

INTEGRATED HERITAGE IMPACT ASSESSMENT IN TERMS OF SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT, 1999 (ACT 25 OF 1999)

PROPOSED DEVELOPMENT OF THE **AMDA ALPHA PV** (SOLAR ENERGY FACILITY) ON PORTION 1 OF N'ROUGAS ZUID NO 121, STRAUSSHEIM AS WELL AS OVERHEAD POWER LINE GRID CONNECTION TO THE ESKOM NIEUWEHOOP MTS SUB-STATION ACROSS PORTION 3 OF GEMSBOK BULT NO120, KENHARDT DISTRICT, NORTHERN CAPE PROVINCE



On behalf of: AMDA Alpha (Pty) Ltd

September 2016

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REFERENCES and ACKNOWLEDGEMENTS:

1. Cape Town Archives
2. Surveyor General Office
3. Draft Scoping Report, Cape Environmental Assessment Practitioners (Pty) Ltd, 7th March 2016
4. Visual Impact Assessment: The Proposed AMDA Strausheim Alpha PV, Northern Cape Province , VRM Africa, April 2016

5. Phase 1a Archaeological Impact Assessment: Proposed development of the AMDA Alpha PV (Solar Energy Facility) on Portion 1 of N'Rougas Zuid No 121, Strausheim, and Overhead Power Line Grid Connection to the Eskom Nieuwehoop MTS Sub-Station across Portion 3 of Gemsbok Bult No120, Kenhardt Registration Division, Northern Cape Province, Dr. Peter Nilssen, July 2016
6. Recommended Exemption from further Palaeontological Studies: Proposed AMDA Alpha Solar PV Development on Portion 1 of N'Rougas Zuid No 121, Kenhardt Registration Division, Northern Cape, Natura Viva, May 2016

ABBREVIATIONS:

1. NGSI - National Geo-Spatial Information, Department of Rural Development and Land Reform, Mowbray
2. DEA – Department of Environmental Affairs
3. HIA – Heritage Impact Assessment
4. NHRA - National Heritage Resources Act, 1999 (Act 25 of 1999)
5. SAHRA - South African Heritage Resources Agency

COVER: Extract from Imperial Mapping No. 123 (1900-1919) (Source: National Geo-Spatial Information, Department of Rural Development and Land Reform, Mowbray).

1. INTRODUCTION

PERCEPTION Planning was appointed by AMDA Alpha (Pty) Ltd to undertake an Integrated Heritage Impact Assessment (HIA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999) as part of a proposal to establish a commercial solar energy facility as well as associated grid connection - to be referred to as AMDA Alpha PV - on portions of the following cadastral land units:

Solar Energy Facility: Portion 1 of N'Rougas Zuid No 121, situated in the District of Kenhardt, Northern Cape Province, measuring 5,232.8138 ha, registered to Wilcaris (Pty) Ltd and held under title deed T3435/2011.

Grid connection: Portion 3 of Gemsbokbult 120, situated in the District of Kenhardt, Northern Cape Province, measuring 5,011.4384 ha, registered to Kamkuip Boerdery (Pty) Ltd and held under title deed T102836/1999.

This report serves as an Integrated Heritage Impact Assessment (HIA) and includes inputs from the following specialist reports sanctioned as part of the HIA:

- Basic archival background research (Perception Planning, S. de Kock);
- Archaeological Impact Assessment (Dr. P. Nilssen);
- Palaeontological specialist assessment: Exemption (Natura Viva, Dr. J. Almond);
- Visual Impact Statement (Visual Resource Management Africa CC, Stephen Stead).

2. INDEPENDENCE OF ASSESSOR

With relation to the author's appointment as an independent specialist responsible for the compilation of an Integrated Heritage Impact Assessment in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999) for this project, it is hereby declared that the undersigned:

- Acts as an independent specialist in this application;
- Regards the information contained in this report as it relates to my specialist input/study to be true and correct;
- Does not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- Have and will not have any vested interest in the proposed activity proceeding;
- Have disclosed, to the applicant, EAP and competent authority, any material information that have or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- Is fully aware of and meet the responsibilities in terms of NEMA, the Environmental Impact Assessment Regulations, 2014 (specifically in terms of regulation 13 of GN No. R. 982) and any specific environmental management Act, and that failure to comply with these requirements may constitute and result in disqualification;
- Is aware that a false declaration is an offence in terms of regulation 48 of GN No. R. 982.

It is further hereby certified that the author has 19 years professional experience as urban planner (3 years of which were abroad) and 10 years professional experience as professional heritage practitioner. The author is professionally registered/ affiliated as follows:

- Professional Heritage Practitioner (Association for Professional Heritage Practitioners)
- Professional Planner (South African Council for Planners, South African Planning Institute)
- ExCo: International Council for Monuments and Sites (ICOMOS) South Africa

3. METHODOLOGY

As part of the compilation of this Integrated HIA report the site and its environs was studied, visited, photographed and assessed, which more specifically involved the following (for broad overview of HIA process refer to explanatory flow diagram below):

- Field work carried out by Dr. Peter Nilssen 24th to 27th April 2016;
- Liaising with project manager, environmental consultant and various specialist consultants;
- Assimilating findings and recommendations emanating from specialist inputs into HIA;

- Identification of heritage-related issues and concerns;
- Analysis of development site and its environs;
- Identification of contextual spatial informants;
- Establishing cultural significance, based on criteria set out in NHRA;
- Identification of heritage-related design informants based on the above;
- Focused public participation process to be coordinated as part of Environmental Impact Assessment facilitated by Cape Environmental Impact Assessment Practitioners (Pty) Ltd (CapeEAPrac);
- Assess conformity of final proposed site layout to design informants identified;
- Submission to competent authorities (SAHRA and Ngwao Boswa Kapa Bokoni) via SAHRIS.

4. DESCRIPTION OF STUDY AREA¹

The entire property is 5,232.8138 ha in extent, while the initial study area is 900 ha and the development lease area is approximately 250 ha in extent. The proposed development forms part of the Portion 1 of N'Rougas Zuid No 121, situated in the District of Kenhardt, Northern Cape Province and is situated approximately 28 km north north-east of the town of Kenhardt as seen in Figure 1 below. The proposed grid connection from the AMDA Alpha SEF to the Eskom Nieuwehoop MTS sub-station will traverse Portion 3 of Gembok Bult No 120.

