, and on the flanks or crests of koppies (Beaumont et al. 1995; Parsons 2008). Some of these sites are also associated with stone features, such as ovals or circles that may represent the bases of huts, windbreaks or hunter's hides (Jacobson 2005; Lombard & Parsons 2008; Parsons 2004). These sites are linked to the historic /Xam communities of the area who usually followed a hunter-gatherer lifeway (Deacon 1986, 1988; Beaumont et al. 1995).

Wilton

These assemblages are distinguished by a significant incidence of cryptocrystalline silicates (mainly chalcedony) and contain many formal tools such as small scrapers, backed blades and bladelets. A regional variation of the Wilton in the area is often referred to as the Springbokoog Industry (Beaumont et al. 1995).

Oakhurst

A few heavily patinated Later Stone Age clusters, that include large scrapers, may represent Oakhurst-type aggregates (Beaumont et al. 1995).

The Middle Stone Age

Previous collections of stone tools in the region include artefacts with advanced prepared cores, blades and convergent flakes or points. Most of the scatters associated with the Middle Stone Age have a 'fresh' or un-abraded appearance. They appear to be mostly associated with the post-Howiesons Poort (MSA 3) or MSA 1 sub-phases (Beaumont et al. 1995).

Substantial Middle Stone Age sites seem uncommon. However, where archaeological sites were excavated, such as only two farms west of Geelkop 456, on Zoovoorbij 458, a Middle Stone Age assemblage was excavated beneath Later Stone Age deposits (Smith 1995). This shows that, although not always visible on the surface, the landscape was inhabited during this phase. The large flake component of the lower units of Zoovoorbij Cave has Levallois-type preparation on the striking platforms, reinforcing their Middle Stone Age context.

The Earlier Stone Age

Stone artefacts associated with this phase, based on their morphology, seem moderately to heavily weathered. Scatters may include long blades, cores (mainly on dolerite), and a low incidence of formal tools such as handaxes and cleavers. Clusters with distinct Acheulean characteristics have been recorded in the area (Beaumont et al. 1995).

5. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed quarry extension the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface.

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance:

- » The unique nature of a site;
- » The integrity of the archaeological/cultural heritage deposits;
- » The wider historic, archaeological and geographic context of the site;
- » The location of the site in relation to other similar sites or features;
- » The depth of the archaeological deposit (when it can be determined/is known);
- » The preservation condition of the sites;
- » Potential to answer present research questions.

Furthermore, The National Heritage Resources Act (Act No 25 of 1999, Sec 3) distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- » Its importance in/to the community, or pattern of South Africa's history;
- » Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- » Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- » Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- » Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- » Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- » Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- » Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- » Sites of significance relating to the history of slavery in South Africa.

5.1. Field Rating of Sites

Site significance classification standards prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 7 of this report.

<i>FIELD RATING</i>	<i>GRADE</i>	<i>SIGNIFICANCE</i>	<i>RECOMMENDED MITIGATION</i>
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

5.2 Impact Rating of Assessment

The criteria below are used to establish the impact rating of sites as per the impact rating methodology employed by Savannah environmental:

- » The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The **duration**, wherein it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
 - * medium-term (5-15 years), assigned a score of 3;
 - * long term (> 15 years), assigned a score of 4; or
 - * permanent, assigned a score of 5;

- » The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- » the **status**, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.
- » the degree to which the impact may cause irreplaceable loss of resources.
- » the *degree* to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- » < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- » 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

6. BASELINE STUDY-DESCRIPTION OF SITES

It is important to note that the entire farm Bloemsmond 455 was not surveyed but only the footprint of the proposed solar facility, which was surveyed on foot and by vehicle (Figure 1, 2 & 3). The preferred area marked for the solar facility measures 280ha. The proposed alternative site measures 275ha. The study area is characterised by hard packed (deflated) Aeolian sand on top of a calcrete sub strata with sparse grass cover and shrubs (Figure 6, 7 & 8). The study area is gently sloping to the south towards the Orange River, characterised by relatively flat plains with shallow drainage lines running through it. In a few places outcrops of quartz (Figure 9) protrude through the sand cover that was thought to be potentially of archaeological interest although very few artefacts were recorded in these areas. No major landscape features like pans or hills exist within the preferred study area, although the hill, Rooiberg, is located just **outside** of the proposed alternative site.

