Heritage Impact Assessment and Palaeontological Impact Assessment (Desktop) for a Prospecting Right Application on the Remaining Extent of Portion 1 (Dragoender Put) of the Farm Rietfontein 11; Portion 6 (a Portion of Portion 1) of the Farm Rietfontein 11; Portion 10 (a Portion of Portion 7 - Zoutputs) of the Farm Rietfontein 11; Remaining Extent of Portion 14 (a Portion of Portion 8) of the Farm Rietfontein 11; Portion 17 (a Portion of Portion 1) of the Farm Rietfontein 11; Portion 18 (a Portion of Portion 1) of the Farm Rietfontein 11; Portion 19 (a Portion of Portion 1) of the Farm Rietfontein 11; Portion 23 (a Portion of Portion 1) of the Farm Rietfontein 11; Portion 24 (a Portion of Portion 1) of the Farm Rietfontein 11; and Portion 25 (a Portion of Portion 14) of the Farm Rietfontein 11; and Farm 20 near Marydale in the Siyathemba Local Municipality, Northern Cape Province

Prepared by

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(Ph.D. Archaeology &Heritage, MPhil, Archaeology; Uppsala/Sweden)

13 March 2023

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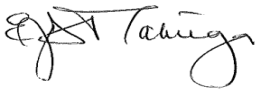
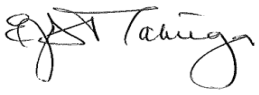
FIELD WORK & REPORT	E. Matenga		11 March 2023

DECLARATION OF INDEPENDENCE

AHSA Pty Ltd is an independent consultancy: We hereby declare that I have no interest, be it business, financial, personal, or other vested interest in the undertaking of the proposed activity, other than remuneration for work performed, in terms of the National Heritage Resources Act (No 25 of 1999).



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EXECUTIVE SUMMARY

1. This Heritage Impact Assessment report has been prepared in support of a mine prospecting right application on several subdivisions of the farm Rietfontein 11 and Farm 20, 4 737.5 Ha in extent, on the northern outskirts of Marydale in the Siyathemba Local Municipality, Northern Cape Province. The report is based on a literature survey undertaken to provide baseline information on the heritage sensitivity of the property.

2. *General observations*

The desktop assessment confirms the presence of Stone Age material on the plains, ridges and valleys of the upper Karroo area north and south of the Orange-Vaal basin. The material comprises scrapers, blades, cores and flakes typologically dating to the Middle Stone Age/Late Stone Age period. Early Stone Age material has been encountered in places evidenced by occasional occurrences of hand-axes and cleavers. This leads us to the conclusion that on the properties under study, we are not likely to encounter a fundamental deviation from this scenario. The scattered distribution pattern seems to suggest general hunter-gatherer activity in the region known as Bushmanland. Rarely have the finds warranted further action such as professional rescue excavations or the issue of a destruction permit from SAHRA.

3. *Other heritage resources that might occur in the broader area*

The following types of heritage resources have also been encountered in the broader region and are therefore flagged:

- Rock engravings (petroglyphs) from the Middle Stone Age to Later Stone Age periods
- Rock Paintings from the Middle Stone Age to Later Stone Age periods
- Buildings and objects associated with modern commercial farming from the 19th century
- Graves, burial grounds and human bones.

4. Postulated heritage sensitivity of the study area

Heritage Impact Assessment studies which have been undertaken in the broader area provide a good theoretical foundation to extrapolate the more likely scenarios on the farms under study. The Table below provides a summary of the probability of occurrence of the different typologies of heritage and a confidence rating of the predictions:

	HERITAGE TYPOLOGY	**PROBABILITY OF OCCURRENCE**	**CONFIDENCE RATING**
1	MSA/LSA	99.99%	High
2	Rock engravings	30%	High
3	Rock paintings	5%	High
4	Early Iron Age / Later Iron Age	1%	High
5	Burial grounds	60%	Medium
6	Farm buildings and structures	75%	High

5. The ranking system in the Table below is adapted with minor modifications from Guidelines for Involving Heritage Specialists in EIA processes by Winter S and & N. Baumann (2005, p19). Graves are given a high priority because of growing public concern about the treatment of human remains in areas under development.

GRADE	RANKING	SIGNIFICANCE	PROBABILITY OF OCCURRENCE	CONFIDENCE RATING
1a	National	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources,	0%	High
1b	Burial grounds	Graves are sacred and their treatment is a sensitive issue.	60%	High
2	Provincial	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential 2 heritage resources	0%	High
3A	Local	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 3A heritage resources	10%	Medium
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources	10%	High
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources	99,99%	High

6. *Chance Finds Procedure (CPF)*

A Heritage Chance Finds Procedure (CFP) will be used to curate heritage resources found during the prospecting activities.

7. *Conclusion and Recommendations*

In light of the findings of the desk assessment, the mine prospecting can go ahead. The Site Manager must refer to the Chance Finds Procedure. The study is mindful that some important discoveries may be made during prospecting. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified for an evaluation of the finds.

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ABBREVIATIONS

CPF	Chance Finds Procedure
EIA	Environmental Impact Assessment
ESA	Early Stone Age
HIA	Heritage Impact Assessment
LSA	Late Stone Age
LIA	Later Iron Age
PHRA	Provincial Heritage Resources Authority
MSA	Middle Stone Age
NEMA	National Environmental Management Act.
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency

1. INTRODUCTION

This Heritage Impact Assessment (HIA) report has been prepared in support of a mine prospecting right application on several portions of the farm Rietfontein 11 (as referenced in the title of this Report), 4 737.5 ha in extent, situated on the northern outskirts of Marydale in the Siyathemba Local Municipality, Northern Cape Province (Figures 1-2). This report fulfils a statutory requirement in terms of Section 38(8) of the National Heritage Resources Act (No 25/1999) to protect heritage resources that may be potentially threatened by development projects. The report is based on an in-depth literature survey undertaken to provide data on potential heritage sensitivity of the area.