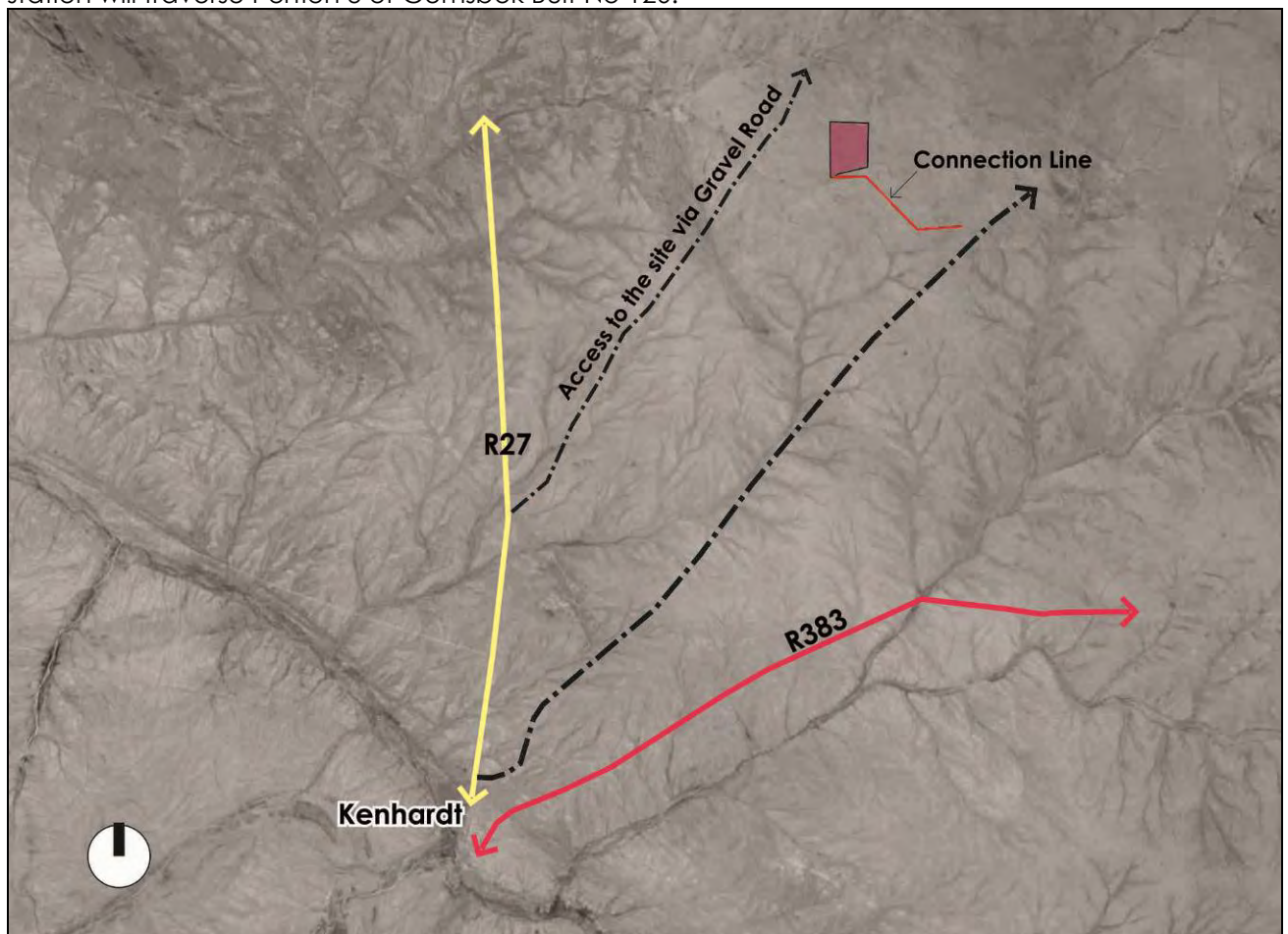


Figure 1: Location of property and proposed site in relation to Kenhardt and direct environs (Source: GoogleEarth, 2015)

While the terrain is essentially flat with minor undulation in places, there are distinct high lying areas as well as low "hills" that consist mainly of quartz outcrops. The most prominent high point in the study area is a low hill with a quartz outcrop at its peak, which is situated at the central meeting point of the AMDA Alpha, AMDA Bravo and AMDA Charlie study areas. Although variations in elevation are seemingly insignificant, it appears that the higher lying areas were preferred points of human activity in prehistoric times. Several small intermittent streams are present that drain to the West and North West, and which are clearly visible in Google Earth imagery (Figure 2). A few small pans, some still

¹ Transposed from Nilssen, P (July 2016)

containing water after recent rains at the time of conducting the field work for this assessment, occur mostly on higher lying areas.