Isolated MSA artefacts are observed in low densities scattered over both the preferred area and the proposed alternative site (Figure 4 & 5), where jaspilitic chert strongly dominates as raw material although quartzite, meta- quartzite and micro-crystalline quartz were also used. Within the preferred site (area 2) an ephemeral LSA site (field nr 157) was recorded in the southern portion of area 2. MSA artefacts consist mostly of cores and large flakes, some with dorsal flaking. Triangular flakes have no scars or secondary trimming and are unutilised. These low density scatters are of low significance and corroborates findings in the area where these isolated artefacts has been given a low significance rating (Morris 2013, Dreyer 2006, Fourie 2014).

Outside of the proposed alternative area on the hill "Rooiberg" an LSA site (Field nr 599) was recorded together with a higher frequency of isolated MSA artefacts. These recorded features **will not** be impacted on by the proposed siting of the proposed alternative site and are not discussed in this report.

Low density (less than 1 artefact per 10 - 15m²) isolated artefacts were recorded as find spots. These find spots as well as ephemeral LSA sites were given field numbers (Table 1). GPS points were taken at such places and selections of artefacts were photographed. A short description of recorded finds follows:

Stone Age Find spots (Field Nr 158, 159, 161, 162,163,164 and 598)

Isolated Middle Stone Age artefacts are scattered over both the preferred sites (area 1 & 2) and alternative site in very low densities (less than 1 artefact per 10m²). These artefacts are not *in-situ* and are scattered too sparsely to be of any significance apart from noting their presence, which has been done in this report. These low density scatters are of low significance and corroborates findings in the area where these isolated artefacts has been given a low significance rating (Dreyer 2006, Morris 2012, Fourie 2014). Artefacts consist mostly of miscellaneous flakes and broken pointed flakes with faceted or plain striking platforms. Raw material consists of igneous and metamorphic rocks (Figure 10, 11 and 16).

Heritage significance: Generally Protected C (GP.C)
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Stone Age Site (Field Nr 157)

The site is located in the southern portion of the preferred site (area 1) and a direct impact is foreseen on the site. The site is marked by exposed bedrock with !gorras (hollows where water collects) (Figure 14). Widely scattered/isolated stone artefacts (<1 per 2 m²) are scattered around the exposed bedrock with lithics made from jaspilitic chert, meta-quartzite and micro-crystalline quartz. Artefacts consist of both MSA and LSA lithics (Figure 15). The site could mark an ephemeral camp especially during the LSA and is therefore of low to medium significance.

Heritage significance: Generally Protected B (GP.B)
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Table 1. Recorded features with Coordinates

Field Number	Type Site	Cultural Markers	Co ordinate	Location
157	MSA & LSA	Flakes on jaspilitic chert, meta-quartzite and micro-crystalline quartz. At exposed bedrock.	28° 35' 18.4237" S, 21° 02' 20.6052" E	Preferred Site
158	MSA	Jaspilitic Chert	28° 35' 01.7658" S, 21° 01' 55.1704" E	Alternative Site
159	MSA	Jaspilitic Chert	28° 35' 11.7203" S, 21° 02' 12.0573" E	Alternative Site
161	MSA	Fine-Grained Quartzite	28° 34' 55.4681" S, 21° 01' 30.4641" E	Alternative Site
162	MSA	Large Quartzite flake	28° 34' 58.6711" S, 21° 02' 57.0981" E	Preferred Site
163	MSA	Triangular flake from Quartzite.	28° 34' 50.9747" S, 21° 02' 24.9311" E	Preferred Site
164	MSA	Broken pointed flake on quartzite	28° 34' 29.4642" S, 21° 02' 35.9823" E	Preferred Site
598	MSA	Unutilised flakes over large area where rock protrudes through red sand. Raw material from Fine-Grained Quartzite	28° 33' 57.8269" S, 21° 01' 58.3319" E	Alternative Site

