

**Heritage impact assessment for the  
PROPOSED ESTABLISHMENT OF A WIND FARM AND PV FACILITY BY  
MAINSTREAM RENEWABLE POWER IN THE LOERIESFONTEIN REGION,  
NORTHERN CAPE PROVINCE**

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A WIND FARM AND PV FACILITY BY MAINSTREAM RENEWABLE POWER IN  
THE LOERIESFONTEIN REGION, NORTHERN CAPE PROVINCE**

**Report No:** 2011/JvS/101  
**Status:** Draft  
**Revision No:** 1  
**Date:** February 2011

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**Declaration:**

I, J.A. van Schalkwyk, declare that I do not have any financial or personal interest in the proposed development, nor its developers or any of their subsidiaries, apart from the provision of heritage assessment and management services.



J A van Schalkwyk (D Litt et Phil)

Heritage Consultant

February

2011

## **EXECUTIVE SUMMARY**

### **HERITAGE IMPACT ASSESMENT FOR THE PROPOSED ESTABLISHMENT OF A WIND FARM AND PV FACILITY BY MAINSTREAM RENEWABLE POWER IN THE LOERIESFONTEIN REGION, NORTHERN CAPE PROVINCE**

Mainstream Renewable Power South Africa plans to develop a wind farm as well as a Photovoltaic solar facility on a site north of Loeriesfontein in the Northern Cape Province of South Africa.

In accordance with Section 38 of the NHRA, an independent heritage consultant was therefore appointed by **SiVest Environmental Division** to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop a wind farm as well as a Photovoltaic solar facility, to assess the significance thereof and to consider alternatives and plans for the mitigation of any adverse impacts.

The following sites, features and objects of cultural heritage significance have been identified (Section 5.4):

- A number of open sites with surface scatterings of stone tools dating to the Middle and Later Stone Age were identified. These are mostly located on small hills or at the foot of the hill.

Because of its location in the open, it is highly likely that there would be a physical impact on it arising from the development of the wind farm and PV facility.

As first option it is recommended that these areas are avoided if possible. If that is not possible, it is recommended that systematic surface collections are made and that this material is housed at a museum. This can only be done under a permit from SAHRA.

- One old farmstead was identified. It dates to beginning of the 20<sup>th</sup> century and includes a house, barn and stock enclosures, all dating to slightly different periods in time. The structures were built with stone and bricks and have corrugated iron roofs.

Because of its location in the area classified as buildable for the wind turbines, it is highly likely that there would be a physical impact on it arising from the development of the wind farm.

If the buildings cannot be retained, it should be documented (photograph and mapped) in full before they are demolished, for which a permit from SAHRA would be required.

- A small informal cemetery with two graves. Only one has a headstone, that of HGJ Lintvelt, a young boy who died in 1913. These graves can probably be linked to the farmstead discussed above. These graves are probably linked to the homestead discussed above.

Because of its location in the area classified as buildable for the wind turbines, it is highly likely that there would be a physical impact on it arising from the development of the wind farm.

If the graves cannot be retained, they should be relocated to a formal cemetery after consultation with descendants and obtaining of all the relevant permits.

In order to safeguard the identified sites, it is recommended that buffer zones are set out around each of the identified sites (Section 7.3).

Based on current information regarding sites in the surrounding area, is viewed to have Grade III significance and therefore would not prevent the proposed development for continuing after the implementation of the proposed mitigation measures and its acceptance by SAHRA.

Therefore, from a heritage point of view we recommend that the proposed development can continue. However, we request that if archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.



J A van Schalkwyk  
Heritage Consultant  
February 2011

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**GLOSSARY OF TERMS AND ABBREVIATIONS****TERMS**

**Study area:** Refers to the entire study area as indicated by the client in the accompanying Fig. 1 & 2.

**Stone Age:** The first and longest part of human history is the Stone Age, which began with the appearance of early humans between 3-2 million years ago. Stone Age people were hunters, gatherers and scavengers who did not live in permanently settled communities. Their stone tools preserve well and are found in most places in South Africa and elsewhere.

Early Stone Age	2 000 000 - 150 000 Before Present
Middle Stone Age	150 000 - 30 000 BP
Late Stone Age	30 000 - until c. AD 200

**Iron Age:** Period covering the last 1800 years, when new people brought a new way of life to southern Africa. They established settled villages, cultivated domestic crops such as sorghum, millet and beans, and they herded cattle as well as sheep and goats. As they produced their own iron tools, archaeologists call this the Iron Age.

Early Iron Age	AD 200 - AD 900
Middle Iron Age	AD 900 - AD 1300
Late Iron Age	AD 1300 - AD 1830

**Historical Period:** Since the arrival of the white settlers - c. AD 1840 - in this part of the country

## ABBREVIATIONS

ADRC	Archaeological Data Recording Centre
ASAPA	Association of Southern African Professional Archaeologists
BP	Before Present
CS-G	Chief Surveyor-General
EIA	Early Iron Age
ESA	Early Stone Age
LIA	Late Iron Age
LSA	Later Stone Age
HIA	Heritage Impact Assessment
MSA	Middle Stone Age
NASA	National Archives of South Africa
NHRA	National Heritage Resources Act
PHRA	Provincial Heritage Resources Agency
SAHRA	South African Heritage Resources Agency

# HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED ESTABLISHMENT OF A WIND FARM AND PV FACILITY BY MAINSTREAM RENEWABLE POWER IN THE LOERIESFONTEIN REGION, NORTHERN CAPE PROVINCE

## 1. INTRODUCTION

Mainstream Renewable Power South Africa plans to develop a wind farm as well as a Photovoltaic solar facility on a site north of Loeriesfontein in the Northern Cape Province of South Africa.

South Africa's heritage resources, also described as the 'national estate', comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (NHRA), Act 25 of 1999, no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site.

In accordance with Section 38 of the NHRA, an independent heritage consultant was therefore appointed by **SiVest Environmental Division** to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop a wind farm as well as a Photovoltaic solar facility, to assess the significance thereof and to consider alternatives and plans for the mitigation of any adverse impacts.

This HIA report forms part of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and is intended for submission to the South African Heritage Resources Agency (SAHRA).

## 2. TERMS OF REFERENCE

The aim of this HIA, broadly speaking, is to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the wind farm and Photovoltaic solar facility and its associated infrastructure.

### 2.1 Scope of work

The scope of work for this study consisted of:

- Conducting of a desk-top investigation of the area, in which available literature, reports, databases and maps were studied;
- A visit to the proposed development area.

The objectives were to

- Identify possible archaeological, cultural and historic sites and features within the proposed development area;

- Evaluate the potential impacts of construction, operation and maintenance of the proposed development on archaeological, cultural and historical sites and features;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance.

## 2.2 Limitations and assumptions

The investigation was influenced by the following factors:

- Archaeological sites, by their very nature, occur below ground and can in most cases only identified by surface indicators. The unpredictability of buried archaeological material therefore always remains a problem.

Table 1: Applicable category of heritage impact assessment study and report.