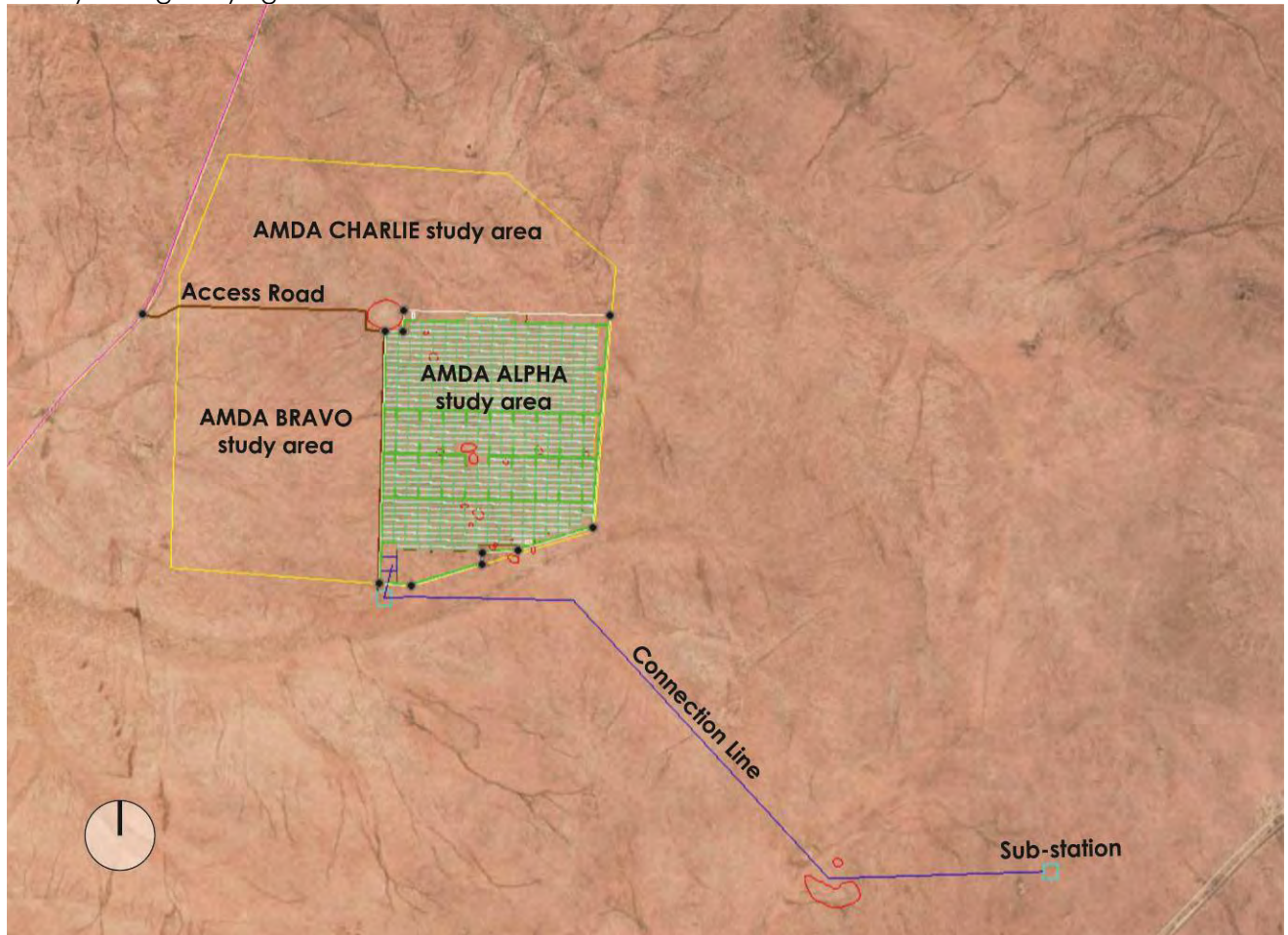


Figure 2: Provisional development layout on the affected properties showing PV Areas (solar panels), access road and grid connection route options. Detailed Development layout is attached hereto as Annexure 1.

In addition to quartz outcrops, a few other low rocky outcrops also occur, and according to geological maps, these are associated with the Namaqua and Natal Metamorphic Provinces, but may also include the Kalahari or Vanrhynsdorp and Nama Groups (Almond & Pether 2009). Some of these outcrops appear to be dolerite while others are of a quartzitic or sandstone nature. Calcrete is also present at the surface in places and occurs both in bedded and nodular form.

Large animal burrows truncate sub-surface calcrete at several localities. Surface sediments are variable across the study area, but generally, finer sediments are more commonly associated with intermittent streams in the low lying areas while coarser, angular to sub-angular fluvial gravels appear more common on slopes and higher ground. What appears to be a coarser version of the orange to red Kalahari or Hutton Sands is dominant, but soft sediments vary somewhat across the landscape.

Overall, vegetation is low, open and sparse, though thicker and higher stands occur along intermittent streams and drainage lines. Vegetation consists of grasses, bush and some thorny scrubs as well as the occasional and mainly isolated specimens of quiver tree (*Aloe dichotoma*).

The surrounding land use is agricultural and undeveloped and is mainly used for the grazing of small domestic stock (sheep) and game animals. Relatively recent human related disturbances to the environment include the gravel road to Louisvale, vehicle and animal tracks, fencing, windmills/boreholes and associated small free-standing dams, watering and feeding troughs for domestic stock, medium and small scale quarrying / borrow pits as well as overhead power lines. Natural disturbances include burrowing by large and small animals. Modest erosion occurs along intermittent streams and several highly polished Middle Stone Age stone artefacts suggest considerable wind erosion (sandblasting) through deep time.

5. DEVELOPMENT PROPOSAL & ALTERNATIVES

According to the information received from *AMDA Alpha (Pty) Ltd and Cape EAprac*, the proposed photovoltaic (PV) SEF will contain a generating capacity of 75 MWAC with an estimated maximum footprint of ± 250 ha. The technology under consideration is photovoltaic (PV) modules mounted on either of fixed or tracking structures. Other infrastructure includes inverter stations, internal electrical reticulation, internal roads, an on-site switching station/ substation, a 132 kV overhead (OH) transmission line, auxiliary buildings, construction laydown areas and perimeter fencing and security infrastructure. The on-site switching station / substation will locate the main power transformer/s that will step up the generated electricity to a suitable voltage level for transmission into the national electricity grid, via the OH line. Auxiliary buildings include, *inter alia*, a control building, offices, warehouses, visitors centre, staff lockers and ablution facilities and gate house and security offices. The most-recent site development plan, which incorporates findings from various environmental- and heritage-related specialist studies, is attached as **Annexure 1**.

5.1 Preferred Layout Alternative

The proposed AMDA Alpha PV Energy Facility is to consist of solar photovoltaic (PV) technology with fixed, single or double axis tracking mounting structures, with a net generation (contracted) capacity of 75MWAC (MegaWatts - Alternating Current) (and up to 90MWDC Direct Current installed/nameplate capacity), as well as associated infrastructure, which will include:

- On-site switching-station / substation;
- Auxiliary buildings (gate-house and security, control centre, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Laydown area;
- Overhead electrical transmission line / grid connection (connect to the proposed Sekgame substation);
- Rainwater tanks; and
- Perimeter fencing.

During the pre-application stage a number of project footprints and configurations were considered by the applicant and optimised with input from ecological specialists.

4.2 Preliminary Development Zone

In July 2015 the applicant defined a preliminary development zone for the proposed development. This took into account the terrain and other technical requirements for the development, with limited ecological impact.

4.3 Preferred Project Footprint

Based on the amended development zones defined by the specialist, the preferred project footprint was developed to fall within the Development zone as defined by the ecological specialist.

4.4 Mitigated Project Footprint

On completion of all the specialist baseline assessment, a mitigated project footprint will be developed to avoid any other sensitive features identified.

4.5 The No-Go Alternative

The Status Quo Alternative proposes that the AMDA Alpha PV Energy Facility not go ahead and that the area in proximity to the Niewehoop substation remain undeveloped as it is currently. The land on which the proposed project is proposed is currently vacant. It is currently used for limited cattle grazing activities, however due to a combination of poor soil quality, water scarcity and extreme climatic conditions; it has no potential for irrigated crop cultivation. The area in question is also considered too small to generate noteworthy financial benefit from agricultural activities due to its low carrying capacity. The solar-power generation potential of the Northern Cape area, particularly in proximity to the existing and proposed substations, is significant and will persist should the no-go option be taken.

The 'No-go/Status Quo' alternative will limit the potential associated with the land and the area as a whole for ensuring energy security locally, as well as the meeting of renewable energy targets on a provincial and national scale. Should the 'do-nothing' alternative be considered, the positive

impacts associated with the solar facility (increased revenue for the farmer, economic investment, local employment and generation of electricity from a renewable resource) will not be realised. The no-go alternative is thus not considered a favourable option in light of the benefits associated with the proposed solar facility; however it will be used as a baseline from which to determine the level and significance of potential impacts associated with the proposed solar development during the Impact Assessment phase of the on-going environmental process.