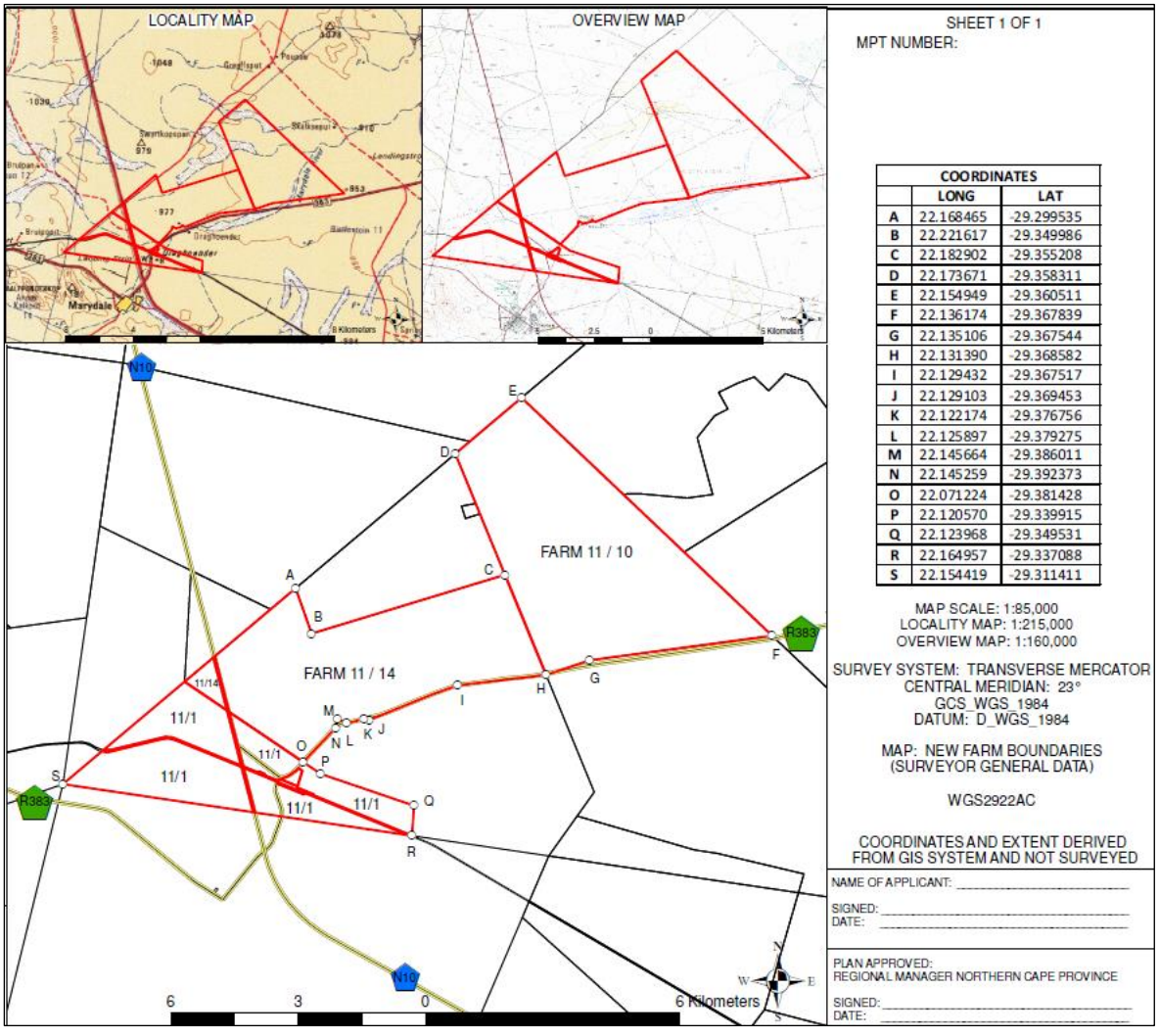

Figure 1: Map showing the location of the subdivisions and cadastral boundaries

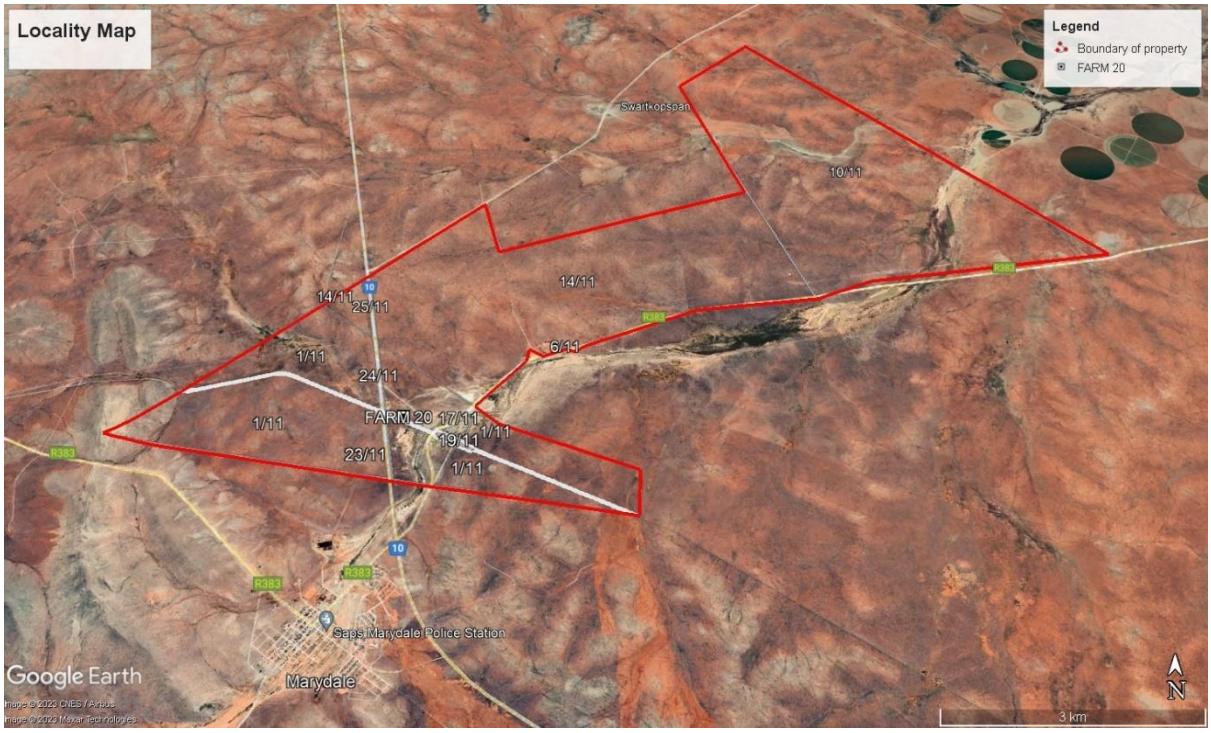

Figure 2: Google Earth map shows the location of the farms Rietfontein 11 and Farm 20 on the outskirts of Marydale

Prospecting for minerals entail the following activities:

- Open excavations and trenches;
- Test pits;
- Drilling;
- Opening of temporary service roads; and
- Location of processing plant.

These activities have potential detrimental impacts on heritage resources if they exist in the footprint of the proposed exploration.

2. DESCRIPTION OF THE RECEIVING ENVIRONMENT

The target area for the prospecting right application consists of several subdivisions of the farms Rietfontein 11 and Farm 20, 4 737.5 ha in extent, on the outskirts Marydale, being 1.3 km at the shortest distance from the limits of the town. The area is situated on the Karoo plain 7 km west of the Orange River. The area is drained by the Marydale River which takes a northeasterly course through the town to a confluence with the Orange River. West of Marydale, the plain is interrupted by hills and ridges. In other areas in the broader region

examined by the author, the superficial geology shows red-brown gravels, which have been characterised as deflated gravels, derived from primary fluvial gravels generally dating to the Miocene age. These fluvial gravels were deflated and lost their original thicknesses as eluvial (derived by in situ weathering) and collegial processes continued. The reddish colour arises from iron staining of the deposits due to oxidation. Vegetation is sparse Karoo scrub and occasional Acacia karoo trees found with increasing density along ephemeral channels with beds filled with sand.

3. LEGAL FRAMEWORK

This study fulfils an onus on developers to safeguard heritage resources. This obligation is legislated with Sections 34, 35, 36 and 38 of the National Heritage Resources Act (No 25 of 1999) forming the legal framework in which this HIA report has been prepared.

