ARCHAEOLOGICAL IMPACT ASSESSMENT REPORT

PROPOSED ESTABLISHMENT OF THE ILANGA CSP 4 PROJECT, NEAR UPINGTON, NORTHERN CAPE PROVINCE

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Professional Member of the Association of Southern African Professional Archaeologist (#159)

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SIGNATURE

EXECUTIVE SUMMARY

Site name and location: The Karoshoek CSP 4 facility is located on Portion 2 of Matjiesrivier 41, approximately 30 km east of Upington within the Khara Hais Local Municipality in the Northern Cape (Figure 1)

1: 50 000 Topographic Map: 2821DA.

EIA Consultant: Savannah Environmental (Pty) Ltd.

Developer: Emvelo Eco Projects (Pty) Ltd

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

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Date of Report: 6 June 2016.

Findings of the Assessment:

The larger study area in which the Ilanga solar facility is located has been subjected to various heritage and archaeological assessments (Beaumont 2005, Gaigher 2012, van Schalkwyk 2011, van der Walt 2014 and Nilssen 2015). Providing a robust baseline of the archaeology expected within the footprint of the proposed project. These studies showed that almost no significant archaeological sites occur in the immediate vicinity of the Ilanga Solar facility. Although artefacts dating to the Early Stone Age, Middle Stone Age and Later Stone Age were recorded in the larger area, they occur as isolated finds that are temporally mixed, in deflated and un-stratified contexts without organic remains and other cultural materials. As a result, the archaeological record of the larger area is considered to be of low significance.

Within the footprint of CSP 4 widely dispersed individual scatters of stone tools were recorded. Artefact density at these scatters are so low that they do not represent individual sites but rather background scatter or find spots and are of no heritage significance.

The impacts to heritage resources by the proposed development are not considered to be highly significant and the impact on archaeological sites is acceptable if the recommendations made in section 7 are adhered to. Subject to approval from SAHRA, HCAC is of the opinion that from an archaeological point of view there is no compelling reason why the development should not proceed if the recommendations as made in this report area adhered to.

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 during the study. Heritage Contracts and Archaeological Consulting CC and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

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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 proposed Ilanga CSP 4 Development, as part of the proposed additional CSP facilities within the Karoshoek CSP Solar Valley Development, proposed on sites located approximately 30 km east of Upington within the Khara Hais Local Municipality in the Northern Cape. This study forms part of the Environmental Impact Assessment (EIA) process.

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 scoping study (van der Walt 2015) that includes collection from various sources and consultations; Phase 2, a field assessment of the study area; Phase 3, reporting the outcome of the study.

General site conditions are 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

Field study

Conduct a field study to:

a) Visit the proposed development footprint to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest;

b) Record GPS points of identified as significant areas; and

c) Determine the levels of significance of the various types of heritage resources affected by the proposed development.

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; and
- » 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 Karoshoek CSP 4 facility is located on Portion 2 of Matjiesrivier 41, approximately 30 km east of Upington within the Khara Hais Local Municipality in the Northern Cape (Figure 1).

The study area falls within a Savannah Biome as described by Mucina et al (2006) with the vegetation described as Bushmanland Arid Grassland in the west with Kalahari Karroid Shrubland to the east. The study area is relatively flat with low hills, the area is characterised by red Kalahari windblown sand