6. Planning Context

A Planning specialist will be appointed in order to consider the planning implications of the proposed facility. The results of the findings of the planning specialist will be presented in the EIR. The following key components will likely take place from a planning perspective.

- A land use change application for the rezoning of approximately 250ha, from Agricultural Zone I to Special Zone, will be lodged at the Kai!Garib Local Municipality, in accordance with the Northern Cape Planning and Development Act (Act 7 of 1998).
- If there are restrictive Title Deed conditions burdening the proposed development, an application for the removal thereof will be lodged at the Government of the Northern Cape Province, Department: Corporate Governance and Traditional Affairs, in accordance with the Removal of Title Deed Restriction Act (Act 84 of 1967).
- Parallel to the rezoning application, a long term lease application will be lodged at the National Department of Agriculture, in accordance with the Subdivision of Agricultural Land Act (Act 70 of 1970).

7. HISTORICAL BACKGROUND

Basic historic background research focussed on primary sources obtained through the Cape Town Archives, Deeds Office, Surveyor General's Office as well as existing research as referenced.

7.1 Basic Pre-Colonial perspectives²

A literature review of previous archaeological and heritage-related work in the surrounding area was conducted in part by using information from the Report Mapping Project of the SAHRA-APM Unit as well as SAHRIS. Most of the reports cited here were downloaded from the SAHRA web site (<http://www.sahra.org.za/sahris/map/reports>). Further pertinent information from related reports was obtained from references cited below.

The Northern Cape Province has a rich and long archaeological record that spans the entire Stone Age, includes a few potential remnants of Iron Age sites further to the east, rock art sites with both engraved and painted rock surfaces, traces of the Anglo-Boer war, indigenous and colonial contact sites and more recent historic occupation and development of the region. A detailed and general account of the history, heritage resources and associated hominin and human behaviours in this portion of South Africa has already been written and is not repeated here (e.g. Küsel and Küsel 2015). Of relevance here is the nature of the archaeological record in the surroundings of the present study area, which give an indication of the type of heritage resources that are expected to occur in the proposed development site.

Overall, there is a widespread, but ephemeral scatter of Stone Age stone artefacts across the landscape that is of low heritage value due to its temporally mixed nature and the absence of faunal, organic and other cultural remains. Higher density scatters of stone artefacts are commonly associated with pans, drainage lines and rocky outcrops or ridges. The entire range of the Stone Age sequence is found in varying proportions of representation, but includes Early Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA) materials. MSA and ESA artefacts are more common than materials of LSA origin. Stone artefact scatters are usually located in areas with exposed gravels, and are less common to absent in areas with sandy surface sediments (Kaplan 2011a, 2011b, 2012a & 2012b, Nilssen 2015, Orton 2011a, 2011b, 2014a & 2014b, Orton & Webley 2013a, Pelsler 2011 and Webley & Halkett 2010 & 2012). Archaeological resources are said to be particularly rare in the surroundings of Kenhardt. A study along the Hartebeest River near Kenhardt, a setting where such resources are expected to be more common, found very few archaeological traces (Morris 2009). This pattern of very low hominin and human occupation of the surrounding

² Nilssen, P, July 2016

environment is almost certainly due to the lack of predictable water sources. Although rock art has been documented in the region, there are no known rock art sites in the immediate surroundings of Kenhardt (Morris 1988, Morris & Beaumont 1994, Orton 2013, Orton & Webley 2012a and Rudner & Rudner 1968).

As in prehistoric times, historic occupation of the surroundings is very scanty, and very large farms result in farmsteads being widely separated in the landscape. The bulk of the farmsteads as well as the majority of structures in the town of Kenhardt, are of recent 20th century origin (Orton 2014a). The only proclaimed heritage site in the surroundings of the present study area is a pioneer house, one of the oldest buildings in Kenhardt, built in 1897, which is a registered Provincial Heritage Site (Orton 2014a).

Overall, a pattern emerges showing that archaeological resources are most commonly clustered around existing and ancient drainage lines, pans, and ridges with rocky outcrops, and that heritage resources are generally absent from flatlands that are some distance from existing or ancient water sources. Further, Stone Age occurrences are more common among gravels as opposed to sandy surface sediments. Based on the findings of the above impact assessments, it is likely to find mainly Stone Age materials in the affected area with lesser potential for the occurrence of historic heritage resources.

Since the bulk of the archaeological record in the immediate surroundings is that of the Stone Age period, a brief overview of the technology associated with the development of archaic and modern humans during this era is given below:

Early Stone Age (ESA) materials including Acheulian hand axes, cleavers and chopping tools that may date from as early as 2.7 million years ago and come to end about 300 000 years ago is the earliest evidence for the tool-making human ancestors occupying this area. Such artefacts are usually found among alluvial gravels. While present, ESA artefacts are fairly rare and are usually found in disturbed or derived contexts where they are mixed with artefacts of more recent Stone Age times.

The **Middle Stone Age (MSA)** starts about 300 000 years ago and the interface between the ESA and MSA is sometimes marked by a stone tool industry known as the Fauresmith, where small hand axes appear to indicate the transition from archaic humans to *Homo sapiens*. In the main, however, MSA stone artefacts are characterised by flake and blade industries where evidence for core preparation - also known as the Levallois technique - is seen on prepared or faceted platforms of flakes and blades. Convergent flakes or points are also one of the markers of the MSA period. Like the ESA specimens, though more numerous, stone artefacts of MSA origin also occur among alluvial and fluvial gravels and are commonly mixed with artefacts of both ESA and Later Stone Age origin. Unfortunately, no other cultural materials or faunal remains are associated with these artefacts when found in exposed contexts.

The **Later Stone Age (LSA)** starts about 40 000 years ago and is characterised by substantial technological improvements over the MSA industries. Advancements on previous technologies and new technologies as well as cultural developments include the widespread occurrence of rock art (cave paintings and rock engravings), decorative objects (ostrich egg shell beads, marine shell pendants and beads, ochre), human burials with grave goods including painted stones, an expanded stone tool kit, microlithic stone tool industries (often associated with composite tools such as bow and arrow hunting), bone tools, tortoise carapace bowls, ostrich egg shell containers, fire making sticks and so on. Due to the non-preservation of organic remains in exposed contexts such as the affected environment, the archaeological traces of the LSA occupants are limited to stone artefacts. While LSA stone artefacts are common in the landscape, they occur in low densities - often in isolation, are sometimes mixed with ESA and MSA specimens and lack organic and cultural remains. As a result, these materials are generally of low scientific value.