3.1. Section 38 of National Heritage Resources Act on Heritage Impact Assessments

Section 38 of the NHRA states the nature and scale of development which triggers a HIA:

38. *(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—*

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50 m in length;

(c) any development or other activity which will change the character of a site—

(i) exceeding 5 000 m^2 in extent[1]; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in the regulations by SAHRA or a provincial heritage resources authority,

[1] Areal extent of the proposed development triggers the HIA.

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

3.2. Definition of heritage (National Estate)

Section 3 lists a wide range of cultural phenomena which could be defined as heritage, or the *National Estate* (3(2)). Section 3(3) outlines criteria upon which heritage value is ascribed. This Section is useful as a field checklist for the identification of heritage resources.

3.3. Protection of buildings and structures older than 60 years

Section 34 provides automatic protection for buildings and structures more than 60 years old until it can be proven that they do not have heritage value:

(1) No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

3.4. Protection of archaeological sites

Section 35 (4) of the NHRA prohibits the destruction of archaeological, palaeontological and meteorite sites:

No person may, without a permit issued by the responsible heritage resources authority—
(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;
(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

3.5. Graves and burial grounds

Section 36 of the NHRA provides for the protection of certain graves and burial grounds. Graves are generally classified under the following categories:

- Graves younger than 60 years;
- Graves older than 60 years, but younger than 100 years;
- Graves older than 100 years; and
- Graves of victims of conflict
- Graves of individuals of royal descent
- Graves that have been specified as important by the Ministers of Arts and Culture.

Further to the legal prescripts, we are mindful of the fact that graves and burial grounds are held sacred whether they are protected by the law or not.

3.6. The National Environmental Management Act (No 107 of 1998)

The Act regards heritage as being a component of the environment. It states that a survey and evaluation of cultural resources must be done in areas where development projects that will affect the environment will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made. Environmental management is a much broader undertaking to cater for cultural and social needs of people. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

3.7. The Burra Charter on Conservation of Places of Cultural Significance

Generic principles and standards for the protection of heritage resources in South Africa are drawn from international charters and conventions. In particular South Africa has adopted the **ICOMOS Australia Charter for the Conservation of Places of Cultural Significance (the Burra Charter 1999)** as a benchmark for best practice in heritage management.

4. APPROACH AND METHODOLOGY

4.1. Literature study

This study is based on an intensive search through existing literature for data on the heritage sensitivity of the broader area around Marydale. The resort to a desktop assessment was in consideration of the imperative to meet set deadlines, whilst arrangements for access to the properties are being made. Heritage Impact Assessment studies conducted in the broader area are the principal source of information (Figures 4-5). These reports have been carefully selected considering factors such as distance from the target of the present study, and spatial distribution of the reference studies within a radius of c 120 km. Using this information the potential yield of the targeted area could be reasonably predicted by extrapolation. Extrapolation is a scientific method of building a hypothesis by estimating or predicting results by assuming that what is known and has been established about a particular situation is likely to apply more or less for a neighbouring area/quantity that is unknown.

Eleven HIA studies by other researchers provide reference data for this report, and their locations are shown in the Google Earth Map above (Figure 4).

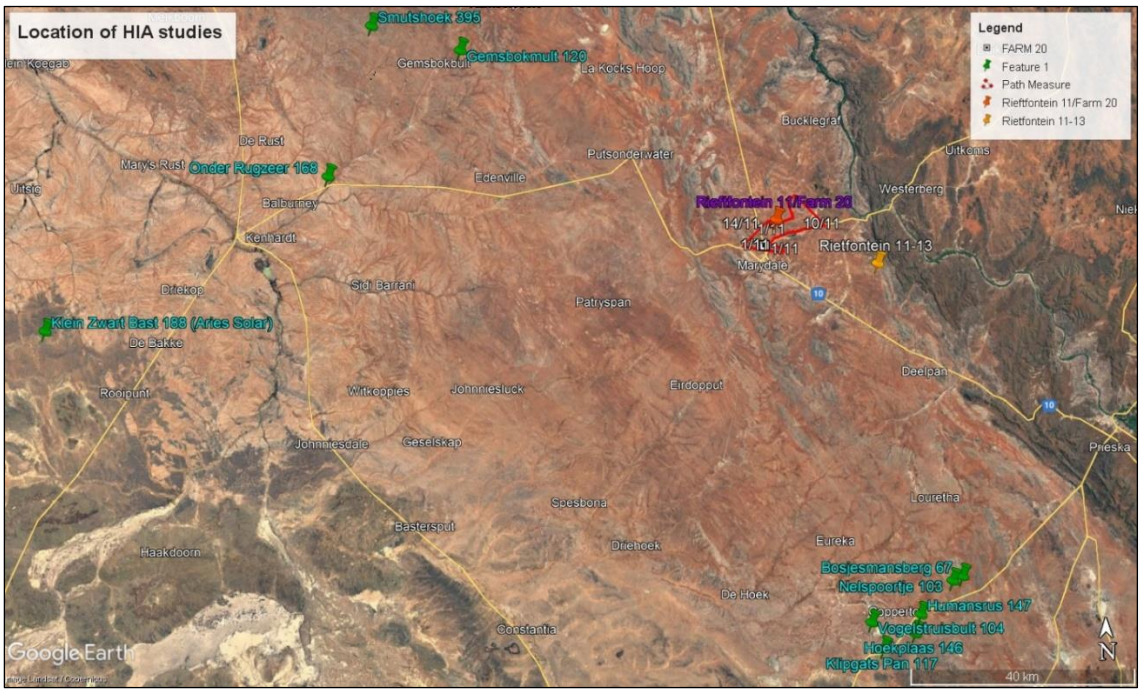

Figure 4: Location of farms where Heritage Impact Assessment studies have been conducted (green icon)

(i) **Webley, L. 2016.** *Archaeological Impact Assessment: Proposed Construction of Humansrus Solar 3 on a Portion of the Farm Humansrus 147 near Copperton, Northern Cape.*

The farm Humansrus 147 is situated 65 km SE of Marydale.

Findings: Occasional scatters of Early Stone Age (ESA) material and widespread, but dispersed scatters of Middle Stone Age (MSA) artefacts across the property. No later Stone Age (LSA) artefacts were found (page 13). No buildings or graves were found (pages 2, 13)

(ii) **Van Der Walt, J. 2014.** *Archaeological Impact Assessment for the proposed Bosjesmansberg PV Center Solar Energy Facility, Located Close to Copperton in the Northern Cape. Prepared for Savannah Environmental (Pty) Ltd*

The farm Bosjesmansberg 67 is situated 65 km SE of Marydale.
Findings: Low density of artefacts dating to the MSA especially around pans. They comprised large flakes, radial and bipolar cores, points, end scrapers, large utilized and retouched blade tools, and utilized and retouched flakes. MSA quarries (manufacturing sites) exploiting quartz outcrops, quartzite ridges, bedrock and boulders were also found. LSA tools (scrapers, retouched and utilised flakes, blades and small round cores) were found in comparatively low density. Several isolated hand axes were recorded suggesting an ESA date (pages 21-22).

(iii) **Orton, J. 2013.** *Heritage Impact Assessment for Multiple Proposed Solar Energy Facilities on Farm Hoekplaas 146, Copperton, Northern Cape*

The farm Hoekplaas is situated 70 km SE of Marydale.