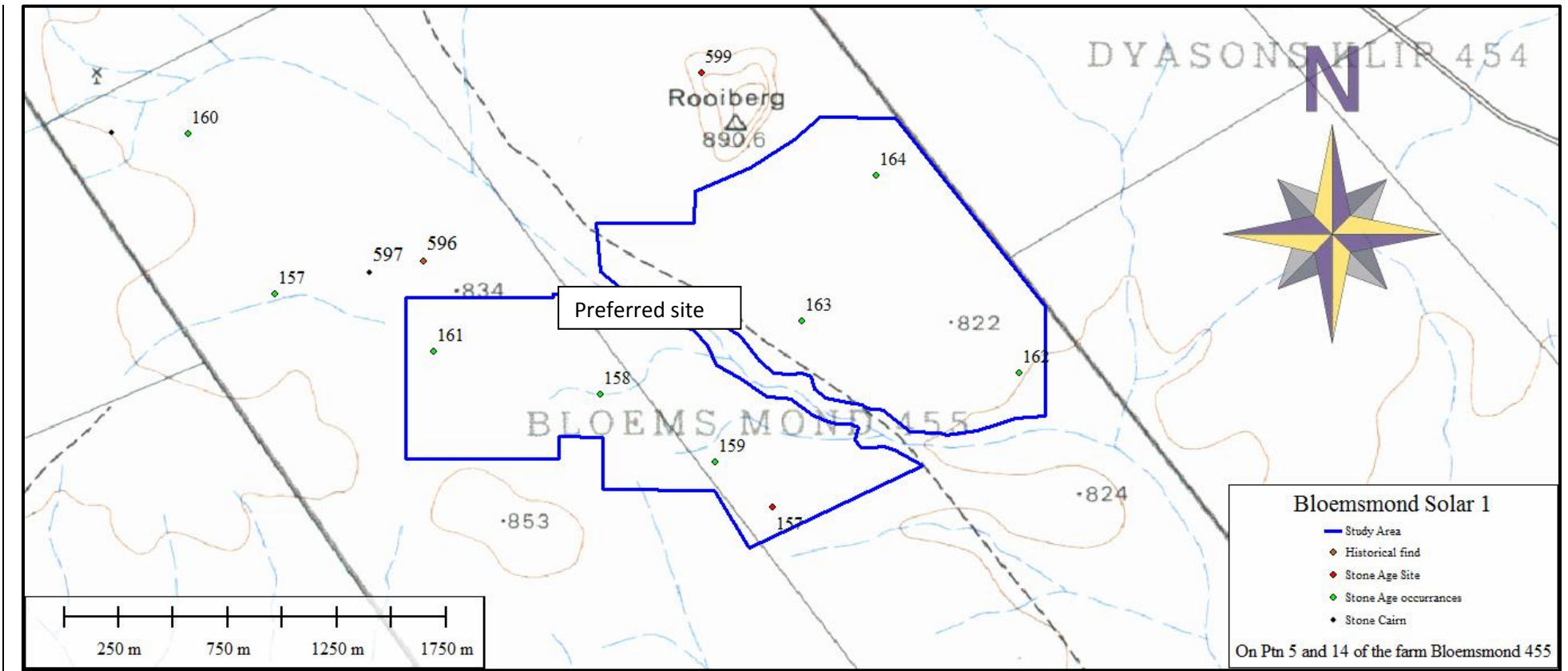


Figure 4: Distribution of recorded features in the preferred site 1 and 2.