7.2 Colonial perspectives³

"The Anglo-Boer War played an important role in the central parts of South Africa leaving many traces of its events. Block houses, battlefields and graves litter the region. Kenhardt only saw a small amount of action. On 25th February 1900 Koos Jooste and Andries de Wet occupied Kenhardt with 12 men. They fired on the town guard when ordered to halt, but eventually took over the town and

³ Nilssen, P, July 2016, et al

locked the town officials in jail for a few days before ordering them to leave town. On 1 March 1900, 200 recruits joined the Boer forces in Kenhardt. They were addressed by Commandant Lucas Steenkamp, after which they went into training. On hearing of the British approach, a group of 130 men under Field Cornet Borrius moved to Rietfontein, 2 km south of Kenhardt, to defend the town from British forces who were on their way to the lower Orange River Valley to suppress the Boers in the area. However, before the arrival of the British, the forces at Kenhardt decided to surrender due to a decision made by a Boer war council in Upington on 20th March to disband the rebel force. By the end of March the 6 week uprising of the Cape Afrikaners in the region had ended.

On 31st March the British reoccupied Kenhardt, stationing a small garrison in the town. After a failed Boer uprising in the North Western Cape, many rebels were detained by the British and, with the jail in Upington totally full by April 1900, more than 100 rebel Boers were detained in a camp outside Kenhardt. As part of a string of executions across the Cape, two Boer rebels, H.L. Jacobs and A.C. Jooste, were executed in Kenhardt by the British on 24 July 1901, on accusations of treason. In January 1902 a British force of about 800 men began gathering at Kenhardt. They left on 10 January to quell the Boer force in Kakamas. On 11 January the battle of Kakamas began and ended with a victory for the Boers when the British departed on 13 January" (Orton 2014a, pages 9 & 10).

7.3 Farms N'Rougas Zuid 121 and Gemsbokbult 120

The farm N'Rougas Zuid was first surveyed during November 1882⁴ at which time it measured 18,335 morgen and 586 square roods (± 15,766ha). During June 1923, portion 1 of the farm (at the time also referred to as "Fairview") was created. The farm N'Rougas Zuid was granted to CPJ Louwrens on 29th June 1891 and portion 1 subdivided/ transferred to A van Wyk Jnr. on 22nd October 1923. The 1923 SG diagram indicates several roads traversing the property and refers to a well, windmill, watering trough, dipping kraal, all of which had been used as common property between adjoining land owners.

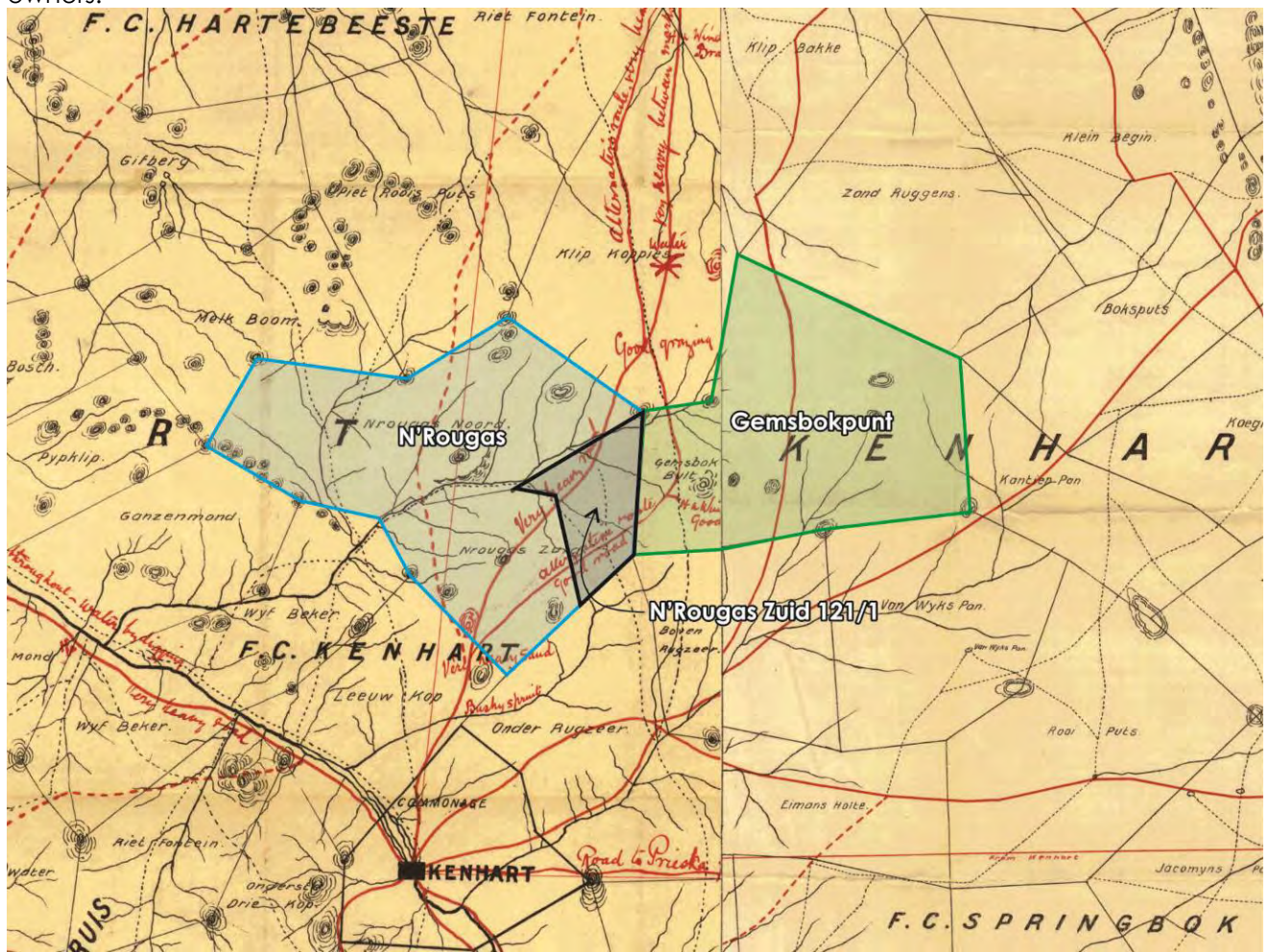


Figure 3: Extract from compilation of Imperial Mapping 123 and 124 (1900-1919) (Source: National Geo-Spatial Information, Department of Rural Development and Land Reform, Mowbray)

⁴ SG Diagram 171/1884

The farm Gemsbokbult 120 was first surveyed during 1884 and measured 40,451 morgen and 517 morgen ($\pm 34,706\text{ha}$). Portion 3 of the farm was subdivided during 1896 and granted to PJ Smit, GJ Malan, JSH Malan, GJ Rossouw, JP Rossouw on 5th November 1892. The 1896 SG diagram highlights several roads traversing the property as well as the location of a "house" close to the southern boundary (outside the proposed development footprint).