Findings: Material dates to all three ages, ESA, MSA and LSA with the first two being represented more by “background scatters” of artefacts commonly found in gravel areas. Most LSA scatters were found to be located around pans occurring throughout the

landscape. Manufacturing sites were found on quartzite outcrops with evidence of flaking (pages 11-12).

(iv) **Van Der Walt J. 2012**. *Archaeological Impact Assessment for the Revised Garob Wind Energy Facility Project* [on the Farm Nelspoortje 103] *Located Close to Copperton, Northern Cape.*

Garob is located on the farm Nelspoortje 5/103, 68 km SE Marydale.

Findings: Low densities of ESA, MSA, LSA scatters were found throughout the study area. MSA material consisted of large flakes, radial and bipolar, points and end scrapers, large utilised and retouched blade tools, and utilised and retouched flakes. LSA tools (scrapers, retouched and utilised flakes, blades and small round cores) were found in comparatively low density (page 3).

(v) **Orton, J. 2016**. *Heritage Impact Assessment for Four Proposed Borrow Pits On Remainder Of Farm Vogelstruisbult 104/1, Prieska Magisterial District, Northern Cape.*

The Farm Vogelstruisbult 104/1 is situated 66 km SE of Marydale.
Findings: Stone Age quarries (stone tool manufacturing sites), a knapping site (where stone tools were made) and artefact scatters from ESA, MSA, and found in the same context suggests downward deflation (page 66). Stone kraals for penning sheep are in current usage (page 66).

(vi) **Orton, J & Parsons. 2018.** *Looking Beneath the Surface: Later Stone Age Remains at Klipgats Pan, Bushmanland, South Africa.*

The farm Klipgats is situated 72 km SE of Marydale.

Findings: Background-scatter artefacts date to the MSA, but are mixed with Early Stone Age (ESA) handaxes. Excavations revealed a higher density of LSA artefacts (page 194). Engraved ostrich egg sherds (page 187).

(vii) Pelser, A. J. 2011. *A report on an archaeological impact assessment (AIA) for the Proposed Solar Energy Plant on Klein Zwart Bast 188, Kenhardt District, Northern Cape.*

This study was undertaken for the establishment of the Aries Power Plant 80 km from Kenhardt, and 128 km west of Marydale. A number of archaeological sites, features and objects were identified and recorded in the area, dating from the Early to Later Stone Ages, as well as the Historical period. Although some finds were more localized the whole area was covered by scatters of Stone Age artefacts (page 20).

(viii) Orton, J. 2019. *Heritage Impact Assessment: Scoping and Environmental Impact Assessment for the Proposed Development of the Skeerhok PV2 solar energy facility on Gemsbokbult 120/9, Kenhardt Magisterial District, Northern Cape Province.*

The farm Gemsbokbult 120/1 is situated 60 km NW of Marydale. Stone artefacts date ESA, MSA and LSA. Of important significance are LSA sites which are commonly located along the margins of pans. Small rock outcrops were quarried as a source of stone material for making stone tools (page 14).

(ix) Orton, J. 2020. *Heritage Impact Assessment: Proposed Access Road on the Remainder and Portion 4 of the Farm Onder Rugzeer 168, Kenhardt Magisterial District, Northern Cape Province*.

The farm Onder Rugzeer lies 80 km north of Marydale. The survey revealed background scatter stone artefacts to be present all over the study area. Denser scatters of artefacts were rare, but three were noted along Option C. All are of low to very low cultural significance. No graves were seen and the chances of graves occurring are considered to be negligible (page 2).

(x) **Orton, J. 2018a.** *Heritage Impact Assessment: Scoping and Environmental Impact Assessment for the Proposed Development of the Skeerhok PV1 Solar Energy Facility on Smutshoek 395/Remainder, Kenhardt Magisterial District, Northern Cape Province. Unpublished Report Prepared for CSIR – Environmental Management Services. Lakeside: ASHA Consulting (Pty) Ltd.*

(xi) The farm Smutshoek 395/Remainder lies 70 km NW of Marydale. Scatters of artefacts found. Of particular significance are artefacts located on the edge of a pan. In the report 1 rock art site is reported located 9 km south of the Farm Gemsbokbult (page 11).

4.2. Other Heritage Impact Assessment Studies

Over the last seven years this author has conducted many heritage impact assessment studies on the upper Karoo and the Orange – Vaal basin. Six studies are referenced below (see Figure 5 for the location of these studies):

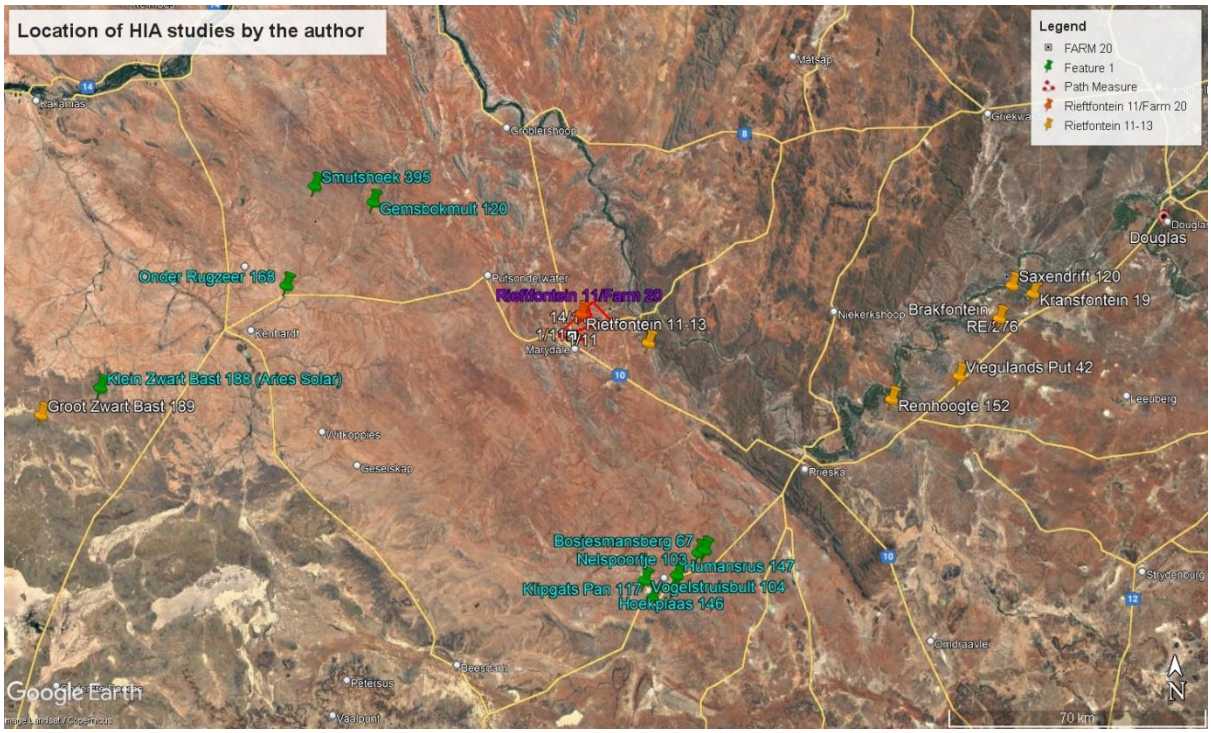

Figure 5: Location of farms surveyed by the author, 2016 – 2022 (orange icon)

(i) **Matenga E. 2019***. Phase I Heritage Impact Assessment (including Palaeontological Assessment) in terms of section 38 of the National Heritage Resources Act (No 25/1999) for the proposed Mine Prospecting on the Remaining extent of Portions 13 and 9 of the of the Farm Rietfontein 11, Prieska District, Northern Cape Province.*

The survey was conducted in 2019 on a portion of the farm Rietfontein 11, 19 km east of properties under study. The environment and terrain characteristics are obviously similar, and the findings thus provide near empirical data shedding important light on the likely heritage sensitivity of the properties under study. Stone tools and associated waste material in varying densities were recorded. The stone tools comprised mainly scrapers, points and flakes while a few blades and cores also occur. The occurrence of a hand-axe confirmed an Early Stone Age footprint in the area. Buildings of the modern era included a 20th century asbestos processing plant.

