ARCHAEOLOGICAL IMPACT ASSESSMENT REPORT

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

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Project Reference:

216035

Report date:

March 2016

DOCUMENT PROGRESS

Archaeological Impact Assessment

Document status

Document Version	**V 1**
Report Purpose	**Draft Report for review Savannah Environmental (Pty) Ltd**
Report Ref. No.	**216042**

Distribution List

Date	Report Reference number	Document Distribution	Number of Copies
2016/04/13	216042	Savannah Environmental (Pty) Ltd	Electronic copy

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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

1: 50 000 Topographic Map: 2821CB

EIA Consultant: Savannah Environmental (Pty) Ltd.

Developer: Emvelo Holdings (Pty) Ltd

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

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Date of Report: 13 April 2016.

Findings of the Assessment:

The larger study area (Karoshoek Solar Valley Development) in which the Ilanga CSP 4 facility is located has been subjected to various heritage and archaeological assessments (Gaigher 2012, van Schalkwyk 2011 and van der Walt 2014). Providing a good baseline of the archaeology expected within the footprint of Ilanga site 4.

From these studies, widely dispersed individual scatters of stone tools are known to occur in the larger study area. Artefact density at these scatters are so low that they do not represent individual sites but rather background scatter or find spots. However several Stone Age sites occur in the larger area. The sites consist of a LSA artefact scatter around depressions that contain seasonal water and stream bed margins that was utilised in the past.

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 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 Site 4 Facility, as part of the proposed additional CSP facilities within the Karoshoek 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 desktop study (van der Walt 2015) that includes collection from various sources and consultations; Phase 2, a high level scan 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

Conducting a field study entailed the following:

a) Visiting the proposed trough and associated infrastructure positions to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest;

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

c) Determining the levels of significance of the various types of heritage resources affected by the proposed towers.

Reporting

Report on the identification of anticipated and cumulative impacts of 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 EMPr, 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 Ilanga 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