While early (1900-1919) SG mapping for the region shows that the main road (as well as alternative road) between Kenhardt and Upington traversed the farm N'Rougas Zuid 121/1, no farmstead or other structures were noted at that time. Mapping for the adjoining farm Gemsbokbult 120/3 shows a windmill as well as an "alternative route" to Upington traversing the westernmost quadrant of the property.

Basic historic background research did not identify or highlight any significant historic or other heritage-related themes, which may be negatively impacted through the proposed development.

8 HERITAGE RESOURCES AND ISSUES

8.1 Landscape Character

8.1.1 Cultural landscape context

The term "cultural landscape" refers to the imprint created on a natural landscape through human habitation and cultivation over an extended period of time. While the Cape has been inhabited for many hundreds of thousands of years (pre-colonial history) prior to Western settlement (colonial history), the nomadic lifestyles of early inhabitants are not always as evident within the landscape as the significant imprints made by humans during the last two – three hundred years and more. Unlike ancient landscapes in parts of the world where environmental conditions allowed more intensive cultivation over periods much longer than locally and allowed natural and cultural components of the landscape to become interwoven, landscape components, the Northern Cape has not yet developed in such a manner. The fact that natural and cultural landscape components in the region are therefore more distinguished means that the cultural landscape is likely to be very vulnerable to the cumulative impact of inappropriate large-scale development.

Ultimately, definition of a cultural landscape can be informed by the following elements, weighed through professional opinion, public values and statutory (legal) framework:

- Natural Landscape
- Public Memory
- Social History
- Historical Architecture
- Palaeontology
- Archaeology

The site may be described as forming part of a typical Northern Cape landscape, defined by flat and wide open spaces overgrown by sparse, low-growing vegetation. From a Pre-Modern perspective, the site formed part of an area mostly used for small stock farming and so, modern man-made features noted on the site include e.g. vehicle tracks, fencing and related infrastructure such as boreholes, small dams, watering and feeding troughs for domestic stock. The proposed development footprint would not affect the existing (modern) built environment elements. No gravesites or burial grounds were noted during field work.

The site forms part of an arid rural landscape defined by a myriad of farming activities. While relatively flat, the landscape is interspersed with low koppies. Also, approximately 60 km is the highly significant cultural landscapes along the Orange River. From a broad, regional perspective the cultural landscape is considered highly complex and potentially significant in terms of pre-colonial as well as pre-modern (traditional) landscape patterns.

8.2 Visual Impact Assessment

The Visual Impact Assessment (VRM Africa) considers the anticipated visual impacts likely to be associated with the proposal and assesses the implications of the possible development alternatives as outlined in Section 5 above. This report is attached as **Annexure 2** to this Integrated HIA.

Visual Absorption Capacity

The VAC of the site is rated low. This is due to the very flat nature of the terrain with limited vegetation or built environment, within the Bushmanland Arid Grassland landscape. The existing Eskom

substation and power lines do generate some visual contrast, however, these features are located approximately 4 km to the south of the site and as such do not significantly increase the capacity of the site to visually absorb the proposed PV landscape modifications.

Project Visibility

The viewshed generated from 4 corner points of the proposed project area is defined as local in extent. The 2km buffer distance area depicts a full coverage, with fragmentation of views starting in the medium to high distance where the viewshed is restricted to the southeast. Beyond the 6km distance, larger fragmentation takes place but only to the north. Beyond the 12km distance, partial views could take place from the west but only on higher ground locations.

Project Exposure

The receptor exposure to the proposed landscape modification is defined as medium. Although the Kenhardt – Louisvale road is located within the 2km high exposure distance zone, the area is very remote as the road predominantly services isolated farms in the areas, and as such moderates the exposure.

Scenic Quality

The Scenic Quality rating for the Bushmanland landscape is rated Medium to Low. Landform is rated low as it has few interesting landscape features. Vegetation is rated medium, as some Quiver Trees (*Aloe dichotoma*) were located on site and are a protected plant species (subject to Botanical Specialist findings). Water was absent but evident in the few shallow washes found on the site. Colours are grey-browns from the vegetation with the sandy soils being a lighter brown in colour. The subtle colour variations of the browns added some value to the site landscape. Adjacent scenery was rated medium to high due to the open and wide views of the Bushmanland Arid Grassland landscape. The routing is moderated by the adjacent scenery with the Eskom substation and power lines located within the foreground/ middle ground area. Scarcity was rated low as, although interesting in its setting, the landscape is fairly common within the region. Cultural modifications include farm tracks and fences, and agricultural reservoirs that neither added nor detracted from the site sense of place.

Receptor Sensitivity

Receptor Sensitivity to landscape change was rated Low. The types of users are predominately agricultural with no evidence of tourism, and as such are rated low. The Amount of Use and Public Interest is rated low as the location is remote and results in very little public usage. Adjacent users are mainly agricultural who will continue with their existing landuses. The area is not defined as a Special Area and as such is rated low.

Conclusion

It is the recommendation of this visual assessment that the proposed Strausheim Alpha PV development should be authorised. Without mitigation the Visual Significance for all phases of development is likely to be medium. With mitigation, the Visual Significance for all phases is likely to be low. Although the VAC level of the Bushmanland Arid Grassland landscape is low, the location is remote and receptor sensitivity to landscape change is likely to be low. The flat terrain of the surrounding areas does increase the viewshed, but the limited height of the PV structures, and small visual footprint of the monopoles, is likely to contain the zone of visual influence to within a local level. The site scenic quality is rated medium, but does not comprise a significant feature in the overall landscape. Cumulative Effects could arise from the combined visual massing of all the proposed PV power lines converging on the Eskom Nieuwehoop substation. If not effectively integrated by the different projects, congestion could take place. However, due to the remoteness of the locality, the visual significance of the cumulative effects across all phases without mitigation is rated Low, which can be reduced to Very-Low with mitigation.

8.3 Archaeology

This section provides an archaeological assessment prepared and compiled by Dr Peter Nilssen as attached as **Annexure 3** to this Integrated HIA.

The proposed development activities will involve area and linear developments that could have a permanent negative impact on archaeological resources. Direct negative impacts on

archaeological resources will occur during the construction and installation phase. Indirect and cumulative impacts will occur during the operational phase and as a result of other potential future developments in the surrounding area.

Earlier heritage related work in the area concludes that archaeological resources are particularly rare in the surroundings of Kenhardt. Overall, archaeological materials are most commonly clustered around existing and ancient drainage lines, pans, and ridges with rocky outcrops, and are generally absent from flatlands removed from existing or ancient water sources. Based on the findings of previous investigations, it was expected to find mainly Stone Age materials in the affected area with lesser potential for the occurrence of historic heritage resources.

While a very ephemeral background scatter of temporally mixed Stone Age stone artefacts was identified in the study areas, these are considered to be of low significance and require no further investigation or mitigation. Their disturbance or destruction will not have a negative impact on the heritage value of the area. No archaeological resources were seen in animal burrows, so it is unlikely that significant archaeological sites are currently buried beneath surface sediments.