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1.3.2. Location Map

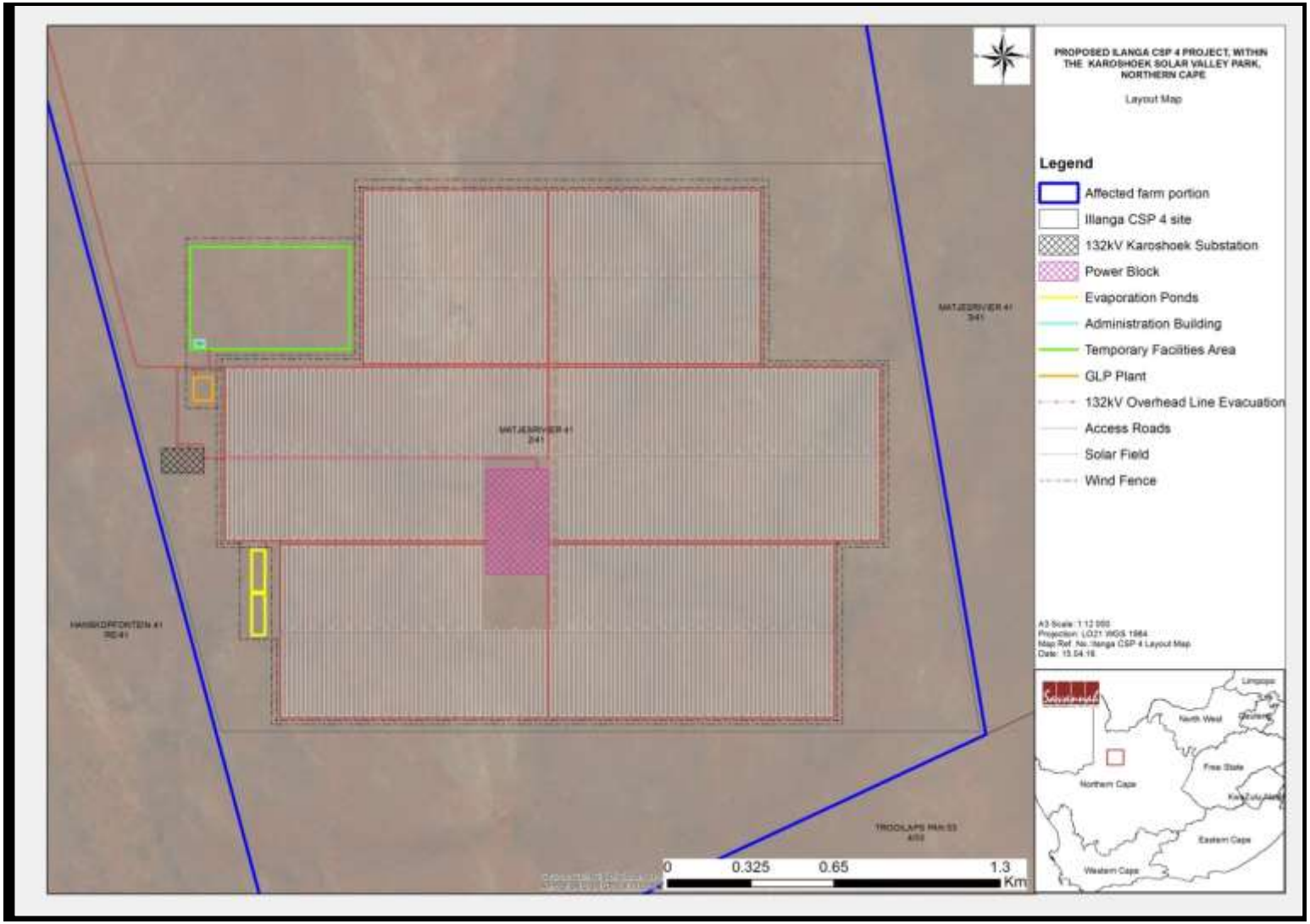

Figure 1: Location map provided by Savannah Environmental (Pty) Ltd.

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 - Scoping 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 approached 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 independently as part of the social consultation 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

The proposed CSP 4 Development was subjected to a walk through assessment during the week of 23 May 2016.

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. Low archaeological visibility of parts of the study area is due to sand cover and vegetation as well as the lack of access to certain portions that hindered the coverage of the survey and the possible occurrence of unmarked graves and other cultural material cannot be excluded.

It is assumed that information obtained for the wider region and the information from the previous HIAs 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 sparse occurrence of cultural material throughout. Sufficient information was recorded to establish the cultural sequence of the area and to inform recommendations to mitigate the anticipated impacts resulting from the development.

This study did not assess living or intangible heritage or the impact on the palaeontology of the area. 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 Ilanga CSP 4 will have a development footprint of up to 680 ha, to be placed within a broader site of ~6000ha and will include the following associated infrastructure:

- On-site substation and associated 132kV power line linking the facility to the national electricity grid;
- Access roads (main and internal access roads);
- A water pipeline from the Orange River (including water treatment and storage reservoirs).

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 brief desktop study and below is a short summary of the findings.

4.1 Databases Consulted

SAHRA Report Mapping Project and SAHRIS

For this study the following previous CRM reports (SAHRIS) conducted in the area were consulted: Beaumont 2005, Gaigher 2012, van Schalkwyk 2011, van der Walt 2014 and Nilssen 2015. The aim of this is to extract data and information on the area in question, looking at archaeological sites, historical sites and graves of the area. Several other unpublished CRM projects were conducted in the general study area (Beaumont 2008, Van Ryneveld 2007a & 2007b, Dreyer, 2006). These studies identified Early and Middle Stone Age assemblages as well as historical structures.