(ii) **Matenga, E. 2017.** *Phase I Heritage Impact Assessment (including Palaeontological Assessment) in terms of Section 38 of the National Heritage Resources Act (No 25/1999) for the proposed Mine Prospecting on the Remaining Extent of Portion 1 of the Farm Viegulands Put 42, Prieska District, Northern Cape Province*.

The Farm Viegulands Put 42 is located on the south bank of the Orange River 95 km east of Marydale. One of the highlights of the survey was an ESA hand-axe among the finds predominated by chert scrapers, blades and flakes.

(iii) **Matenga, E. 2018.** *Phase I Heritage Impact Assessment (including Palaeontological Assessment) in terms of Section 38 of the National Heritage Resources Act No 25/1999 for the proposed mine prospecting and application for mining right on a portion of the remaining extent of the Farm Kransfontein 19 & portion 2 (de rust) of the Farm Kransfontein 19, Prieska District, northern cape province*

Kransfontein 19 is on the south bank of the Orange River 120 km east of Marydale. MSA/LSA lithics were found to be widely distributed indicating general hunter-gatherer foraging

activities. There were buildings and a burial ground on the property both associated with pioneer commercial farmers.

(iv) **Matenga, E. 2019***. Phase I Heritage impact assessment (including palaeontological assessment) requested in terms of Section 38 of the National Heritage Resources Act No 25/1999 for the proposed Mine Prospecting on a Portion of the Remaining Extent of the Farm Remhoogte 152 Prieska, Northern Cape.*

On the farm Remhoogte 152 located on the south bank of the Orange River 87 km SE of Marydale. MSA/LSA lithics were found to be widely distributed indicating general hunter-gatherer foraging activities.

(v) **Matenga, E. 2022.** Heritage Impact Assessment (including Palaeontological Desk Assessment) for a Mining Right Application on the Remaining Extent of Portion 1 (Paals Werf) of the farm Saxendrift 20, near Prieska, Northern Cape

The farm Saxendrift 20 lies 115 km NE of Marydale. Stone Age tools occurred in all but four of the 24 recorded instances. The finds were dominated by scrapers, while there were a few blades. The two handaxes encountered were recognised as a type tools for the Early Stone Age period.

(vi) **Matenga, E. 2022**. Heritage Impact Assessment (including Palaeontological Desktop Assessment) for a Prospecting Right Application on the Remaining Extent of the Farm Brakfontein 276 near Prieska in the Siyathemba Local Municipality, Northern Cape Province.

Brakfontein is located south of the Orange River 112 km east of Marydale.
Eight (8) out of 12 occurrences recorded were lithics in a rare find of a fine hand-axe probably dating to the transition from the Early Stone Age to the Middle Stone Age.

Matenga, E. 2021*. Phase 1 Heritage Impact Assessment & Palaeontological Desktop Assessment for a Mine Prospecting Right Application on Portion 1, 2 & the Remaining Extent*

of the Farm Drieboom Leegte No 345; Portion 1, 2, 3 and the Remaining Extent of Farm Groot Zwart Bast No 189 and Portions 3, 5 & 8 of the Farm Jagt Kolk No 244 near Kenhardt Town, within the Kai !Garib Municipality, Northern Cape. The properties in reference lie near Kenhardt 142 km west of Marydale.

The properties are situated 80 km SW of Kenhardt and 143 km west of Marydale.
Stone Age material was recorded as "background scatter" comprising scrapers, blades, cores and flakes typologically dating to the Middle Stone Age/Late Stone Age period. Early Stone Age material was encountered during this study exemplified by hand-axes and cleavers.

4.3. General observations

The studies confirm a wide distribution of Stone Age material on the plains, ridges and valleys of the upper Karroo region north and south of the Orange-Vaal basin. The scattered distribution pattern suggests general hunter-gatherer activity in the region. Typically such scattered finds have not warranted further action such as professional rescue excavations or the issue of a destruction permit from SAHRA.

5. ARCHAEOLOGICAL AND HISTORICAL CONTEXT

An outline of the cultural sequence in South Africa provides a theoretical framework for the identification of features / structures and objects of archaeological, historical and cultural interest. As summary of the reconstructed cultural sequence is given below:

5.1. Cultural sequence summary[2]

PERIOD	EPOCH	ASSOCIATED CULTURAL GROUPS	TYPICAL MATERIAL EXPRESSIONS
Early Stone Age 2.5m – 250 000 YCE	Pleistocene	Early Hominids: *Australopithecines* *Homo habilis* *Homo erectus*	Typically large stone tools such as hand axes, choppers and cleavers.

[2] Adapted from Exigo Consultancy. 2015. Frances Baard District Municipality: Proposed Nkandla Extension 2 Township Establishment, Erf 258 Nkandla, Hartswater, Northern Cape Province.

Middle Stone Age 250 000 – 25 000 YCE	Pleistocene	First *Homo sapiens* species	Typically smaller stone tools such as scrapers, blades and points.
Late Stone Age 20 000 BC – present	Pleistocene / Holocene	*Homo sapiens* including San people	Typically small to minute stone tools such as arrow heads, points and bladelets.
Early Iron Age / Early Farmer Period c300 – 900 AD (or earlier)	Holocene	Iron Age Farmers	Typically distinct ceramics, bead ware, iron objects, grinding stones.
Later Iron Age 900ADff	Holocene	Iron Age Farmers, emergence of complex state systems	Typically distinct ceramics, evidence of long distance trade and contacts
(ii) Mapungubwe (K2)	1350AD		Metals including gold, long distance exchanges
(ii) Historical period	Tswana / Sotho, Nguni people	Iron Age Farmers	Stone walls Mfecance / Difaqane
(iii) Colonial period	19th Century	European settlers / farmers / missionaries/ industrialisation	Buildings, Missions, Mines, metals, glass, ceramics

5.2. Appearance of hominids

South Africa has a yielded a very good record of fossil hominids, proto-humans which appeared in South Africa more than 3 million years ago. Three famous sites in Gauteng, Limpopo and Northwest Provinces have been collectively named the Cradle of Humankind and inscribed as a serial UNESCO World Heritage Site.[3] No hominid sites have been reported in the vicinity of the study area.