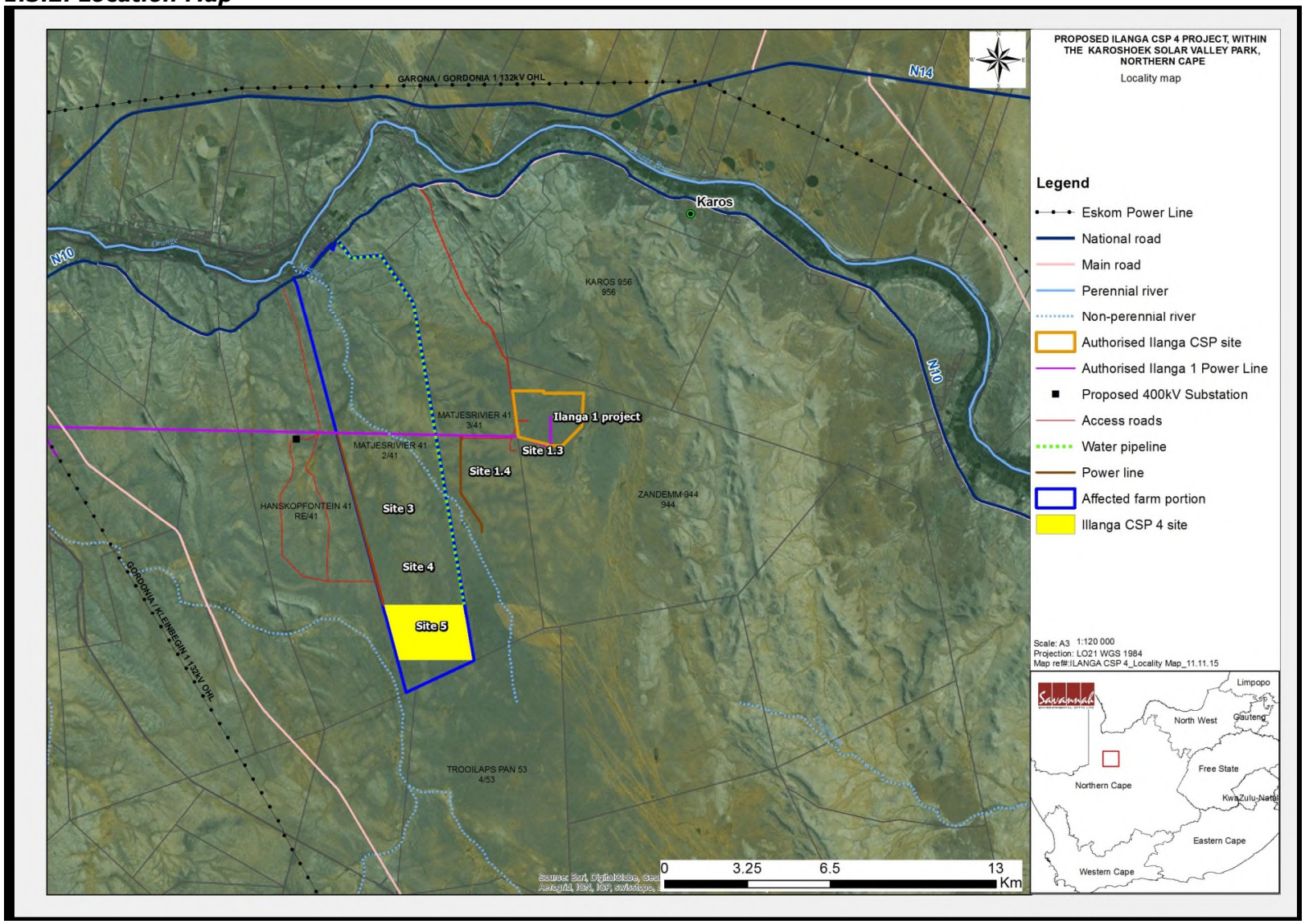

Figure 1: Location of the Ilanga CSP 4 Facility (map provided by Savannah Environmental (Pty) Ltd).

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 - 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 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 as part of Environmental Impact Assessment 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 Ilanga CSP 4 Facility was assessed at desktop level informed by previous surveys of the area and a high level field survey.

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 ground visibility of parts of the study area is due to sand cover and vegetation, 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 HIA's 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

Emvelo Holdings (Pty) Ltd is proposing the development of an additional Concentrated Solar Power (CSP) Facility and associated infrastructure adjacent to the authorised CSP site Karoshoek LFTT 2 (1 x 100 MW Parabolic Trough) Site 5, DEA Ref No.: 14/12/16/3/3/2/295) within the Karoshoek Solar Valley Development on Portion 2 of the Farm Matjiesrivier 41, located approximately 30 km east of Upington within the Khara Hais Local Municipality in the Northern Cape.

The Ilanga CSP 4 Facility is proposed to generate up to 50MW in capacity and will be constructed over an area of approximately 200ha in extent within the broader property. The authorised CSP Site 5 (Karoshoek Site 5 CSP/ Ilanga LFTT 2) will be constructed over an area of approximately 480ha in extent within the broader property and it will consist of parabolic trough technology with a heat transfer fluid (HTF) with a generating capacity of 100MW consisting of the following infrastructure:

» Parabolic troughs utilising a heat transfer fluid (HTF)
» Power Plant/Power Island: powe- island with steam turbine generator, auxiliary boilers, dry cooling and molten salt storage.

Associated infrastructure: access roads, plant substation, power line, water abstraction point and supply pipeline, water storage tanks, packaged water treatment plant, lined evaporation ponds, and workshop and office buildingsThe consolidated 150MW Ilanga CSP 4 Project will have a development footprint of up to 680 ha, to be placed within a broader site of ~6000ha to form part of the larger Karoshoek Solar Valley Development.

The consolidated 150MW Ilanga CSP 4 Project will have a development footprint of up to 680 ha, to be placed within a broader site of ~6000ha to form part of the larger Karoshoek Solar Valley Development and will include the following associated infrastructure:

» Parabolic troughs utilising a heat transfer fluid (HTF).
» Internal access roads.

» Power Plant/Power Island: power island with steam turbine generator, auxiliary boilers, dry cooling and molten salt storage.
» Associated infrastructure: access roads, plant substation, power line, water abstraction point and supply pipeline, water storage tanks, packaged water treatment plant, lined evaporation ponds, and workshop and office buildings.

The power plant/power island, plant substation, water storage tanks, packaged water treatment plant, lined evaporation ponds, and workshop and office buildings authorised as part of the Karoshoek LFTT 2 facility will be utilised for the larger 150MW facility.

The proposed Ilanga CSP 4 Project is proposed to include several parabolic troughs with a generating capacity of up to 50 MW and internal access roads and will be developed together with the authorised Karoshoek Site 5 CSP/ Ilanga LFTT 2

.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: Van Schalkwyk (2011), Gaigher (2012) van der Walt (2014) and are discussed in section 6 of this report. 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 unpublished CRM projects were conducted in the general study area (Beaumont 2005 & 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. A Brief History of Human Settlement close to the study area.