A damaged and disturbed pan site with a few Stone Age implements was identified along the grid connection corridor. This site is considered to be of low significance and its disturbance or destruction will not detract from the heritage value of the area. No further investigation or mitigation of this locality is required.

Several Stone Age quartz quarry sites were documented. Although these sites contain temporally mixed Stone Age materials and preserve no faunal, organic or other cultural materials, some are considered to represent fine examples of Stone Age quarrying of quartz in prehistoric times for the manufacture of stone tools. With increased alternative energy and a variety of other developments in the Northern Cape, it is possible that the cumulative impact of such developments in the area could obliterate these types of archaeological resources. It is recommended, therefore, that four of these sites be conserved in perpetuity as part of the National Estate and for potential future research. This recommendation was accepted by the applicant as is reflected in the avoidance of the fore mentioned sites in the revised development layout plans. In lieu of such protection and conservation, it is further recommended that the remainder of these quarry sites do not require sampling and that, because they were adequately recorded during this investigation and are considered to be of low significance, permits are not required for their disturbance or destruction.

The proposed development will involve construction and installation activities that will have a permanent negative impact on archaeological resources identified in this study. However, a representative sample of the archaeological resources will be conserved and the remainder are considered to be of low significance, and therefore, their destruction will not have a negative impact on the heritage value of the area.

From an archaeological perspective, provided that the below recommendations are considered and/or implemented, there are no fatal flaws, and therefore, there are no objections to the authorization of the proposed development of the AMDA Alpha SEF and associated on-site collector sub-station, overhead power line grid connection and access road. The positive impact of the development is that it will allow for the conservation of archaeological resources that may otherwise have been overlooked or destroyed.

Recommended Mitigation Measures

Four of the Stone Age quartz quarry sites identified in the AMDA Alpha SEF PV area and grid connection corridor was selected for protection and conservation in perpetuity. These include sites at waypoints 122A, 136, 140 and 130 & 131 (See Figures 4 and 5 below). A temporary fence should be erected around these sites in the presence of an archaeologist prior to the construction phase of development to ensure that they are not damaged or destroyed. Such management measures should be included in the Construction and Operational Environmental Management Plan for the development. Given the fore-mentioned conservation measures, the likely disturbance or destruction of the remaining quarry sites will have a negligible negative impact on the heritage value of the area. It is further recommended that the remainder of these quarry sites do not require sampling and that, because they were adequately recorded during this investigation and are

considered to be of low significance, permits are not required for their disturbance or destruction. The latter suggestion may require SAHRA's formal approval.

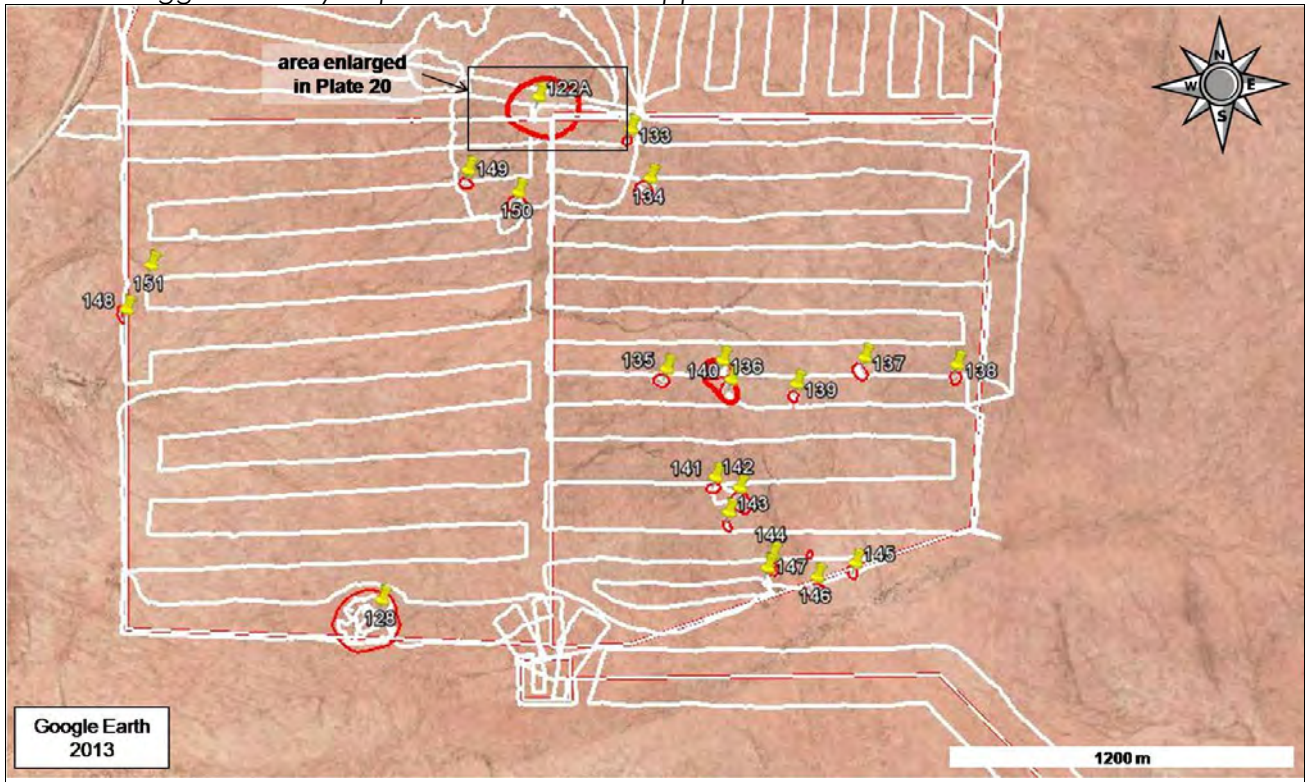


Figure 4: Archaeological survey walk tracks (white lines) and archaeological sites (labelled red polygons). Bold red polygons indicate sites selected for conservation (waypoints 122A, 136 & 14) (Nilssen, P, 2016)



Figure 5: Red polygon at waypoints 130 & 131 indicates area of Stone Age quartz quarry site selected for conservation (Nilssen, P, 2016)

Although unlikely, the presence of sub-surface archaeological resources cannot be ruled out entirely, it is recommended that the Environmental Management Plan for the construction phase of development makes provision for archaeological training of the appointed Environmental Control Officer (ECO). This will allow for the ECO to recognise archaeological remains if they are exposed during construction, and to alert the authorities or a suitably accredited archaeologist, who should

be called to site to assess the finds and to determine mitigation measures if necessary. Such work will be at the expense of the developer.