5.3. The Early Stone Age

The Early Stone Age may date back more than 2 million years. Much of the Karoo in the Northern Cape is covered by gravels from which ESA artefacts have been found. These artefacts are generally very well weathered and have been described as background scatters in that their distribution is conditioned more by geological actions than human actions (Orton

[3] Deacon, J. and N. Lancaster. 1986. *Later Quaternary Palaeo-environments of Southern Africa*. Oxford: Oxford University Press.

2013, p7). A good profile of the Stone Age in the Northern Cape has been reconstructed from many heritage impact assessments that have been conducted in recent years. Locales along and adjacent to the Orange – Vaal River systems have yielded evidence of great interest.[4] Further north the Wonderwerk Cave has become a benchmark for the characterisation of the Stone Age. Excavations reveal a long sequence of occupation spanning the Early (ESA), Middle (MSA) and Later Stone Ages.[5]

5.3.1. Middle Stone Age (MSA) [250 000 yrs – 30 000 yrs BP]

The Middle Stone Age (MSA), dates from 250 000 years to 40 000 years ago, marked by the introduction of a new tool kit which included prepared cores, parallel-sided blades and triangular points hafted to make spears. A number of field surveys have been carried out on the Ghaap Plateau and the Orange-Vaal River basin confirming significant hunter gatherer activity in the area from the MSA onwards.

5.3.2. Later Stone Age (LSA)[40 000 yrs to ca2000 yrs BP]

LSA technology is characterised by microlithic scrapers and segments made from very fine-grained rock. The ephemeral pans in the Northern Cape, also present in the locality of the present study hosted hunter gatherer communities as evidenced by a comparatively high density of LSA lithics found on the edges of these pans.

Rock art, in the form of engravings (petroglyphs), is widely known from the Karoo (Orton 2013, p10) with examples nearest to the study area on the farm Springbokoog 80km to the south, Driekopseiland180km to the ENE), and the farm Katlani 236 (150km ENE). Various subjects are depicted in both stylized and naturalistic motifs including humans and animals.

The upper Karoo region of the Northern Cape is now referred to as Bushmansland in recognition of the strong archaeological and historical footprint of hunter-gatherer communities identified to the San and the Khoikhoi, with a cultural distinction being made between the two as hunter-gatherers and hunter-gatherer pastoralists respectively.

[4] Morris, D. 2009. Phase 1 Archaeological Impact Assessment at Bucklands Settlement near Douglas, Northern Cape, p3.
[5] http://www.southafrica.net/za/en/articles/entry/article-southafrica.net-the-wonderwerk-cave.

5.4. The Iron Age Culture [ca. 2000 years BP]

The Iron Age culture supplanted the Stone Age at least 2000 years ago, associated with the earliest farming communities keeping domestic animals such as cattle, sheep, goat and chickens, and using several metals and pottery (Huffman 2007). The transition to the Iron Age appears to coincide with the spread of Bantu speakers from the north into Southern Africa. Around the beginning of the 2nd millennium, radical changes in the Iron Age culture occurred signifying the transition to the Later Iron Age. Subsequently the Iron Age people built stonewalled settlements present in a large swathe of territory straddling the Northern Cape, Northwest Province, Limpopo Province and the Free State. One such site Dithakong near Kuruman.

5.5. Early Contact with the Boers

In the early 19th century, a number of traders, hunters, explorers and missionaries transited the area. A few can be named here - PJ Truter's and William Somerville (arriving in 1801), Donovan, Burchell and Campbell, and James Read (arriving around 1870). Subsequently, a large number of Great Trek Boers from the Cape Colony and established commercial farms in the area. The came into contact with local people who included the Khoisan, Korana, Tswana and Griqua (Van der Walt 2012).

Prieska was established in 1878. It developed from a place to which farmers migrated when the pans were full, after rains. It was administered by a village management board from 1882 and attained municipal status in 1892. Situated on the south bank of the Orange River at the foot of the Doringberg, it was originally named Prieschap, a Khoisan word meaning "place of the lost she-goat". It is 130 km north-west of Britstown and 75 km south-east of Marydale.[6]

The above forms the archaeological and historical context for the identification of heritage resources in the study area.

[6] Prieska. Found at: https://www.karoo-information.co.za/routes/town/506/prieska#:~:text=Prieska%20was%20established%20in%201878,the%20lost%20she%2Dgoat%22.

6. FINDINGS FROM HERITAGE IMPACT ASSESSMENT STUDIES CARRIED OUT IN THE BROADER AREA

6.1. General observations

The studies confirm a wide distribution of Stone Age material on the plains, ridges and valleys of the upper Karroo area north and south of the Orange-Vaal basin. The material comprises scrapers, blades, cores and flakes typologically dating to the Middle Stone Age/Late Stone Age period. Early Stone Age material has been encountered in places as hand-axes and cleavers. The scattered distribution pattern seems to suggest general hunter-gatherer activity in the region called Bushmanland. Rarely have the findings warranted further action such as professional excavations or the issue of a destruction permit from SAHRA.

6.2. Other heritage resources that might occur in the broader area

The following site types/objects have been encountered in the broader region and are therefore flagged:

- Rock engravings (petroglyphs) from the Middle Stone Age to Later Stone Age periods
- Rock Paintings from the Middle Stone Age to Later Stone Age periods
- Buildings and objects associated with modern commercial farming from the 19th century
- Graves, burial grounds and human bones.

6.3. Postulated heritage sensitivity of the study area

The area was evidently home to MSA/LSA hunter gatherers who left behind the scatters of stone tools and flake waste. As most pre-industrial communities had a propensity to gravitate to permanent water sources, the pans which occur in the area have potential to yield artefacts both above and below the surface. Although MSA/LSA finds have been seen in all surveys that have been encountered in the broader area, no occurrences have been deemed to warrant further action beyond primary documentation.

The Table below provides a summary of the probability of occurrence of different typologies of heritage and a confidence rating of the predictions:

	HERITAGE TYPOLOGY	PROBABILITY OF OCCURRENCE	CONFIDENCE RATING
1	MSA/LSA	99.99%	High
2	Rock engravings	30%	High
3	Rock paintings	5%	High
4	Early Iron Age / Later Iron Age	1%	High
5	Burial grounds	60%	Medium
6	Farm buildings and structures	75%	High

The ranking system in the Table below relates to the national grading of heritage sites. It has been adapted with a minor modification from Guidelines for involving Heritage Specialists in EIA processes by Winter S and & N. Baumann (2005, p19). Burial Ground and graves are given a high priority because of public sensitivities about the sanctity of human remains.

GRADE	RANKING	SIGNIFICANCE	PROBABILITY OF OCCURRENCE	CONFIDENCE RATING
1a	National	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 1, 2 or 3A heritage resources,	0%	High
1b	Burial grounds	Graves are sacred and their treatment is a sensitive issue.	60%	High
2	Provincial	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential 2 heritage resources	0%	High
3A	Local	Of high intrinsic, associational and contextual heritage value within a national, provincial and local context, i.e. formally declared or potential Grade 3A heritage resources	10%	Medium
3B	Local	Of moderate to high intrinsic, associational and contextual value within a local context, i.e. potential Grade 3B heritage resources	10%	High
3C	Local	Of medium to low intrinsic, associational or contextual heritage value within a national, provincial and local context, i.e. potential Grade 3C heritage resources	99,99%	High

6.4. Assessment of Impacts using the Heritage Impact Assessment Statutory Framework

Section 38 of the NHRA

Section 38 (Subsection 3) of the National Heritage Resources Act also provides a schedule of tasks to be undertaken in an HIA process:

Section 38(3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected

N/A

(b) An assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7

There are no Grade I or Grade II sites.