The development of the Gordonia area: The Orange River Irrigation Systems

The irrigation of the Orange River has been central to the economic existence of the area in the vicinity of Upington since the 1880s. 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. 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". 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: 371-372; Moolman 1946: 670)

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. The farms bordering on the river measured in sizes ranging from 4 000 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. (Morris 1992: 14; Legassick 1996, p. 379)

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. In 1891 the first census in the area recorded 735 whites, 1 429 "aboriginal natives" and 3 121 "other coloured persons" living in the area. (Legassick 1996: 374-377).

It is interesting to note the sudden growth in the number of coloured people who settled in the Gordonia area, and especially in the years between the 1936 and the 1970 census. By 1970, coloured people still made up the vast majority of the population of the Gordonia district, as they had done in 1911. By 1970 the smallest proportion of the population of Gordonia was black people.

Today the town of Karos, as well as the farms under investigation form part of the //Khara Hais Local Municipality, a Category B municipality that is located in the ZF Mgcawu District Municipality (previously Siyanda District Municipality), which is the second-largest district in the Northern Cape. It is the commercial, educational, military, agricultural, medical, transport and tourism centre of the area.

Upington is the central town, situated 400 km west of Kimberley, and has an airport and a landing strip. Natural boundaries provide a unique aspect to the town – one is the Kalahari Desert and another is the Orange River, South Africa's largest river. The main economic sector of this municipality is agriculture. (The Local Government Handbook 2015 *ZF [//Khara Hais Local Municipality]*)

Matjes Rivier:

In 1928 there was a transfer of ownership of the farm Matjes Rivier from the nil desperandum development syndicate Rooth and Wessels to the government of the Union of South Africa. (NASA *SAB, JUS: 766 1/160/23/137*)

On 28 June 1930 the Secretary for Lands reported that the following properties had been transferred to the government:

a) Matjes Rivier Settlement A, being a portion of the farm Annas Hoek, portion of Matjes Rivier, Division of Kenhardt, measuring 442 morgen 26889 square feet.
b) Matjes Rivier Settlement B, being a portion of the farm Dagbreek, portion of Matjes Rivier, Division of Kenhardt, measuring 293 morgen 45298 square feet.

(NASA *SAB, MNW: 1028 MM1403/30*)

It was requested that the properties would be withdrawn from prospecting. In August 1930 the Inspector of Mines wrote an interesting report to the Government Mining Engineer regarding Matjes Rivier. He noted that the farm was notable from a geological point of view, as on it were present some of the oldest shale beds belonging to the Swaziland System of rocks. These shale beds had old granite intruded. A good portion of the farm surface disclosed decomposed granitic gneiss. More recent sand deposits covered a portion of the property. Volcanic and sedimentary rocks of the Ventersdorp system could be seen in the extreme north east corner of Matjes Rivier. The Orange River bed took two distinct curves along the northern boundary, which would make irrigation on the farm fairly simple. The inspector believed that there were undoubtedly minerals on the farm but that it was doubtful that any would be found there in payable quantities. The farm was however an ideal agricultural proposition and taking into consideration the rock formations the ground would most likely be fertile, especially for wheat grown under irrigation. It was recommended for this reason that the land would be withdrawn from prospecting. Prospecting on the land was officially prohibited as of 13 October 1930. (NASA *SAB, MNW: 1028 MM1403/30*)

By 1930, a portion of Matjes Rivier belonged on one Mr Gert Jacobus Nel. The government desired to exchange his portion of Matjes Rivier for a section of Zand Dam, in order to ensure that the Karos settlement and irrigation district would be a continuous strip of land. Nel was however not willing to give up a 33 morgen piece of land on which his home and farming operations were situated. This matter was however resolved soon thereafter. The official agreement between Mr Nel and the government was concluded on 18 October 1930, when the government recommended an exchange by private treaty of the government owned grazing farm Zand Dam, for 100 morgen of irrigable and 400 morgen of grazing land on the farm Annas Hoek, a portion of Matjes Rivier, division of Kenhardt, which was required by the Government in connection with the Karos Settlement, and the issue of a Crown Grant in respect of the farm Zand Dam in favour of Anna Magdalena Petronella Nel (born Strauss). (NASA *SAB, URU: 1162 3089*; NASA *SAB, ACT: 391 13417*)

4.3. Stone Age Background

4.3.1. 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.