Type of study	Aim	SAHRA involved	SAHRA response
Heritage Impact Assessment	<p>The aim of a full HIA investigation is to provide an informed heritage-related opinion about the proposed development by an appropriate heritage specialist. The objectives are to identify heritage resources (involving site inspections, existing heritage data and additional heritage specialists if necessary); assess their significances; assess alternatives in order to promote heritage conservation issues; and to assess the acceptability of the proposed development from a heritage perspective.</p> <p>The result of this investigation is a heritage impact assessment report indicating the presence/ absence of heritage resources and how to manage them in the context of the proposed development.</p> <p>Depending on SAHRA's acceptance of this report, the developer will receive permission to proceed with the proposed development, on condition of successful implementation of proposed mitigation measures.</p>	Provincial Heritage Resources Authority	Comments on built environment and decision to approve or not
		SAHRA Archaeology, Palaeontology and Meteorites Unit	Comments and decision to approve or not

## 3. HERITAGE RESOURCES

### 3.1 The National Estate

The NHRA (No. 25 of 1999) defines the heritage resources of South Africa which are of cultural significance or other special value for the present community and for future generations that must be considered part of the national estate to include:

- places, buildings, structures and equipment of cultural significance;
- places to which oral traditions are attached or which are associated with living heritage;
- historical settlements and townscapes;



- landscapes and natural features of cultural significance;
- geological sites of scientific or cultural importance;
- archaeological and palaeontological sites;
- graves and burial grounds, including-
  - ancestral graves;
  - royal graves and graves of traditional leaders;
  - graves of victims of conflict;
  - graves of individuals designated by the Minister by notice in the Gazette;
  - historical graves and cemeteries; and
  - other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- sites of significance relating to the history of slavery in South Africa;
- movable objects, including-
  - objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;
  - objects to which oral traditions are attached or which are associated with living heritage;
  - ethnographic art and objects;
  - military objects;
  - objects of decorative or fine art;
  - objects of scientific or technological interest; and
  - books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996).

### 3.2 Cultural significance

In the NHRA, Section 2 (vi), it is stated that “cultural significance” means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This is determined in relation to a site or feature’s uniqueness, condition of preservation and research potential.

According to Section 3(3) of the NHRA, a place or object is to be considered part of the national estate if it has cultural significance or other special value because of

- its importance in the community, or pattern of South Africa's history;
- its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- its importance in demonstrating a high degree of creative or technical achievement at a particular period;

- its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
- sites of significance relating to the history of slavery in South Africa.

A matrix was developed whereby the above criteria were applied for the determination of the significance of each identified site (see Appendix 1). This allowed some form of control over the application of similar values for similar sites.

#### 4. STUDY APPROACH AND METHODOLOGY

##### 4.1 Extent of the Study

This survey and impact assessment covers the area as presented in Section 5 and as illustrated in Figures 1 - 2.

##### 4.2 Methodology

###### 4.2.1 Preliminary investigation

###### 4.2.1.1 Survey of the literature

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area. The following sources were consulted – Beaumont & Vogel 1984; Fagan 2008; Humphreys 1976; Morris 2000; Raper 2004; Rudner & Rudner 1968; Van Schalkwyk 2011; Wilson & Anhaeusser 1998.

- Information on events, sites and features in the larger region were obtained from these sources.

###### 4.2.1.2 Data bases

The *Heritage Atlas Database*, the *Environmental Potential Atlas*, the *Chief Surveyor General (CS-G)* and the *National Archives of South Africa (NASA)* were consulted.

- Database surveys produced a number of sites located in the larger region of the proposed development. The original Title Deeds for the farms were accessed.

###### 4.2.1.3 Other sources

Aerial photographs and topocadastral and other maps were also studied - see the list of references below.

- Information of a very general nature was obtained from these sources.

###### 4.2.2 Field survey

The area that had to be investigated was identified by **SiVEST Environmental Division** by means of maps. The site was surveyed by walking transects over it. In addition, Mr A Mouton, who was born in the region and is now foreman on the farm, was interviewed about the possibility of sites occurring on the property.

## 5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

### 5.1 Site location

The study area is an irregular shaped section of land located some distance to the north of the town of Loeriesfontein in the Northern Cape Province (Fig. 1). It includes sections of the farms Sous 226 and Aan de Karree Doorn Pan 213 in the Calvinia magisterial district of Northern Cape Province.

The geology is made up of shale, with some dolerite intrusions to the west of the study area. The original vegetation is classified as Bushmanland Nama Karoo. The topography is classified as slightly irregular plains. No perennial river passes through the area. The current land use is farming, with the largest area used for grazing.

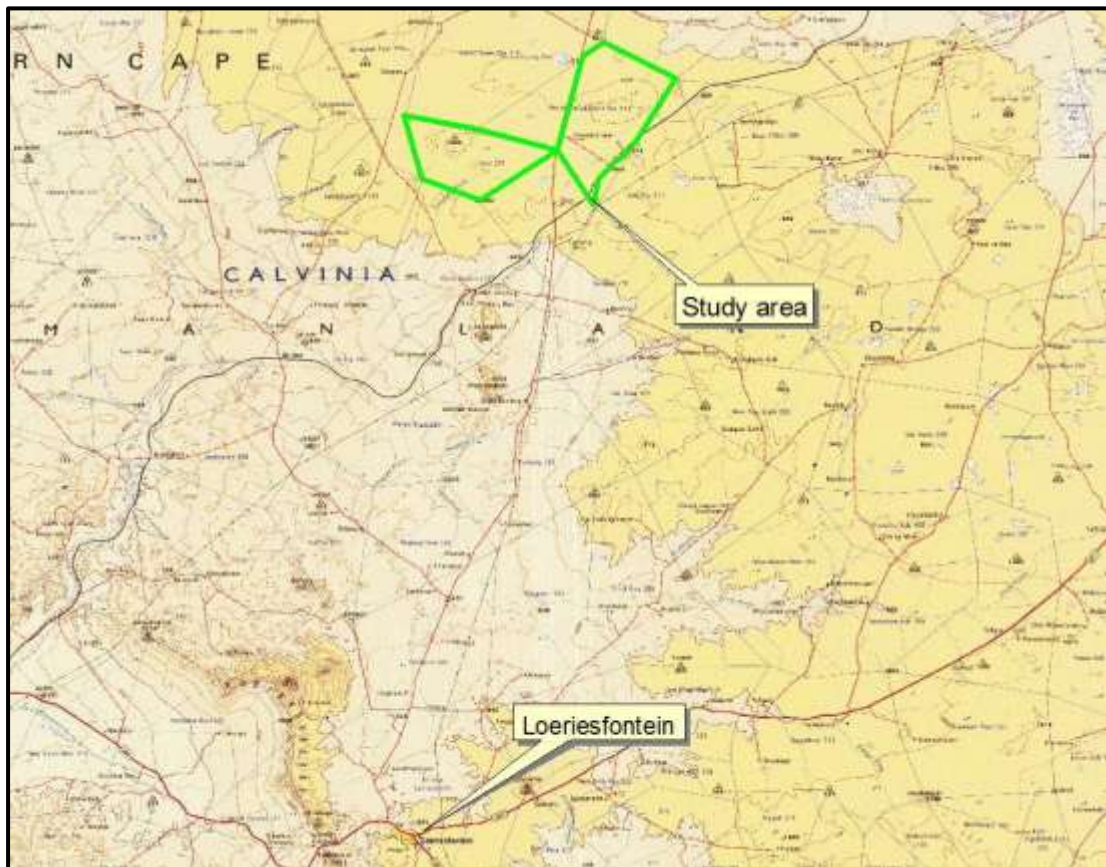


Fig. 1. Map showing the study area in regional context.