(c) An assessment of the impact of the development on such heritage resources

The risk ranking is an index of potential risks based on perceived value of the heritage and potential threats posed by the proposed development. Any sites found during the exploration and are deemed to be significant will be dealt with in accordance with the mitigation procedures in the Heritage Chance Finds Procedure.

(i) An evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development

Mining in the northern is making a significant contribution to the growth of the South African economy. Mineral wealth provides stimulus for rapid socio-economic development in the Northern Cape Province in particular and the country as a whole. Mining is labour intensive and can contribute immensely to alleviate the current high rate of employment. General improvement in the quality of livelihoods in local communities and the country at large is expected.

(e) The results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources

N/A

(f) If heritage resources will be adversely affected by the proposed development, the consideration of alternatives

A Chance Finds Procedure will be used to deal with any sites or objects found during the mine exploration and actual mining commences.

(g) Plans for mitigation of any adverse effects during and after the completion of the proposed development.

In accordance with the CPF in the event of discovery of heritage resources deemed of significance during exploration or mining, the Provincial Heritage Resources Authority or SAHRA will be informed and an archaeologist or heritage expert called to attend.

6.5. Risk Assessment of the findings

EVALUATION CRITERIA	RISK ASSESSMENT
Description of potential impact	Negative impacts range from partial to total destruction of surface and under-surface movable/immovable relics.
Nature of Impact	Negative impacts can both be direct or indirect.
Legal Requirements	Sections 34, 35, 36, 38 of National Heritage Resources Act No. 25 (1999).
Stage/Phase	Prospecting for minerals (test pits, drilling); Mining Phase
Extent of Impact	Test pits, excavations and ground clearing can result in damage and destruction of archaeological resources above and below the surface not seen during the survey.
Duration of Impact	Any accidental destruction of surface or subsurface relics is not reversible but can be mitigated.
Intensity	Uncertain.
Probability of occurrence	Medium.
Confidence of assessment	High.
Level of significance of impacts before mitigation	Medium.
Mitigation measures	If archaeological or other heritage relics deemed of high significance are found during the exploration phase, heritage authorities will be advised and a heritage specialist will be called to attend.
Level of significance of impacts after mitigation	Low.

Cumulative Impacts	None.
Comments or Discussion	None.

7. HIA REPORT AND CHANCE FINDS PROCEDURE

A Heritage Chance Find Procedure (CPF) is a manual that will be used to curate heritage resources that may be found during the prospecting activities.

8. CONCLUSION AND RECOMMENDATIONS

In light of the findings of the desk assessment, the mine prospecting can go ahead. The study is mindful that some important discoveries may be made during prospecting. If this happens operations should be halted, and the provincial heritage resources authority or SAHRA notified in order for an investigation and evaluation of the finds to take place.

9. REFERENCES

Deacon, J. and N. Lancaster. 1986. *Later Quaternary Palaeo-environments of Southern Africa*. Oxford: Oxford University Press.

Government of South Africa. 1999. The National Heritage Resource Act (25 of 1999).

Huffman, T. N. 2007. A Handbook of the Iron Age. Cape Town: UKZN Press

Matenga, E. 2017. Phase I Heritage Impact Assessment (including Palaeontological Assessment) in terms of Section 38 of the National Heritage Resources Act (No 25/1999) for the proposed Mine Prospecting on the Remaining Extent of Portion 1 of the Farm Viegulands Put 42, Prieska District, Northern Cape Province.

Matenga, E. 2018. Phase I Heritage Impact Assessment (including Palaeontological Assessment) in terms of Section 38 of the National Heritage Resources Act No 25/1999 for the proposed mine prospecting and application for mining right on a portion of the

remaining extent of the Farm Kransfontein 19 & Portion 2 (de rust) of the Farm Kransfontein 19, Prieska District, Northern Cape Province.

Matenga, E. 2019. Phase I Heritage impact assessment (including palaeontological assessment) requested in terms of Section 38 of the National Heritage Resources Act No 25/1999 for the proposed Mine Prospecting on a Portion of the Remaining Extent of the Farm Remhoogte 152 Prieska, Northern Cape.

Matenga E. 2019. Phase I Heritage Impact Assessment (including Palaeontological Assessment) in terms of section 38 of the National Heritage Resources Act (No 25/1999) for the proposed Mine Prospecting on the Remaining extent of Portions 13 and 9 of the of the Farm Rietfontein 11, Prieska District, Northern Cape Province.

Matenga, E. 2019. Phase I Heritage impact assessment (including palaeontological assessment) in terms of Section 38 of the National Heritage Resources Act No 25/1999 for the proposed Mine Prospecting on the Farm Katlani 236 near Douglas, Northern Cape.

Matenga, E. 2022a. Phase 1 Heritage Impact Assessment & Palaeontological Desktop Assessment for a Mining Right Application on a Portion of the Remaining Extent of Portion 8 (a Portion of Portion 3 - Rooidam) of the Farm Gemsbokbult 120 HE near Kenhardt, within the Kai !Garib Local Municipality, Northern Cape

Matenga, E. 2022b. Heritage Impact Assessment (including Palaeontological Desktop Assessment) for a Prospecting Right Application on the Remaining Extent of the Farm Brakfontein 276 near Prieska in the Siyathemba Local Municipality, Northern Cape Province

Morris. D. 2017. Heritage Impact Assessment for Proposed Lodge at Springbokoog, north-west of Vanwyksvlei, Northern Cape.

Morris, D. 2009. Phase 1 Archaeological Impact Assessment at Bucklands Settlement near Douglas, Northern Cape.

Orton, J. 2013. Heritage Impact Assessment for Multiple Proposed Solar Energy Facilities on Farm Hoekplaas 146, Copperton, Northern Cape.

Orton, J. 2016. *Heritage Impact Assessment For Four Proposed Borrow Pits On Remainder Of Farm Vogelstruisbult 104/1, Prieska Magisterial District, Northern Cape.*

Orton, J. 2018. Heritage Impact Assessment: Scoping and Environmental Impact Assessment for the proposed development of the Skeerhok PV1 Solar Energy Facility on Smutshoek 395/Remainder, Kenhardt Magisterial District, Northern Cape Province. Unpublished report prepared for CSIR – Environmental Management Services. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J & Parsons. 2018. *Looking beneath the surface: Later Stone Age remains at Klipgats Pan, Bushmanland, South Africa.*

Orton, J. 2018a. Heritage Impact Assessment: Scoping and Environmental Impact Assessment for the Proposed Development of the Skeerhok PV1 Solar Energy Facility on Smutshoek 395/Remainder, Kenhardt Magisterial District, Northern Cape Province. Unpublished Report Prepared for CSIR – Environmental Management Services. Lakeside: ASHA Consulting (Pty) Ltd.