Van Schalkwyk (2011), Gaigher (2012) and van der Walt (2014) 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

This report deals with the infrastructure for Ilanga CSP 4 Facility. This site was covered in a previous HIA's by Stefan Gaigher (2012) who recorded no sites within the development footprint of CSP 4 facility. Studies by van der Walt (2014) and van Schalkwyk (2011) were also conducted for the larger Karoshoek Solar Valley Development. Sites recorded by these studies were given the abbreviation JvS for the van Schalkwyk (2011) study and SG for the Gaigher (2012) study and JW for the van der Walt 2014 study.

For the larger study area 12 sites (Figure 2) were recorded during the previous HIA's for the different project components and is summarised under section 6.2 of this report. No sites were recorded for the area impacted on by the proposed CSP 4 footprint.

Scatters of isolated stone tools occur in the larger study area. Artefact density at these scatters are so low that they do not represent individual sites but rather background scatter or find spots. These low density scatters are of low significance and it is recommended that the scatters are recorded, which has been done in this report. No further mitigation is required. However several Stone Age sites do occur in the larger area. These sites consist of a LSA artefact scatter around depressions that contain seasonal water (JW1) and stream bed margins that was utilised in the past (JvS 4). These sites are given a Generally Protected A (GP.A) field rating.

LSA artefacts (mostly on the locally available CCS) and isolated MSA artefacts on a green coarse grained quartzite are noted scattered over the landscape .Sand cover is thick on some portions of the study area while other sections have higher archaeological visibility.

The description and assessment of this layout stems from superficial observations and a desktop study only. Very few heritage resources are on record close to the study area and none of them will be directly impacted on by the proposed development (Figure 2).

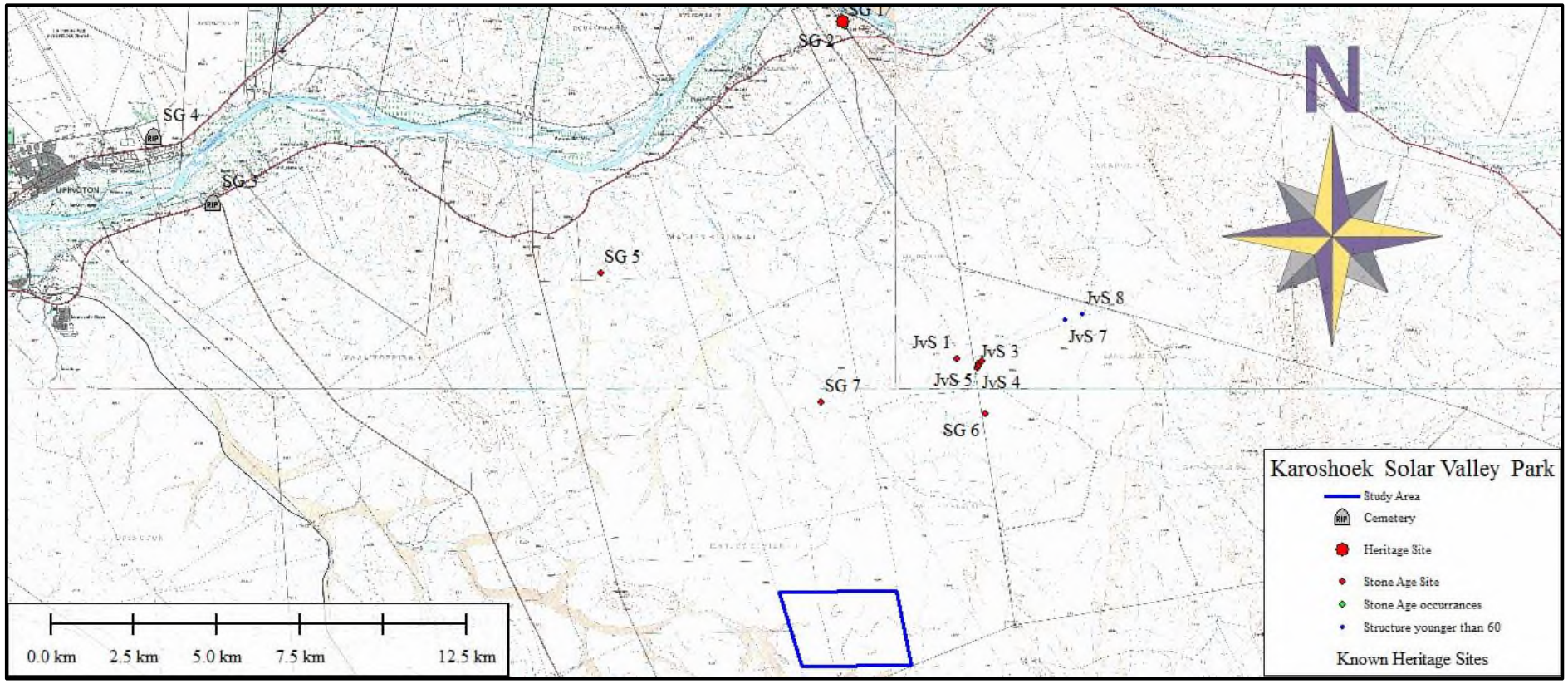

Figure 2: Site distribution map.