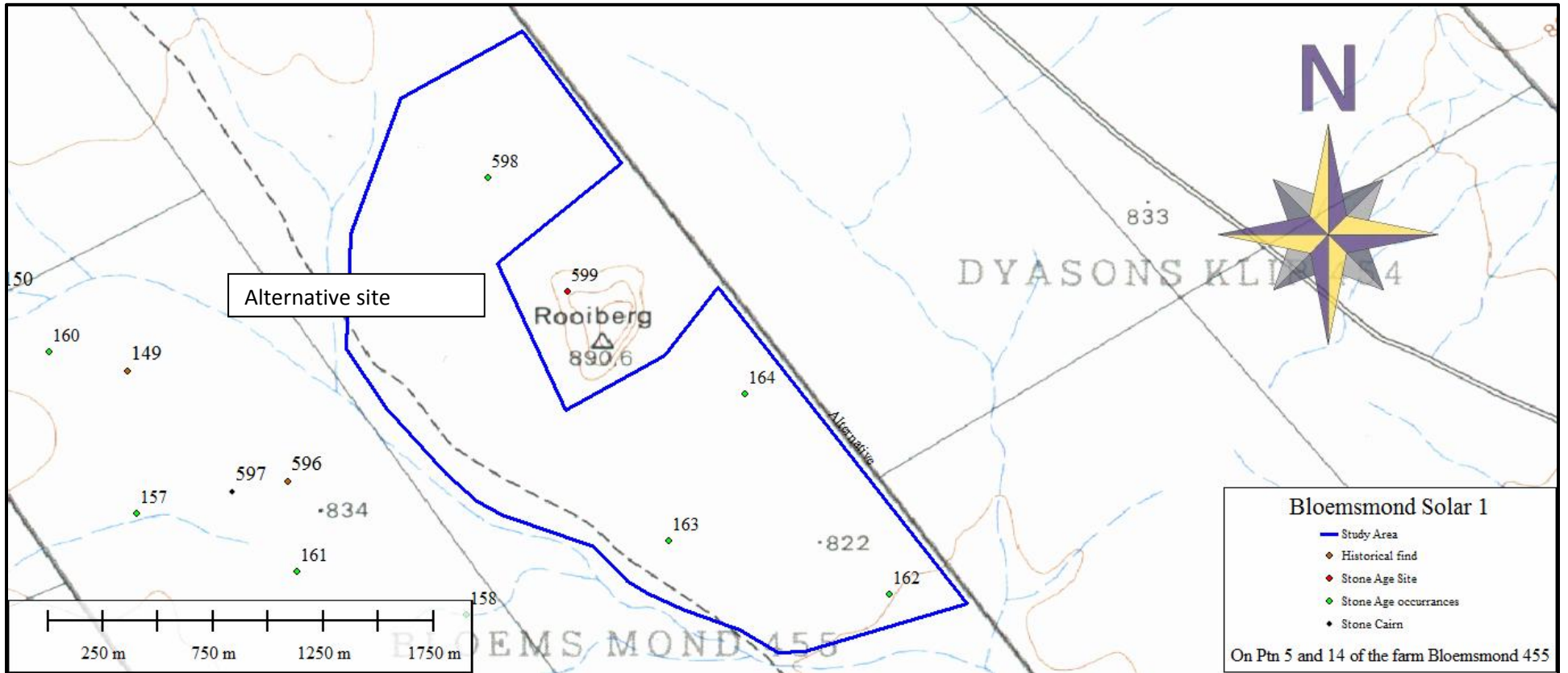


Figure 5: Distribution of recorded features in the proposed alternative site.



Figure 6. General site conditions.



Figure 7. General site conditions.



Figure 8. General site conditions.



Figure 9. Quartzite outcrop.



Figure 10 Dorsal view of a selection of artefacts from find spots. (*Scale in cm*).



Figure 11 Jaspilitic chert dominates as raw material. (*Scale in cm*).



Figure 12. Exposed bedrock that retains water after rains.



Figure 13. Range of tool from Field nr 157.



Figure 14. Dorsal view of a selection of artefacts from find spots. (*Scale in cm*).

Impact evaluation of the proposed project on heritage resources

Stone Age Scatter Find Spots

<i>Nature:</i> During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.				
	Without mitigation		With mitigation	
	Preferred Site	Alternative	Preferred Site	Alternative
<i>Extent</i>	Local (2)	Local (2)	Local (1)	Local (1)
<i>Duration</i>	Permanent (5)	Permanent (5)	Permanent (5)	Permanent (5)
<i>Magnitude</i>	Low (2)	Low (2)	Low (1)	Low (1)
<i>Probability</i>	Most Likely (4)	Most Likely (4)	Most Likely (4)	Most Likely (4)
<i>Significance</i>	36 (Medium)	36 (Medium)	28 (low)	28 (low)
<i>Status (positive or negative)</i>	Negative	Negative	Negative	Negative
<i>Reversibility</i>	Not reversible	Not reversible	Not reversible	Not reversible
<i>Irreplaceable loss of resources?</i>	Yes	Yes	Yes	Yes
<i>Can impacts be mitigated?</i>	Yes	Yes		
	<i>Mitigation:</i> No preconstruction mitigation needed. The artefacts within the study area are scattered too sparsely to be of any significance apart from noting their presence, which has been done so in this report.			
	<i>Cumulative impacts:</i> Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.			
	<i>Residual Impacts:</i> Depletion of archaeological record of the area.			

Stone Age Site

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.

	Without mitigation		With mitigation	
	Preferred Site	Alternative	Preferred Site	Alternative
Extent	Local (2)	Local (2)	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (3)	Low (1)	Low (1)
Probability	Most Likely (4)	Most Likely (4)	Likely (3)	Likely (3)
Significance	40 (Medium)	40 (Medium)	21 (low)	21 (low)
Status (positive or negative)	Negative	Negative	Negative	Negative
Reversibility	Not reversible	Not reversible	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes	Yes	Yes
Can impacts be mitigated?	Yes	Yes		

Mitigation:

It is recommended that the Stone Age site should be demarcated and excluded from the development if possible. If this is not possible shovel pit testing should be done on the site prior to construction.