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. Archaeological Background

4.2.1. Stone Age Background of the study area

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 Later Stone Age

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).

Van Schalkwyk (2011), Gaigher (2012), van der Walt (2014) and Nilssen (2015) recorded heritage resources dating to the Stone Age and Historical period as well as graves in the general study area.

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 wind energy facility 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; and
- 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; and
- 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.

FIELD RATING	***GRADE***	***SIGNIFICANCE***	***RECOMMENDED MITIGATION***
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

The eastern and northern portions of the larger Ilanga study area are characterised by hilly topography, and the remaining area, which forms the majority of the study area, is characterised by a low relief. This area consists of metamorphosed sedimentary and igneous rocks that is covered by Aeolian sands of Quaternary age (Outeniqua Geotechnical 2012). Rock outcrops and ridges area commonly found in higher relief areas, specifically in the northern and eastern portions with thick sand cover in the southern, central and western lowland areas where the solar facilities is proposed (Figure 2 -5).

Previous archaeological studies in the surrounding environment (within the project footprint and adjacent areas) showed that almost no significant archaeological sites occur in the immediate vicinity of the Ilanga Solar facility. Although artefacts dating to the Early Stone Age, Middle Stone Age and Later Stone Age were recorded in the larger area, they occur as isolated finds that are temporally mixed, in deflated and un-stratified contexts without organic remains and other cultural materials. As a result, the archaeological record of the larger area is considered to be of low significance (e.g., Beaumont 2005, Gaigher 2012, van van der Walt 2014 and Nilssen 2015).

This report deals with the development footprint of CSP 4 as indicated in Figure 1. During the survey scatters of isolated stone tools were recorded scattered in low densities over the study area. Artefact density at these scatters are so low that they do not represent individual sites but rather background scatter or find spots. Finds at this location consist of MSA flakes and cores with faceted platforms together with a LSA component with tools consisting of small scrapers and flakes with use wear. All of the artefacts are made from banded iron stone and quartzite. Tools are scattered over a large area (100 x 50m) with the artefact density estimated at 1 artefact per 4 m². These scatters are given a Generally Protected C field rating.

During the survey for the larger Ilanga facility several sites were recorded (Figure 6) and is summarised in Table 1. From Figure 6 it is clear that there is a marked paucity of sites moving from north to the south that could be attributed to thick sand cover and the lack of water and raw material for stone tool making.

The majority of the Stone Age finds for the larger Ilanga Solar Facility is classified as MSA characterised by Levallois cores, blades, pointed flakes and large scrapers with faceted striking platforms. Raw material consists of quartzite, quarts and banded Iron Stone.

LSA artefacts were also recorded but are often mixed with the MSA material and some artefacts could not be positively classified as either being MSA or LSA. LSA finds are found less frequent than MSA material and the finds are characterised by flakes, adzes, small blades and scrapers on quartzite and banded iron stone. Very few ESA (bifacially retouched hand axes) artefacts were noted mostly made from quartzite.

Figure 2. General Site conditions

Figure 3. Site conditions.