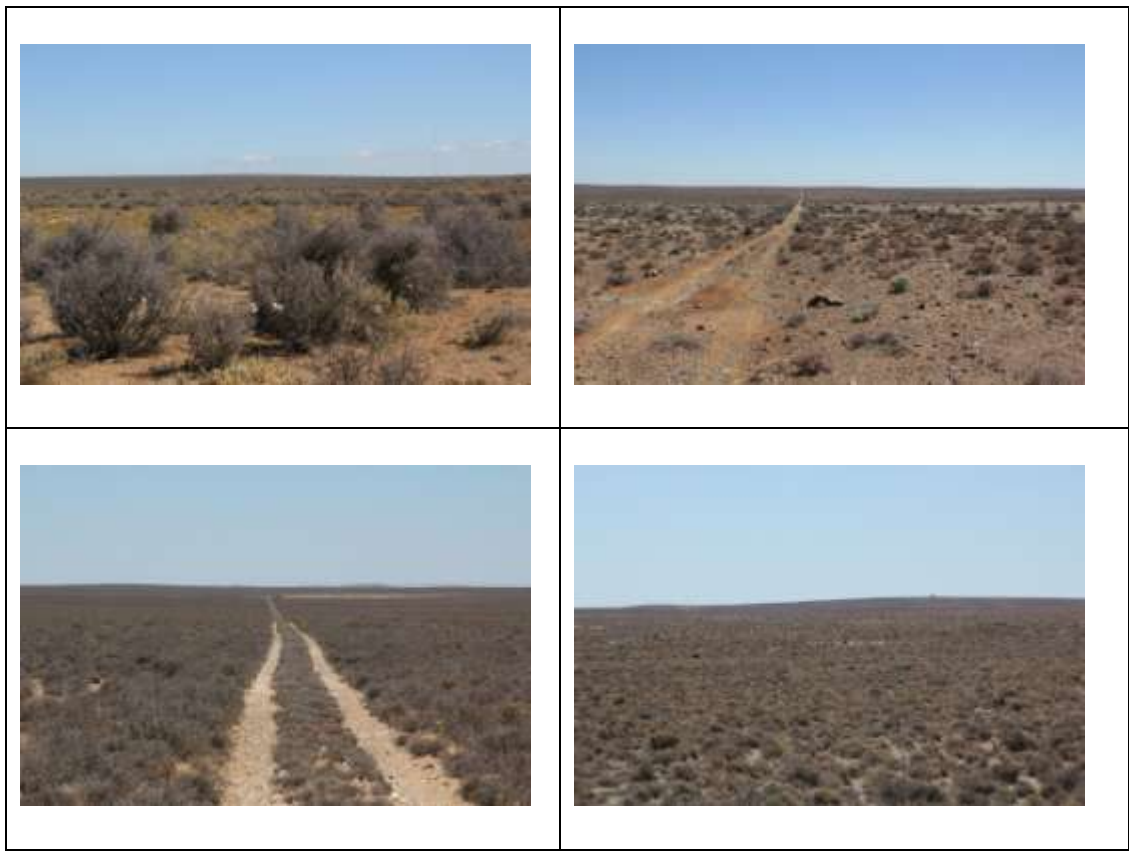


Fig. 2. Views over the study area.



Fig. 3. Aerial view of the study area.  
(Photo: Google Earth)

## 5.2 Project Description

The proposed development will be taking on a phased approach and will be broken down into the following projects:

- Project 1 – Wind 50MW
- Project 2 – Wind 420MW
- Project 3 – Solar PV 100MW

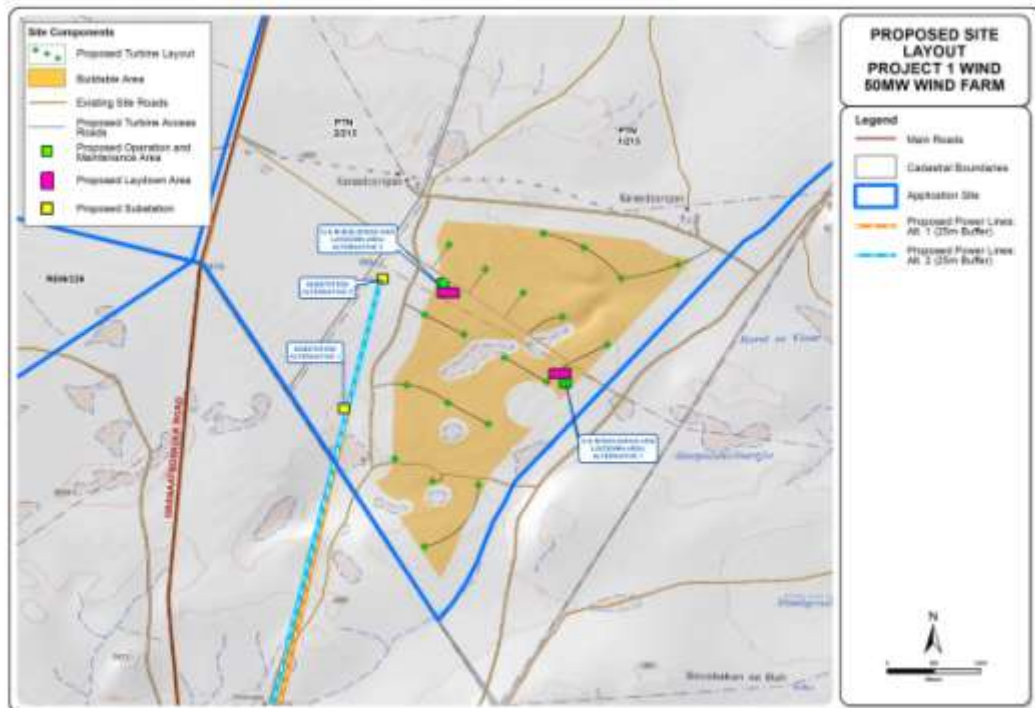


Fig. 4. Map showing the layout of the study area – Project 1.