Required Mitigation Measures:

In the event that excavations and earthmoving activities expose significant archaeological or heritage resources, such activities must stop and SAHRA must be notified immediately. Such resources must be handled in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer.

In the event of exposing human remains during construction, the matter will fall into the domain of the South African Heritage Resources Agency and will require a professional archaeologist to undertake mitigation if needed. Such work will also be at the expense of the developer.

8.4 Palaeontology

The Recommended Exemption from further Palaeontological Studies, compiled by Dr. John Almond, is attached as **Annexure 4** and summarised below with permission from the author. Kindly refer to specialist's full report and findings.

"It is recommended that, pending the discovery of substantial new fossils remains during construction of the proposed solar energy facility and of the associated 132 kV transmission lines, exemption from further specialist palaeontological studies and mitigation be granted for this project.

Should any substantial fossil remains (e.g. mammalian bones and teeth) be encountered during construction, these should be safeguarded, preferably in situ, and reported by the ECO to the South African Heritage Resources Authority, as soon as possible (SAHRA contact details: P.O. Box 4637, Cape Town 8000. Tel: 021 462 4502. This is to ensure that appropriate mitigation action can be taken by a professional palaeontologist, at the developer's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a professional palaeontologist. These recommendations should be incorporated into the Environmental Management Plan for the proposed solar energy facility.⁵"

8.5 Eco-tourism⁶

One of the goals of ecotourism is to offer tourists insight into the impact of human beings on the environment, and to foster a greater appreciation of our natural habitats and from an economic perspective, heritage resources may prove to be valuable resources when used in sustainable manner through eco-tourism. This may for example include investment in adaptive reuse of historic buildings so as to conserve and enhance the unique character and historic themes pertinent to this area. Heritage tourism can therefore serve as a driver for economic development, including infrastructure development and poverty alleviation through job creation. The broader region's rich archaeological, palaeontological, historical and natural heritage has the potential to provide unique tourism opportunities when developed and used in responsible and sustainable ways.

Given the location as well as pattern of existing land use within the proximity of the site and furthermore, the relative low density of heritage resources considered of cultural significance noted as part of this assessment, we do not consider that the proposed development would offer significant heritage-related eco-tourism opportunities associated with the development site.

9 HERITAGE INFORMANTS AND INDICATORS

According to the requirements of Section 38(3) of the NHRA, land use planning and EIA processes must be informed by and incorporate heritage informants and indicators. It is the purpose of this Section to define heritage informants and indicators pertaining to the way in which heritage

⁵ Almond, J. May 2016

⁶ Section included in accordance with requirements set by National Department of Environmental Affairs

resources must be incorporated into the overall layout and design of the proposed development as read in conjunction with preceding Sections.

Cultural landscape issues

From a regional and natural landscape perspective, the proposed development site forms part of a highly-transformed landscape altered through farming activities as well as high concentration of, and proposals for, development of several renewable energy (solar) facilities. While the proposal would relate to a landscape modification, we do not consider that it would alter any natural or cultural landscape of cultural significance.

Visual-spatial issues

The detailed mitigation measures put forward in Section 6 of the Visual Impact Assessment shall be adhered to.

Archaeology

The mitigation measures put forward in the Archaeological Impact Assessment, and summarised in Section 8.3 of this report, shall be adhered to.

Palaeontology

While no further specialist palaeontological studies or monitoring are recommended at this stage, the mitigation measures put forward in Section 8.4 of this report shall be adhered to in order to safeguard chance fossil finds on site during the construction phase of the development.

10 PUBLIC PARTICIPATION

Due to the fact that there are no known local heritage conservation bodies in the Kathu area (registered as such with the relevant provincial heritage resources authority in terms of Section 25 of the National Heritage Resources Act, 1999 (Act 25 of 1999)), the Public Participation Process (PPP) for this HIA will be coordinated with that of the EIA Process facilitated by Cape EAPrac in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), so as to solicit possible heritage-related comments with relation to the proposed development.

11 LIMITATIONS AND ASSUMPTIONS

This report is limited to the assessment of the potential impact of the proposed facility on heritage resources found on/ within the proximity of the development site as defined in this report. There is a limitation in terms of understanding the cumulative impacts of the project when taken in conjunction with other similar future development projects in the surrounding area.

12 RECOMMENDATION

Having regard to the above assessment, it is recommended that:

- 12.1 This report fulfils the requirements of an Integrated Heritage Impact Assessment (HIA);
- 12.2 That the recommendations below be incorporated into the proposed development and that the Department of Environmental Affairs be informed accordingly:

Recommended Conditions of Approval	
VS-1	The detailed mitigation measures put forward in Section 6 of the Visual Impact Assessment shall be adhered to.
AIA-1	Four of the Stone Age quartz quarry sites identified in the AMDA Alpha SEF PV area and grid connection corridor was selected for protection and conservation in perpetuity. These include sites at waypoints 122A, 136, 140 and 130 & 131 (See Figures 4 and 5 below). A temporary fence should be erected around these sites in the presence of an archaeologist prior to the construction phase of development to ensure that they are not damaged or destroyed. Such management measures should be included in the Construction and Operational Environmental Management Plan for the development.
AIA-2	The Environmental Management Plan for the construction phase of development shall make provision for archaeological training of the appointed Environmental Control Officer (ECO). This will allow for the ECO to recognise archaeological remains if they are exposed during construction, and

	to alert the authorities or a suitably accredited archaeologist, who should be called to site to assess the finds and to determine mitigation measures if necessary. Such work will be at the expense of the developer.
AIA-3	In the event that excavations and earthmoving activities expose significant archaeological or heritage resources, such activities must stop and SAHRA must be notified immediately.
AIA-4	If significant archaeological or heritage resources are exposed during construction activities, then they must be dealt with in accordance with the National Heritage Resources Act (No. 25 of 1999) and at the expense of the developer.
AIA-5	In the event of exposing human remains during construction, the matter will fall into the domain of the South African Heritage Resources Agency and will require a professional archaeologist to undertake mitigation if needed. Such work will also be at the expense of the developer.
PIA-1	Should any substantial fossil remains (e.g. mammalian bones and teeth) be encountered during construction, these should be safeguarded, preferably in situ, and reported by the ECO to the South African Heritage Resources Authority, as soon as possible (SAHRA contact details: P.O. Box 4637, Cape Town 8000. Tel: 021 462 4502. This is to ensure that appropriate mitigation action can be taken by a professional palaeontologist, at the developer's expense. Mitigation would normally involve the scientific recording and judicious sampling or collection of fossil material as well as associated geological data (e.g. stratigraphy, sedimentology, taphonomy) by a professional palaeontologist. These recommendations should be incorporated into the Environmental Management Plan for the proposed solar energy facility.

PERCEPTION Planning
13th September 2016

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