Figure 4. General Site Conditions

Figure 5. General Site conditions

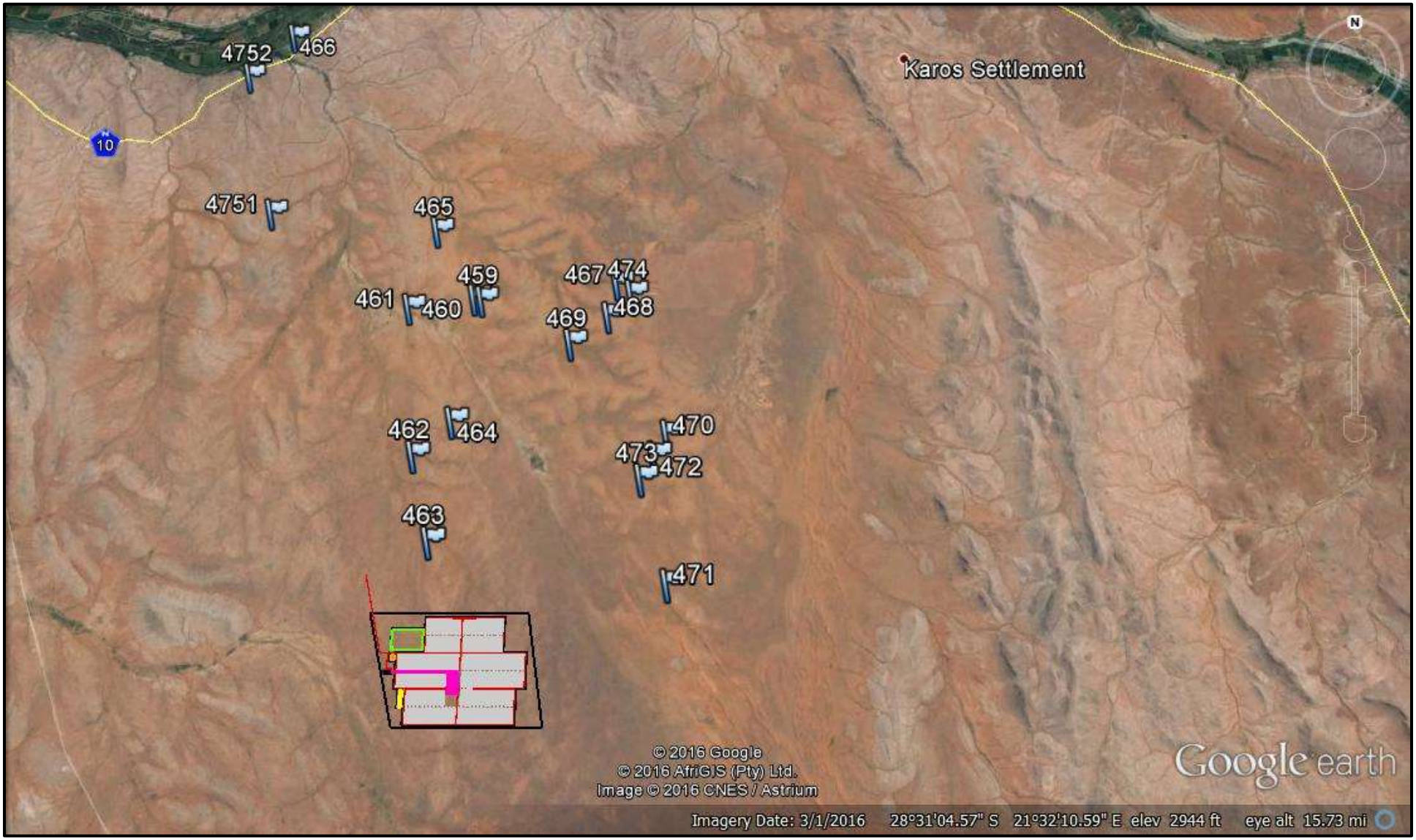

Figure 6: Site distribution map.