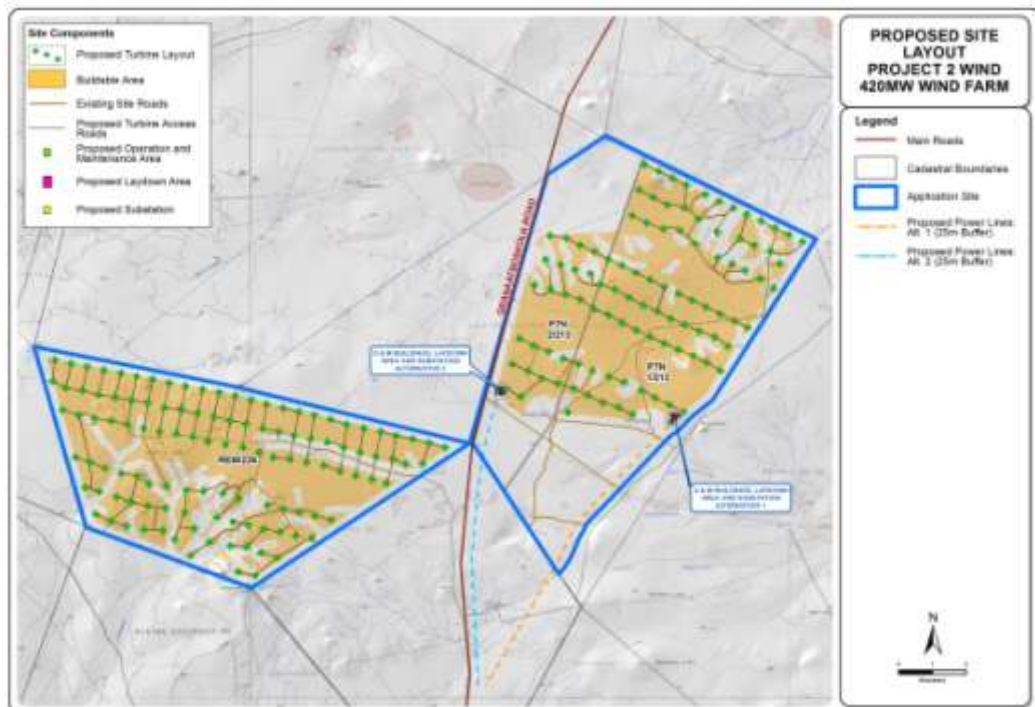


Fig. 5. Map showing the layout of the study area – Project 2.

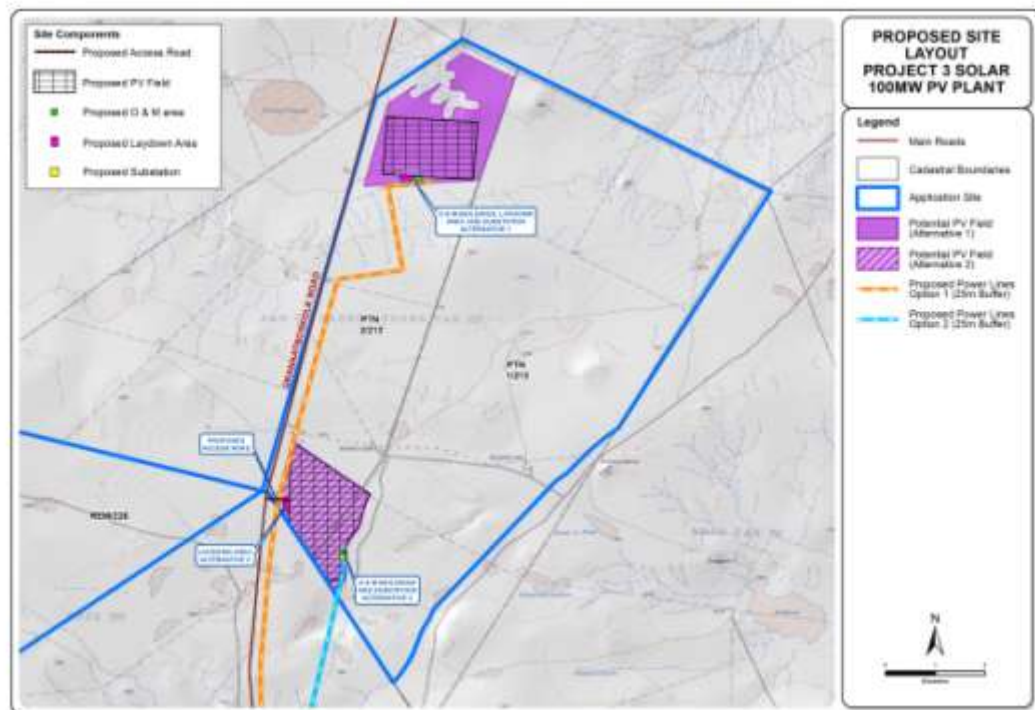


Fig. 6. Map showing the layout of the study area – Project 3

The proposed development would include the following aspects:

- The area where the wind turbines would be erected – approximately 180 turbines with an ultimate capacity of 470MW;
- Electrical connections – which will connect the turbines to each other by means of buried medium voltage cables, except where overhead lines are more appropriate;
- The area where the photovoltaic facility would be erected – a 100 MW PV facility to be located on approximately 200 ha;
- Electrical connections – cables which will connect the PV arrays may be buried or pole mounted;
- Substations – a new substation will be developed which will supply the electricity to the Eskom grid;
- Access and internal roads – existing roads will be used and internal roads will be developed;
- Temporary construction area – will be a maximum 10 000m<sup>2</sup> temporary lay down area;
- Other infrastructure – which will include administration and warehouse buildings, borrow pits, fencing and panel maintenance.

### 5.3 Regional overview

This is a rural landscape where sheep farming dominates. For large sections of the region even this is not a permanent type of settlement, as many farmers move their live-stock to different regions (Loeriesfontein) for a couple of months (July to December) every year. It was only with the drilling of bore holes that the possibility of permanent settlement became a reality.

### Stone Age

Information on occupation of the larger region in general and the Stone Age specifically, is very limited. This is probably the result of the fact that no systematic survey or studies has been done in the region.

In open country it is suggested that the most likely places for sites would be close to water points that predate the colonial period. Another potential for archaeological site concentration would be outcrops of raw material used in stone tool production. In mountain areas, rock shelters and caves would be where rock art is found.

It seems as if finds of Early Stone Age material this far to the west is very limited and no report of any such finds in the region of the study area could be found.

Similarly, information on settlement during the Middle Stone Age time is very limited. With regards to the Middle Stone Age, a few such tools and flakes were found. These were mostly of hornfels, although some are of indurated shale. All were found at the foot of a number of hills/outcrops in the southern section of the study area.

Occupation of the region seems to have increased during the Later Stone Age (LSA). This is probably the result of an interface between a foraging presence and a pastoralist occupation of the region. However, the latter subsistence regime would only have been possible in a situation of increased open water available for live-stock, a fact that would need much more background research to be confirmed.

According to local land owners stone tools are most commonly found in the following places:

- On the rims of fresh water pans or stream beds where water might remain for some time during the rainy season.
- Amongst some of the red sand dunes, where small pans are likely to develop during the rainy season.
- At the base of some of the dolerite hills/outcrops in the southern region.



Fig. 7. Typical stone tools.



*These stone tools are not from the region and are only used to illustrate the difference between Early (left), Middle (middle) and Later Stone Age (right) technology.*

By the early 19<sup>th</sup> century some Dutch speaking trekboers moved into the region, grazing their stock. As they depended on water for their live-stock, these farmers would have stuck close to available water sources and it was only during the wetter parts of the rain season that they might have accessed other areas for short periods of time. Even today, people migrate with their stock on a seasonal basis, moving between winter and summer grazing. In the past this was done by following the sheep by means of wagons and donkey carts, but in recent times this is done by means of trucks.



Fig. 8. Examples of farmsteads and farming related features (sheep dip) in the region.