Cumulative impacts:

Archaeological sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.

Residual Impacts:

Depletion of archaeological record of the area.

7. CONCLUSIONS AND RECOMMENDATIONS

Heritage Contracts and Archaeological Consulting CC has been contracted by AEP Bloemsmond Solar 1 (Pty) Ltd to conduct an Archaeological Impact Assessment for the proposed AEP Bloemsmond Solar 1 development located 10 km north-east of Keimoes and to the west of the Orange River.

No major landscape features such as pans or hills exist within the preferred study area, although a hill referred to as Rooiberg exists outside (to the east) of the proposed alternative site. The sites recorded on this focal point in the landscape will not be impacted on by any of the proposed preferred areas or alternative site.

Isolated Middle Stone Age artefacts are scattered over both the preferred site and alternative site in very low density's (less than 1 artefacts per 10m²). These artefacts are not *in-situ* and are scattered too sparsely to be of any significance apart from noting their presence, which has been done in this report

A Stone Age site was recorded at Field nr 157 in the southern portion of the preferred site (Area 2) and a direct impact is foreseen on the site. The site is marked by exposed bedrock with !gorras (hollows where water collects) with widely scattered/isolated stone artefacts. Artefacts consist of both MSA and LSA and could mark an ephemeral camp especially during the LSA and it is therefore of medium significance.

The impacts to heritage resources by the proposed development are not considered to be highly significant and the impact on archaeological sites can very easily be mitigated. Based on the results of the study there are no significant archaeological risks associated with the proposed solar facility if the following recommendations are implemented:

- The Stone Age Site (Field nr 157) are marked as a no go area on development plans with a 20 meter buffer zone.
- Once the pylon positions of the power line have been confirmed a walk-through of the power line is recommended.
- The power line has a connection on an adjacent property and once this alignment is finalised a walk-through of the alignment is recommended.
- A chance finds procedure is included within the EMP as detailed below.

Chance find procedure

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or rock engraving, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the SAHRA.

No cultural landscape elements were noted and visual impacts to scenic routes and sense of place are also considered to be low from a heritage perspective but are assessed by a separate study by a visual specialist. In terms of the built environment (Section 34 of the NHRA), no standing buildings of significance were recorded.

7.1 Reasoned Opinion

From a heritage perspective both the preferred site (area 1) and the alternative site is acceptable from a heritage point of view. The preferred site 2 is also acceptable as long as the archaeological feature at Field nr 157 is excluded with a 20 meter buffer zone from the development. If the above recommendations are adhered to and based on approval from SAHRA, HCAC is of the opinion that the development can continue as the impact of the development on heritage will not impact negatively on the archaeological record of the Upington/Keimoes area.

If during the pre-construction phase or during construction, any archaeological finds are made (e.g. graves, stone tools, and skeletal material), the operations must be stopped, and the archaeologist must be contacted for an assessment of the finds. Due to the subsurface nature of archaeological material and graves the possibility of the occurrence of unmarked or informal graves and subsurface finds cannot be excluded.

8. PROJECT TEAM

Jaco van der Walt, Project Manager

9. STATEMENT OF COMPETENCY

I (Jaco van der Walt) am a member of ASAPA (no 159), and accredited in the following fields of the CRM Section of the association: Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation. This accreditation is also valid for/acknowledged by SAHRA and AMAFA.

I have been involved in research and contract work in South Africa, Botswana, Zimbabwe, Mozambique, Tanzania and the DRC; having conducted more than 300 AIAs since 2000.

10. REFERENCES

Archaeological Sources:

Archaeological Database Wits University 2009

- Beaumont, P.B., Smith, A.B. & Vogel, J.C. 1995. Before the Einiqua: the archaeology of the frontier zone. In: Smith, A.B. (ed.) Einiqualand: Studies of the Orange River Frontier: 236-264. Cape Town: UCT Press.
- Beaumont, P.B. 2005. Archaeological Impact Assessment at and in the Vicinity of a Quartzite Quarry on Portion 4 of the Farm Droogehout 442 near Upington.
- Beaumont, P.B. 2008. Phase 1 Heritage Impact Assessment Report on a Portion of the Farm Keboes 37, near Kanoneiland, Siyanda District Municipality, Northern Cape Province.
- Deacon, H.J. & Deacon, J. 1999. Human Beginnings in South Africa: Uncovering the Secrets of the Stone Age. Cape Town: David Phillips Publishers.
- Deacon, J. 1986. 'My place the Bitterputs': the home territory of Bleek and Lloyd's/Xam San informants. *African Studies* 45: 135-155.
- Deacon, J. 1988. The power of a place in the understanding of southern San rock engravings. *World Archaeology* 20: 129-140.
- De Beer, M. 1992. *Keimoes en omgewing: 'n kultuurhistoriese verkenning*. Keimoes, 1992.
- Dreyer, C. 2006. First Phase Archaeological and Cultural Heritage Assessment of the Proposed Concentrated Solar Thermal Plant (Csp) at the Farms Olyvenhouts Drift, Upington, Bokpoort 390 and Tampansrus 294/295, Groblershoop, Northern Cape.
- Fourie 2014. Heritage Impact Assessment for the proposed Solar Power Park for SolarReserve SA (Pty) Ltd, Farm Rooipunt 617, Gordonia RD, Siyanda District Municipal Region, Northern Cape
- Gaigher, S. 2012. Heritage Impact Assessment, Basic assessment report for the proposed establishment of the grid integration infrastructure for sites 1.1, 1.2, 1.3 and 2, as part of the larger Karoshoek Valley Solar Park, on a site located 30 km East of Upington, Northern Cape Province. Unpublished report for Savannah Environmental (Pty) Ltd.
- Legassick, M., "The will of Abraham and Elizabeth September: the struggle for land in Gordonia, 1898-1995" in *The Journal of African History*, (37)3, 1996, pp. 371-418
- Lombard, M. 2011. Background to the stone age of the Kakamas/Keimoes area for CRM purposes. Unpublished report.
- Lombard, M. & Parsons, I. 2008. Blade and bladelet function and variability in risk management during the last 2000 Years in the Northern Cape. *South African Archaeological Bulletin* 63: 18-27.
- Moolman, J.H., "The Orange River, South Africa" in *Geographical review*, 36(4), (Oct. 1946), pp. 653-674.
- Morris, D. & Beaumont, P., "Inawabdanas: Archaeological Sites at Renosterkop Kakamas District, Northern Cape" in *The South African Archeological Bulletin*, 46(154), Dec 1991, pp. 115-124.
- Morris, D. 2012. Archaeological Impact Assessment for Blocuso. Unpublished report.
- Morris, A. G. *The skeletons of contact: a study of protohistoric burials from the lower Orange River valley, South Africa*. Johannesburg, 1992.
- Morris, A.G. 1995a. The Einiqua: an analysis of the Kakamas skeletons. In: Smith, A.B. (ed.) Einiqualand: Studies of the Orange River Frontier: 110-164. Cape Town: UCT Press.
- Morris, D. 2014. Proposed case Kheis solar park phases 1 – 3 on Portion 7 and 9 of the farm Namakwari 656 East of Grootdrink in Northern Cape: Heritage Impact Assessment
- Mucina, L. & Rutherford, M.C. 2006. The Vegetation of South Africa, Lesotho and Swaziland. *Strelitzia* 19. South African National Biodiversity Institute. Pretoria.
- National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)

- Parsons, I. 2008. Five Later Stone Age artefact assemblages from the interior Northern Cape Province. South African Archaeological Bulletin 63: 51-60.
- SAHRA Report Mapping Project Version 1.0, 2009
- Smith, A.B. 1995. Archaeological observations along the Orange River and its hinterland. In: Smith, A.B. (ed.) Einiqualand: studies of the Orange River frontier: 236-264. Rondebosch: UCT Press.
- Van der Walt, J. 2015. Heritage Scoping Report for the proposed Grootdrink Solar (Pv) Energy Facility East Of Upington, Northern Cape Province prepared for Savannah Environmental (Pty) Ltd
- Van Der Walt, J. 2014. AIA for Karoshoek Powerline. Unpublished report.
- Van Ryneveld, K. 2007a. Phase 1 Archaeological Impact Assessment -Portion of the Farm Cnydas East 439, Upington District, Northern Cape, South Africa.
- Van Ryneveld, K. 2007b. Phase 1 Archaeological Impact Assessment -Portion of the Farm Bokspits 118, Groblershoop District, Northern Cape, South Africa.
- Van Schalkwyk, J. 2011. AIA for Karoshoek Solar Park. Unpublished report.