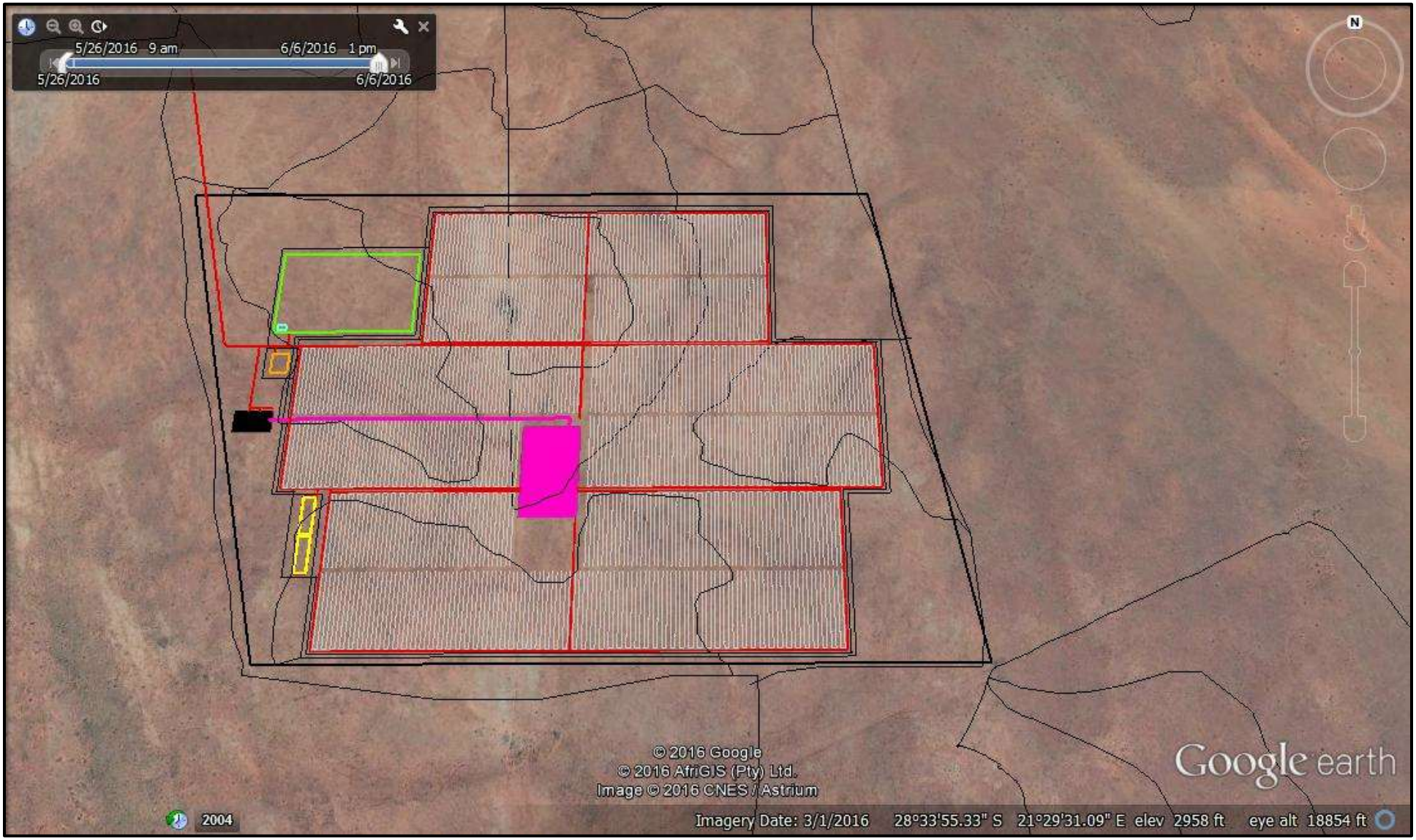

Figure 7. Google image of the study area with track logs in black of the areas covered.

Table 1: Identified heritage features with Coordinates

Field No	Type site	LONGITUDE	LATITUDE	ELEVATION
459	ESA and MSA	21° 29' 13.1604" E	28° 29' 50.2009" S	862.318787
460	MSA	21° 29' 07.1269" E	28° 29' 49.0235" S	863.871582
461	Ruin & MSA Findspot	21° 28' 15.3264" E	28° 29' 56.3783" S	857.138489
462	MSA Findspot	21° 28' 28.2937" E	28° 31' 44.4541" S	867.029175
463	MSA Findspot	21° 28' 45.2891" E	28° 32' 43.6885" S	879.091553
464	MSA & LSA Findspot	21° 28' 56.2513" E	28° 31' 20.2943" S	873.566528
465	ESA and MSA	21° 28' 33.0131" E	28° 28' 56.3123" S	853.373108
466	Memorial	21° 26' 15.3599" E	28° 26' 13.4483" S	819.888855
467	LSA & MSA	21° 31' 01.3188" E	28° 29' 37.1437" S	876.51825
468	MSA Findspot	21° 30' 55.0367" E	28° 30' 02.1924" S	879.789612
469	MSA Findspot	21° 30' 25.7004" E	28° 30' 22.6223" S	872.925964
470	MSA & LSA	21° 31' 43.5000" E	28° 31' 28.9991" S	900.378662
471	MSA Findspot	21° 31' 45.3756" E	28° 33' 11.2391" S	926.047058
472	MSA Findspot	21° 31' 33.8555" E	28° 31' 44.0075" S	900.539795
473	ESA and MSA	21° 31' 23.9880" E	28° 32' 00.0457" S	896.163452
474	LSA	21° 31' 12.9072" E	28° 29' 45.1177" S	882.748657
4751	Stone Cairn	21° 26' 15.2627" E	28° 28' 42.4165" S	850.126709
4752	MSA & LSA	21° 25' 41.5683" E	28° 26' 48.1211" S	850.126709

6.1. Impact evaluation of the proposed project on heritage resources

CSP 4

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 (Preservation/ excavation of site)**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (3)	Low (3)
Probability	Probable (3)	Not Probable (2)
Significance	**30 (Low)**	**20 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes unless sites can be preserved.
Can impacts be mitigated?	Yes	Through preservation or excavation of sites.
Mitigation: None of the recorded heritage resources will be impacted on by CSP 4 and no further mitigation is required. Artefacts are scattered too sparsely to be of any significance apart from noting their presence, which has been done in this report. These scatters are given a Generally Protected C field rating.		
Cumulative impacts: In any archaeological context the impacts are once-off permanent destructive events.		
Residual Impacts: If sites are destroyed this results in the depletion of archaeological record of the area. However if sites are recorded and preserved or mitigated this adds to the record of the area.		