Fig. 9. An isolated grave and a monument on the southern section of the farm Sous.

An investigation of the Title Deeds of most of the farms under consideration indicated that they were surveyed during the latter part of the nineteenth century, implying that they would have been occupied since then. Both the farms Sous and Aan de Karree Dorn Pan were first surveyed in 1898.

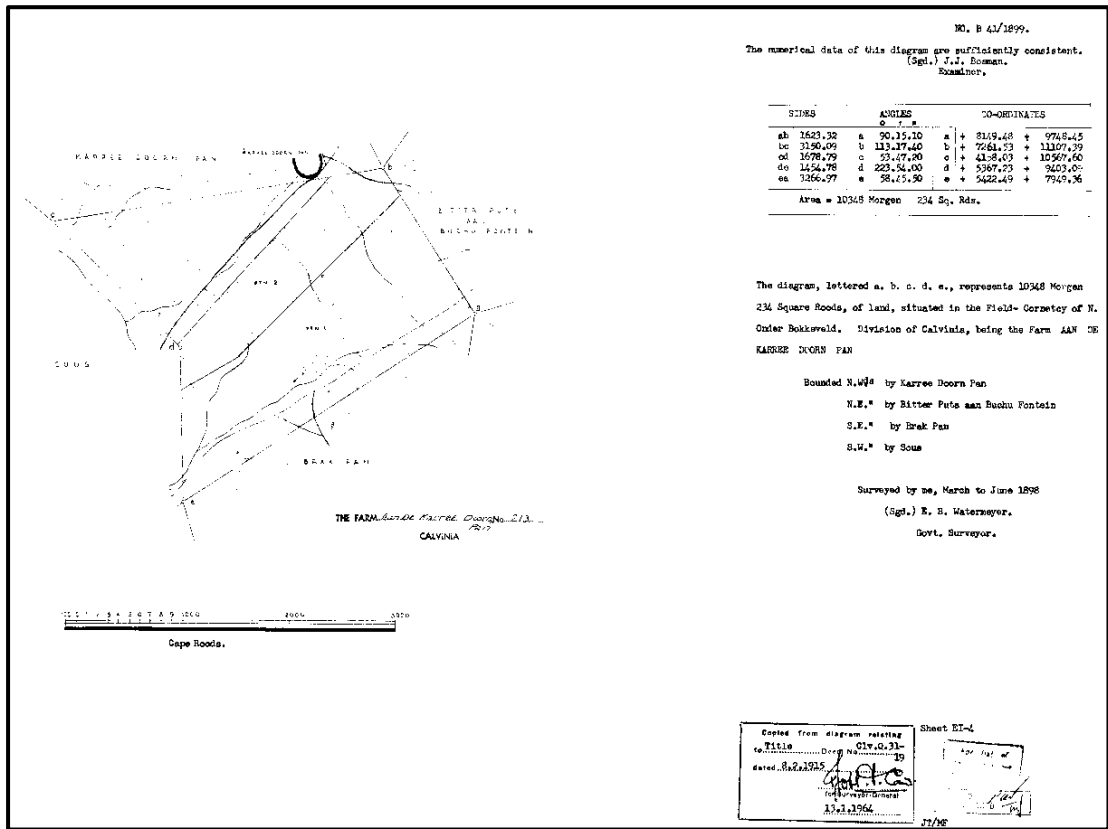


Fig. 10 Copy of the Title Deed for Aan de Karree Doorn Pan.

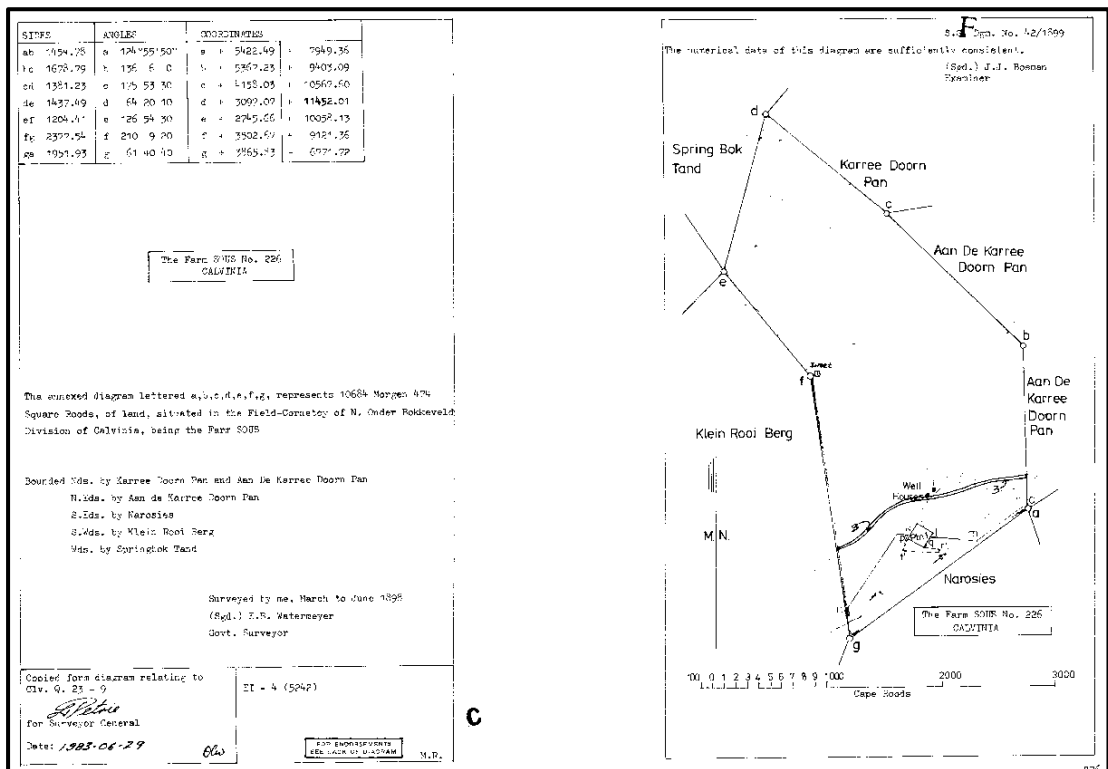


Fig. 11. Copy of the Title Deed for Sous.

Due to the sparse population, infrastructural development in this part of the world has always been low. The roads are gravel and graded occasionally. As there are no major rivers, river crossings remained informal.

The one industrial activity that is practised in the region on a commercial basis is the extraction of salt from the various pans in the region. The manner in which the salt is extracted requires a low level technology, with the result that even if it has taken place over a long period of time at any given place, few structures or features are associated with it.

It is probable that the salt pans were exploited in pre-colonial times for obtaining of salt, but this would have been on a very low level of activity. It was only with the more permanent settlement of farmers in the region since the early twentieth century that the salt was exploited on a commercial basis.



Fig. 12. Typical salt works in the larger region.