Figure 3. Google image of the Ilanga CSP 4 Facility study area.

Figure 4. General Site conditions

Figure 5. Site conditions in the Ilanga CSP 4 study area.

Figure 6. Range of raw materials and isolated MSA and LSA flakes.

Table 1: Identified heritage features with Coordinates

Site Number	Recorded by:	Type Site	Cultural Markers	Coordinate (accuracy 4 -8 meters)
Site 1	vd Walt (2014) and van Schalkwyk (2011)	Late Stone Age	Seasonal pans with flakes	S28.49389 E21.51799
SG 1	Gaigher (2012)	Stone Age	Scattered MSA/LSA flakes	S28.40118 E21.48513
SG 2	Gaigher (2012)	Historical	Porcelain	S28.40118 E21.48513
SG 3	Gaigher (2012)	Cemetery	Headstones etc.	S28.45036 E21.31508
SG 4	Gaigher (2012)	Cemetery	Headstones etc.	S28.43233 E21.29913
SG 5	Gaigher (2012)	Late Stone Age	Flakes	S28.46904° E21.41985°
SG 6	Gaigher (2012)	Middle Stone Age	Flakes	S28.50682° E21.52352°
SG 7	Gaigher (2012	Later Stone Age	Flakes	S28.50373° E21.47926°
JvS 1	van Schalkwyk (2011)	Late Stone Age	Flakes and cores	S28.49227 E21.51588
JvS 3	van Schalkwyk (2011)	Late Stone Age	Flakes and cores	S28.49464 E21.52133
JvS 4	van Schalkwyk (2011)	Late Stone Age	Flakes and cores	S28.49395 E21.52172
JvS 5	van Schalkwyk (2011)	Late Stone Age	Flakes and cores	S28.49341 E21.52184
JvS 6	van Schalkwyk (2011)	Late Stone Age	Flakes and cores	S28.49263 E21.52279
JvS 7	van Schalkwyk (2011)	Recent	Clay brick dwellings	S28.48176 E21.54503
JvS 8	van Schalkwyk (2011)	Recent	Clay brick dwellings	S28.48010 E21.54974

6.3. Impact evaluation of the proposed project on heritage resources

Ilanga 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	Regional (4)	Regional (4)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (4)	Low (3)
Probability	Not probable (2)	Not Probable (2)
Significance	**26 (Low)**	**24 (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:
The sites will not be impacted as per the current layout and will be preserved. It has also been recorded in this report. It is recommended that the impact area should be subjected to a walk down prior to construction and if any sites are identified that are of significance these sites can be preserved or mitigated.

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 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 CSP 4 Facility is located has been subjected to various heritage and archaeological assessments (Gaigher 2012, van Schalkwyk 2011 and van der Walt 2014). Providing a good baseline of the archaeology expected within the footprint of Ilanga CSP4 site.

From these studies widely dispersed individual scatters of stone tools are known to occur in the larger study area. Artefact density at these scatters are so low that they do not represent individual sites but rather background scatter or find spots. However several stone age sites do occur in the larger area. The sites consist of a LSA artefact scatter around depressions that contain seasonal water and stream bed margins that was utilised in the past.

The proposed Ilanga CSP 4 facility was assessed at a desktop level informed by fieldwork and previous surveys of the area (Van Schalkwyk 2011, Gaigher 2012, Van der Walt 2014). The impacts to heritage resources by the proposed development are not considered to be highly significant if the following recommendations are implemented:

- Shallow pans and depressions that contain seasonal water could be archaeologically significant and should be avoided.
- It is recommended that the impact area should be subjected to a walk down prior to construction and if any sites are identified that are of significance these sites can be preserved or mitigated.

If these recommendations area adhered to, HCAC is of the opinion that from an archaeological point of view the project is viable as potential impacts to heritage resources by the proposed development could be mitigated prior to construction.

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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