Orton, J. 2019. Heritage Impact Assessment: Scoping and Environmental Impact Assessment for the proposed development of the Skeerhok PV2 Solar Energy Facility on Gemsbokbult 120/9, Kenhardt Magisterial District, Northern Cape Province.

Orton, J. 2020. Heritage Impact Assessment: Proposed Access Road on the Remainder and Portion 4 of the Farm Onder Rugzeer 168, Kenhardt Magisterial District, Northern Cape Province.

Webley, L. 2016. Archaeological Impact Assessment: Proposed Construction of Humansrus Solar 3 on a Portion of the Farm Humansrus 147 near Copperton, Northern Cape.

Van Der Walt J. 2012. Archaeological Impact Assessment for the Revised Garob Wind energy facility project located close to Copperton, Northern Cape.

Van Der Walt, J. 2014. Archaeological Impact Assessment for the proposed Bosjesmansberg PV Center Solar Energy Facility, located close to Copperton in the Northern Cape. Prepared for Savannah Environmental (Pty) Ltd.

Winter S and & N. Baumann. 2005. Guidelines for involving Heritage Specialists in EIA processes. Western Cape Government.

WEBSITES

http://www.southafrica.net/za/en/articles/entry/article-southafrica.net-the-wonderwerk-cave.

Prieska. Found at: https://www.karoo-information.co.za/routes/town/506/prieska#:~:text=Prieska%20was%20established%20in%201878,the%20lost%20she%2Dgoat%22.

GLOSSARY

Archaeological material: remains older than 100 years, resulting from human activities left as evidence of their presence, which are in the form of structure, artefacts, food remains and other traces such as rock paintings or engravings, burials, fireplaces etc.

Artefact: Any movable object that has been used modified or manufactured by humans.

Catalogue: An inventory or register of artefacts and / or sites.

Conservation: All the processes of looking after a site or place including maintenance, preservation, restoration, reconstruction and adaptation.

Cultural Heritage Resources: refers to physical cultural properties such as archaeological sites, palaeontological sites, historic and prehistoric places, buildings, structures and material remains, cultural sites such as places of rituals, burial sites or graves and their associated materials, geological or natural features of cultural importance or scientific significance. These include intangible resources such as religious practices, ritual ceremonies, oral histories, memories, indigenous knowledge.

Cultural landscape: a stretch of land that reflects "the combined works of nature and man" and demonstrates "the evolution of human society and settlement over time, under the influence of the physical constraints and / or opportunities presented by their natural environment and of successive social, economic and cultural forces, both internal and external".[7]

[7] This definition is taken from current terminology as listed on the World Heritage Convention website, URL: http://whc.unesco.org/en/culturallandscape/#1 accessed 17 March 2016.

Cultural Resources Management (CRM): the conservation of cultural heritage resources, management and sustainable utilization for present and future generations.

Cultural Significance: is the aesthetic, historical, scientific and social value for past, present and future generations.

Early Iron Age: refers to cultural remains dating to the first millennium AD associated with the introduction of metallurgy and agriculture.

Early Stone Age: a long and broad period of stone tool cultures with chronology ranging from around 3 million years ago up to the transition to the Middle Stone Age around 250 000 years ago.

Excavation: a method in which archaeological materials are extracted from the ground, which involves systematic recovery of archaeological remains and their context by removing soil and any other material covering them.

Historic material: means remains resulting from human activities, which are younger than 100 years and no longer in use; that include artefacts, human remains and artificial features and structures.

Historical: means belonging to the past, but often specifically the more recent past, and often used to refer to the period beginning with the appearance of written texts.

Intangible heritage: something of cultural value that is not primarily expressed in material form e.g. rituals, knowledge systems, oral traditions or memories, transmitted between people and within communities.

***In situ* material:** means material culture and surrounding deposits in their original location and context, for instance archaeological remains that have not been disturbed.

Later Iron Age: The period from the beginning of the 2nd millennium AD marked by the emergence of complex state society and long-distance trade contacts.

Late Stone Age: The period from ± 30 000 years ago up until the introduction of metals and farming technology around 2000 years ago, but overlapping with the Iron Age in many areas up until the historical period.

Middle Stone Age: a period of stone tool cultures with complex chronologies marked by a shift towards lighter, more mobile toolkit, following the Early Stone Age and preceding the Late Stone Age; the transition from the Early Stone Age was a long process rather than a specific event, and the Middle Stone Age is considered to have begun around 250 000 years ago, seeing the emergence of anatomically modern humans from about 150 000 years ago, and lasting until around 30 000 years ago.

Monuments: architectural works, buildings, sites, sculpture, elements, structures, inscriptions or cave dwellings of an archaeological nature, which are outstanding from the point of view of history, art and science.

Place: means site, area, building or other work, group of buildings or other works, together with pertinent contents, surroundings and historical and archaeological deposits.

Preservation: means the protecting and maintaining of the fabric of a place in its existing state and retarding deterioration or change, and may include stabilization where necessary.

Rock Art: various patterned practices of placing markings on rock surfaces, ranging in Southern Africa from engravings to finger paintings to brush-painted imagery.

Sherds: ceramic fragments.

Significance grading: Grading of sites or artefacts according to their historical, cultural or scientific value.

Site: a spatial cluster of artefacts, structures, organic and environmental remains, as residues of past human activity.

Site Recording Template: a standard document format for site recording.

DETAILS OF SPECIALIST

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(i) Academic qualifications

2011: Ph.D. in Archaeology & Heritage (Uppsala University, Sweden) with a published Thesis

1993: MPhil in Archaeology (Uppsala University, Sweden) with a published Thesis

2002. Certificate in the Integrated Conservation of Territories and Landscapes of Heritage Value (ICCROM, Rome)

(ii) Professional experience

1988-1993: Curator of Archaeology, Museum of Human Sciences, Harare

1994-1997: Senior Curator / Conservator, Great Zimbabwe World Heritage Site

1997-2004: Director, Great Zimbabwe World Heritage Site

2005 – 2016: Heritage Management Consultant (associateship with various other specialists), South Africa

2016 – present. Director & Principal Researcher, AHSA Archaeological and Heritage Services Africa (Pty) Ltd

(iii) Membership in professional bodies/associations

ASAPA – Association of Southern African Professional Archaeologists

ICOMOS – International Council of Monuments and Sites

WAC – World Archaeological Congress

(iv) Heritage Impact Assessments

Edward Matenga has undertaken more than 100 heritage impact assessments and written as many reports. The reports were to enable various development projects including mining, public infrastructure development (e.g. agriculture, water reticulation) and power distribution. In this regard Matenga has a significant footprint in the Northern Cape, Northwest and Limpopo Provinces, and he has also undertaken similar work in Mauritius.

Matenga has also been involved in the preparation of Heritage Management Plans otherwise known as Conservation Management Plans for high-profile sites, e.g. the ten sites in the World Heritage Nomination Dossier for the Nelson Mandela Legacy sites, which was submitted to UNESCO.

Matenga has undertaken exhumations and relocations of graves and has gained considerable experience in handling community issues relating to the treatment of human remains.

Matenga is a former Director of a World Heritage Site. Over the last 2 decades, UNESCO and its affiliated bodies (ICOMOS and ICCROM) sent him on World Heritage advisory missions to Cameroon (2002), Kenya (2006), Mauritius (2007), Ghana (2008) and