#### **5.4 Identified sites**

Based on the above literature and other sources and the field visit, the following heritage sites, features and objects were identified in the proposed development area:

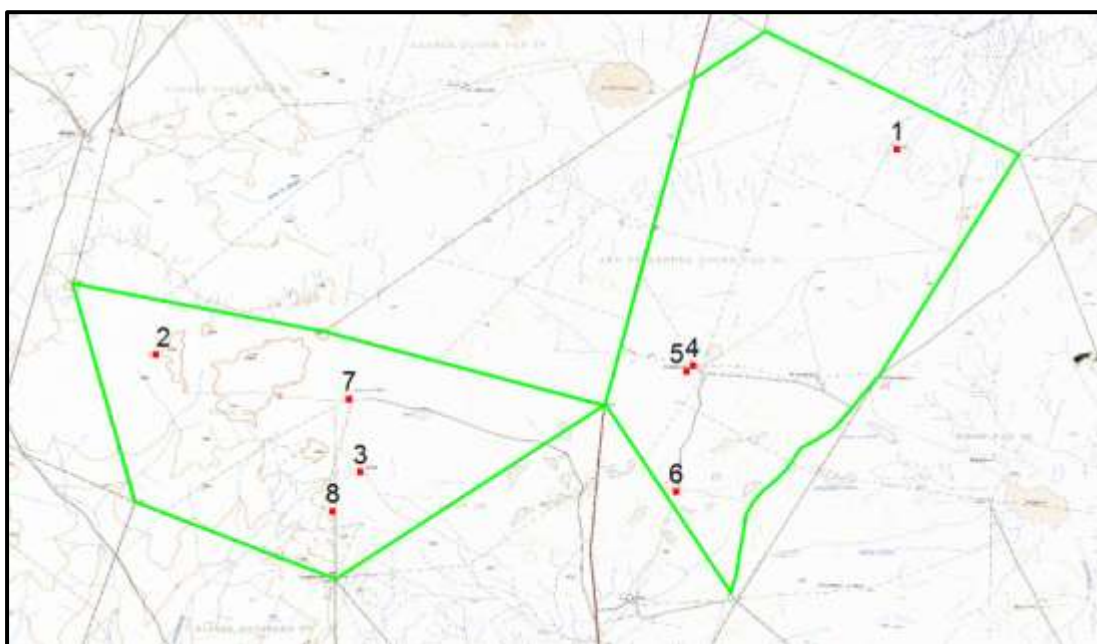


Fig. 13. Map showing the location of the identified sites.

- Archaeological sites

Archaeological sites can vary from open sites with surface scatters of material, to shelters sites where continuous occupation took place over shorter or longer periods of time. Sites can also vary according to use, ranging from living sites to special purpose (quarries, ritual significance).

<b>Location</b>	No. 1	S 30.37768	E 19.62242
	No. 2	S 30.42260	E 19.46030
	No. 3	S 30.44827	E 19.50504
<b>Description</b>			
<p>Sites no. 1 &amp; 2 are both located at the foot of low hills, with no. 1 in close proximity of an old streambed. The sites consist of low density surface scatters of MSA material, mostly of hardened shale and chalcedony. The density for site no. 1 is approximately 2 tools/flakes per m<sup>2</sup>, over an area roughly 30 x 30 metres. No. 2 is much smaller, consisting of approximately 1 tool/flake per m<sup>2</sup> over an area of 20 x 20 metres.</p> <p>Site no. 3 is located on top of a small hill, overlooking the region. It is a relatively high density surface scatter of LSA material, mostly of hardened shale and chalcedony. The density is approximately 5 tools/flakes per m<sup>2</sup> over an area of 30 x 30 metres.</p>			
<b>Significance</b>	Low on a regional level – Grade III		
<b>Mitigation</b>			
<p>There must be hundreds of similar occurrences in the larger region. As they are all surface finds, their significance is judged to be low. However, as very little is known about the Stone Age occupation of the larger region, studying of these sites might contribute to a better understanding of the prehistory of the region. As first option it is therefore recommended that these areas are avoided if possible. If that is not possible, it is recommended that systematic surface collections are made and that this material is housed at a museum. This can only be done under a permit from SAHRA.</p>			

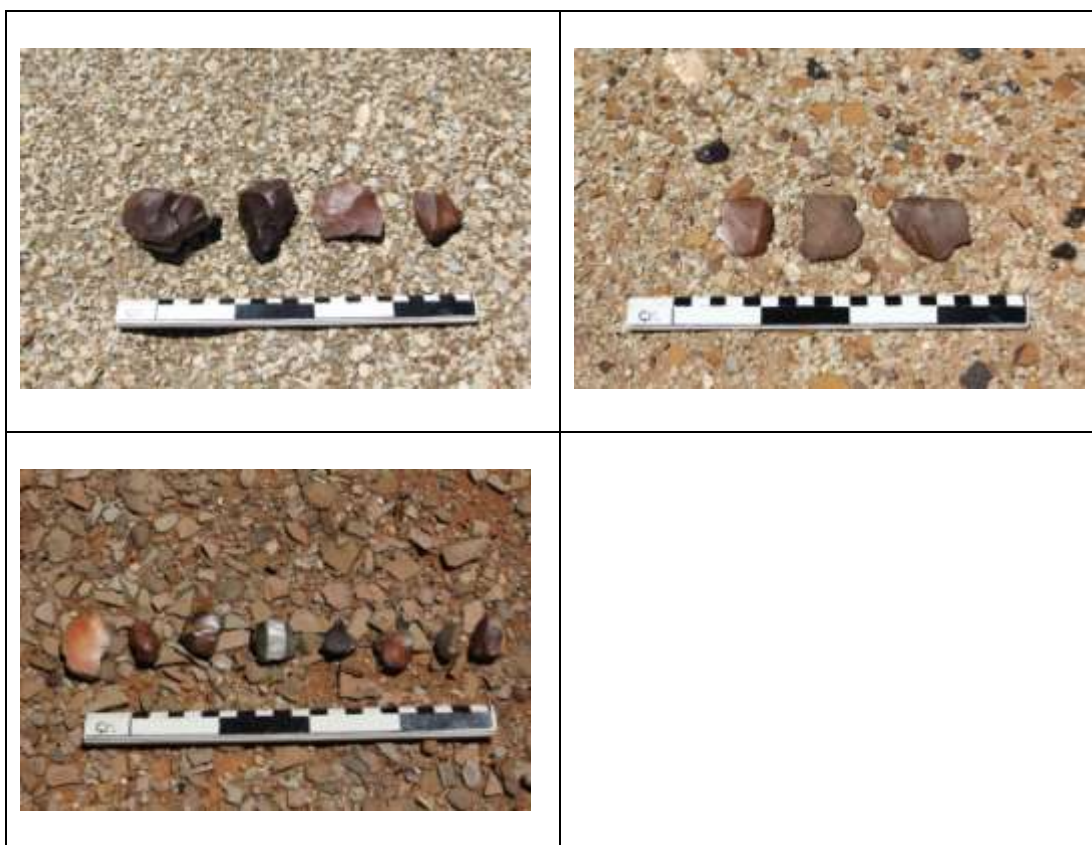


Fig. 14. The material identified on the various Stone Age sites.

- Farmstead

Farmsteads are complex features in the landscape, being made up of different yet interconnected elements. Typically these consist of a main house, gardens, outbuildings, sheds and barns, with some distance from that labourer housing and various cemeteries. In addition roads and tracks, stock pens and wind mills complete the setup. An impact on one element therefore impacts on the whole.