Cumulative Assessment

Through CRM studies for developments in the area heritage sites are identified and protected from accidental damage, this can be regarded as a positive impact as it adds to the heritage database of the area.

In terms of the cumulative impact of this and other developments in the Karoshoek area, as there are numerous similar projects in the area the impact on archaeological material and the heritage landscape is increased slightly.

The impact of the project on identified heritage resources will be mitigated.

Action trigger	**Development impact**
Is the proposed action one of several similar past, present or future actions in the same geographic area?	Yes
Do other activities (whether state or private) in the region have environmental effects similar to those of the proposed action?	Yes
Will the proposed action (in combination with other planned activities) affect any natural resources, cultural resources, socio or economic units, or ecosystems of local, regional or national concern?	There is a secondary impact that can be managed through the correct mitigation.
Have any recent heritage studies of similar actions identified important adverse or beneficial cumulative effects issues?	Data on the heritage resources on the area is being collected through systematic surveys and identified resources are recorded and managed through mitigation.
Has the impact been historically significant, such that the importance of the resource is defined by past loss, gain or investments to restore resources?	Identified resources are being recorded and mitigated for projects such as these that would otherwise have remained unidentified.
Does the proposed action involve any of the following? » Loss of natural habitats or historic character through residential, commercial and industrial development » Social, economic or cultural effects on marginalised communities resulting from ongoing development	Currently the area is not inhabited. The project and others in the area will have an impact on the cultural landscape, but the social benefits of the project have been classified as beneficial.

Cumulative Impact Assessment

Nature: Heritage impacts associated with the establishment of CSP Facilities on the archaeology of the area		
	Without mitigation	**With mitigation (Preservation/ excavation of site)**
Extent	Local (2)	Local (2)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (3)
Probability	Not probable (2)	Not Probable (2)
Significance	**22 (Low)**	**20 (Low)**
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes unless sites can be preserved.
Can impacts be mitigated?	Yes	Through preservation or excavation of sites.
Mitigation: Identified resources are being recorded and mitigated for projects such as these that would have otherwise remained unidentified. In terms of the impact on the cultural landscape the impact is considered low, with the correct mitigation measures as well as the vast physical area in which these projects are constructed.		
Cumulative impacts: If sites are destroyed this results in the depletion of archaeological record of the area. However if sites are preserved or recorded and mitigated this adds to the archaeological record of the area.		
Residual Impacts: In any archaeological contexts the impacts are once-off permanent destructive events.		

7. CONCLUSIONS AND RECOMMENDATIONS

The larger study area in which the Ilanga solar facility is located has been subjected to various heritage and archaeological assessments (Beaumont 2005, Gaigher 2012, van Schalkwyk 2011, van der Walt 2014 and Nilssen 2015). This provides a robust baseline of the archaeology expected within the footprint of the proposed project. These studies showed that almost no significant archaeological sites occur in the immediate vicinity of the Ilanga Solar facility. Although artefacts dating to the Early Stone Age, Middle Stone Age and Later Stone Age were recorded in the larger area, they occur as isolated finds that are temporally mixed, in deflated and un-stratified contexts without organic remains and other cultural materials. As a result, the archaeological record of the larger area is considered to be of low significance.

Within the footprint of CSP 4 widely dispersed individual scatters of stone tools were recorded. Artefact density at these scatters are so low that they do not represent individual sites but rather background scatter or find spots. Artefacts are scattered too sparsely to be of any significance apart from noting their presence, which has been done in this report.

A thick mantle of Aeolian sands of Quaternary age characterised the footprint of the area where the solar facility is proposed. This sandy area is marked by a paucity of sites that could be attributed to thick sand cover and the lack of water and raw material for stone tool making.

The impacts to heritage resources by the proposed development are not considered to be highly significant and the impact on archaeological sites is acceptable. Subject to approval from SAHRA, HCAC is of the opinion that from an archaeological point of view there is no compelling reason why the development should not proceed if the recommendations as made in this report area adhered to.

Due to the subsurface nature of archaeological material the possibility of the occurrence of unmarked or informal graves and subsurface archaeological 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.

7.1 Reasoned Opinion

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 development will probably not impact negatively on the archaeological record of Northern Cape. 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, but can be easily mitigated by preserving the sites *in-situ* within the development.

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.

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