The architecture of these farmsteads can be described as an eclectic mix of styles modified to adapt to local circumstances. Farm buildings were generally single storied. Walls were thick and built in stone. The roof was either flat or ridged and thatched or with corrugated iron and was terminated at either end by simple linear parapet gables.

In some cases outbuildings would be in the same style as the main house, if they date to the same period. However, they tend to vary considerably in style and materials used as they were erected later as and when they were required.

<b>Location</b>	No. 4	S 30.42494	E 19.57780
<b>Description</b>			
An old farmstead was identified on the farm Aan de Karree Doorn Pan. It was built of clay bricks and later clad with corrugated iron – quite a unique method. An old 'kookskerm", stone walled kraal and garage is found adjacent. Apparently it dates to about the 1920s, or slightly earlier. Considering the scarcity of farm buildings in the larger region and the unique construction method, this site is viewed to have high significance.			
<b>Significance</b>	High on a regional level – Grade III		
<b>Mitigation</b>			
These structures are located in the area where it is planned to develop the wind farm and PV facility. If the buildings cannot be retained, it should be documented (photograph and mapped) in full before they are demolished, for which a permit from SAHRA would be required.			



Fig. 15. Views of the farmstead.

- Cemeteries

Apart from the formal cemeteries that occur in municipal areas (towns or villages), a number of these, some quite informal, i.e. without fencing, is expected to occur sporadically all over, but probably in the vicinity of the various farmsteads. Many might also have been forgotten, making it very difficult to trace the descendants in a case where the graves are to be relocated.

Most of these cemeteries, irrespective of the fact that they are for land owner or farm labourers (with a few exceptions where they were integrated), are family orientated. They therefore serve as important 'documents' linking people directly by name to the land.

<b>Location</b>	No. 5	S 30.42624	E 19.57634
<b>Description</b>			
Informal cemetery with two graves. Only one has a headstone, that of HGJ Lintvelt, a young boy who died in 1913. These graves can probably be linked to the farmstead discussed above.			
<b>Significance</b>	High on a local level – Grade III		
<b>Mitigation</b>			
These graves are probably linked to the homestead discussed above. As such it forms a unit with it and it is recommended that they are retained in place. If that is not possible, they should be relocated to a formal cemetery after consultation with descendants and obtaining of all the relevant permits.			



Fig. 16. The identified cemetery.

- Farming related features

In addition roads and tracks, stock pens and wind pumps complete the setup. An impact on one element therefore impacts on the whole.

<b>Location</b>	No. 6	S 30.45250	E 19.57417
	No. 7	S 30.43228	E 19.50254
<b>Description</b>			
Water points for stock served by wind pumps. Although the wind pumps are not that old, it could have been replaced at any point, the associated dams are quite old.			
<b>Significance</b>	Low on a regional level – Grade III		
<b>Mitigation</b>			
These structures are located in the area where it is planned to develop the wind farm and PV facility. As there are probably hundreds similar sites in the contiguous area no further action is required.			

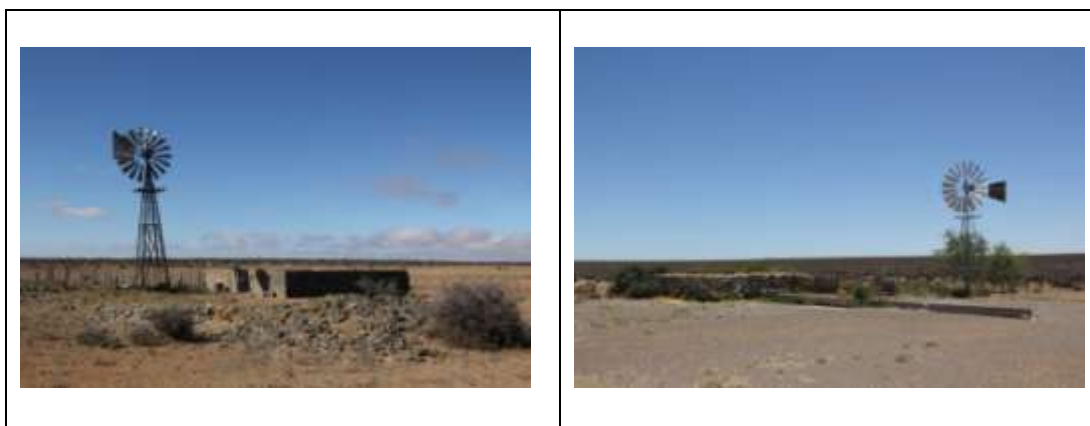


Fig. 17. Different wells.

- Indigenous plant use


<b>Location</b>	No. 8	S 30.45687	E 19.49890
<b>Description</b>			
An area where a significant number of <i>ghaap</i> ( <i>Hoodia currori</i> ) occurs. This plant was used by the San as vegetable as well as appetite suppressant. Under agreements with the CSIR the San would share in any commercialised locally derived products made from this plant.			
			

Fig. 18. Some of the *ghaap* plants.

## 6. SITE SIGNIFICANCE AND ASSESSMENT

### 6.1 Heritage assessment criteria and grading

The NHRA stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

- **Grade I:** Heritage resources with qualities so exceptional that they are of special national significance;



- **Grade II:** Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
- **Grade III:** Other heritage resources worthy of conservation on a local authority level.

The occurrence of sites with a Grade I significance will demand that the development activities be drastically altered in order to retain these sites in their original state. For Grade II and Grade III sites, the applicable of mitigation measures would allow the development activities to continue.

## 6.2 Statement of significance

A matrix was developed whereby the above criteria, as set out in Sections 3(3) and 7 of the NHRA, No. 25 of 1999, were applied for each identified site (see Appendix 1). This allowed some form of control over the application of similar values for similar sites. Three categories of significance are recognized: low, medium and high. In terms of Section 7 of the NHRA, all the sites currently known or which are expected to occur in the study area are evaluated to have a grading as identified in the table below.

Table 2. Summary of identified heritage resources in the study area.

<b>Identified heritage resources</b>	
<i>Category, according to NHRA</i>	<i>Identification/Description</i>
<b>Formal protections (NHRA)</b>	
National heritage site (Section 27)	None
Provincial heritage site (Section 27)	None
Provisional protection (Section 29)	None
Place listed in heritage register (Section 30)	None
<b>General protections (NHRA)</b>	
structures older than 60 years (Section 34)	Yes
archaeological site or material (Section 35)	Yes
palaeontological site or material (Section 35)	None
graves or burial grounds (Section 36)	Yes
public monuments or memorials (Section 37)	None
<b>Other</b>	
Any other heritage resources (describe)	None

## 6.3 Impact assessment

Impact analysis of cultural heritage resources under threat of the proposed development, are based on the present understanding of the proposed development.

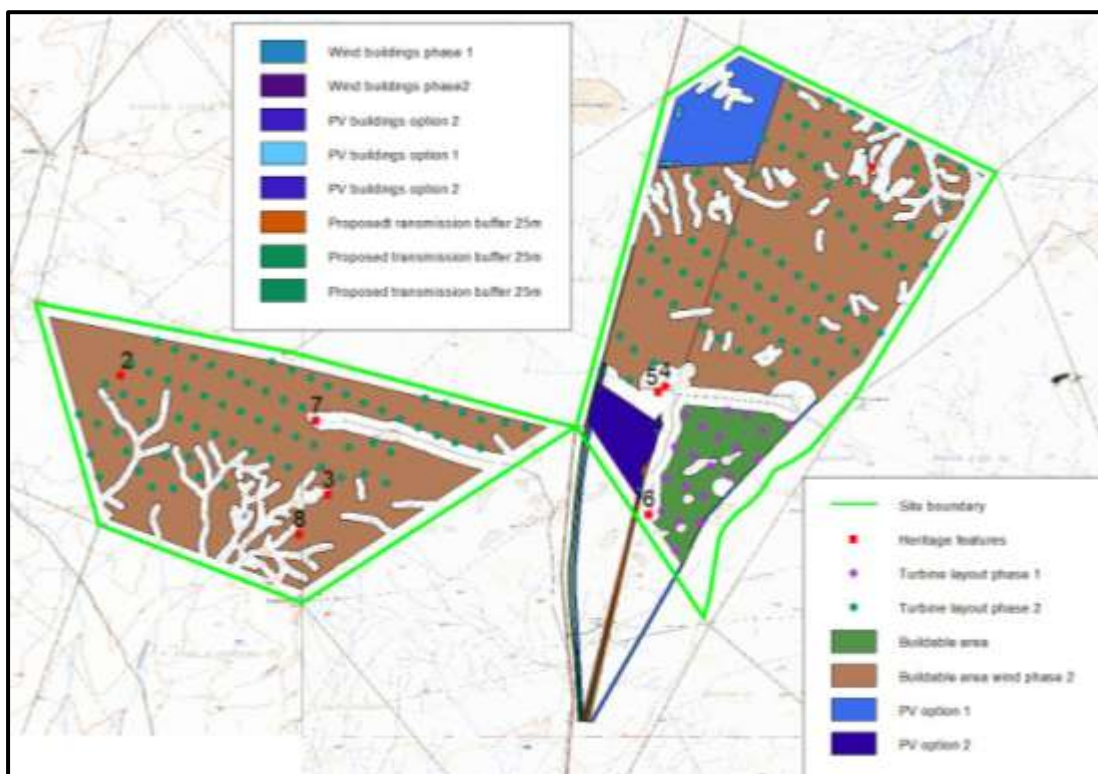


Fig. 19. Layout of the development in relationship to the heritage sites.

Environmental Parameter	<b>Pre-colonial: Stone Age sites</b>	
Issue/Impact/Environmental Effect/Nature	Many sites are still unknown. Their potential and significance therefore unknown. The impact will be the physical disturbance of the material and its context. Impact will be focused on a particular node, i.e. tower positions or access/inspection roads.	
Extent	Local	
Probability	Can occur	
Reversibility	Irreversible	
Duration	Permanent	
Cumulative effect	High	
Intensity/Magnitude	Moderate	
Significance Rating	Sites have a low significance on a region level – viewed as NHRA Grade III sites. Distinguish from find spots, which have low significance	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	1
Reversibility	4	2
Irreplaceable loss	4	3
Duration	4	4
Cumulative effect	4	1
Intensity/magnitude	3	1

Significance rating	75 – Negative, very high impact	12 – Negative, low impact
Mitigation measures	Once sites are identified, if the location is to be used for development purposes, then mitigation of the site will be necessary. This could require excavation, or at least mapping and collection of surface material	

Environmental Parameter	<b>Colonial Period: Farmsteads</b>
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole.
Extent	Local
Probability	Can occur
Reversibility	Reversible with human intervention
Duration	Permanent
Cumulative effect	High
Intensity/Magnitude	Moderate
Significance Rating	Sites have a high significance on a region level – viewed as NHRA Grade III sites.

	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	1
Reversibility	4	2
Irreplaceable loss	4	3
Duration	4	4
Cumulative effect	4	1
Intensity/magnitude	3	1
Significance rating	75 – Negative, very high impact	12 – Negative, low impact
Mitigation measures	Mitigation should take the form of isolating known sites and declare them as no-go zones with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed.	

Environmental Parameter	<b>Colonial Period: Cemeteries</b>
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole.
Extent	Local
Probability	Can occur
Reversibility	Irreversible
Duration	Permanent
Cumulative effect	High

Intensity/Magnitude	Moderate	
Significance Rating	Sites have a high significance on a local level – viewed as NHRA Grade III sites	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	1
Reversibility	4	2
Irreplaceable loss	4	3
Duration	4	4
Cumulative effect	4	1
Intensity/magnitude	3	1
Significance rating	75 – Negative, very high impact	12 – Negative, low impact
Mitigation measures	Mitigation should take the form of isolating known sites and declare them as no-go area with sufficient large buffer zones around them for protection. In exceptional cases mitigation can be implemented after required procedures have been followed.	

Environmental Parameter	<b>Colonial Period: Farming related features</b>	
Issue/Impact/Environmental Effect/Nature	The various features are subject to damage. Easier to identify and therefore easier to avoid. Variety of interconnected elements makes up the whole. Impact on part therefore implies an impact on the whole.	
Extent	Local	
Probability	Can occur	
Reversibility	Reversible with human intervention	
Duration	Permanent	
Cumulative effect	High	
Intensity/Magnitude	Moderate	
Significance Rating	Sites have a low significance on a region level – viewed as NHRA Grade III sites.	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	2	1
Probability	3	1
Reversibility	4	2
Irreplaceable loss	4	3
Duration	4	4
Cumulative effect	4	1
Intensity/magnitude	1	1
Significance rating	75 – Negative, very high impact	12 – Negative, low impact
Mitigation measures	Mitigation should take the form of isolating known sites and declare them as no-go areas with sufficient large buffer zones around them for protection. Mitigation can be implemented	

	after required procedures have been followed.
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## 7. RECOMMENDED MANAGEMENT MEASURES

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated/recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

### 7.1 Objectives

- Protection of archaeological, historical and any other site or land considered being of cultural value within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during mining activities.

The following shall apply:

- Known sites should be clearly marked in order that they can be avoided during construction activities.
- The contractors and workers should be notified that archaeological sites might be exposed during the construction activities.
- Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).

### 7.2 Control

In order to achieve this, the following should be in place:

- A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage sites and should be held accountable for any damage.
- Known sites should be located and isolated, e.g. by fencing them off. All construction workers should be informed that these are no-go areas, unless accompanied by the individual or persons representing the Environmental Control Officer as identified above.

- In areas where the vegetation is threatening the heritage sites, e.g. growing trees pushing walls over, it should be removed, but only after permission for the methods proposed has been granted by SAHRA. A heritage official should be part of the team executing these measures.

### 7.3 Safe guarding sites

It is recommended that buffer areas are set out around the identified sites:

- The Stone Age open sites should be demarcated with a buffer of a radius of at least 20 metres from the centre point of the site (see coordinates supplied in Section 5.4).
- The farmstead should be demarcated with a buffer of at least 10 metres from the outer edge of all structures and features such as gardens, orchards, etc.
- The cemetery should be demarcated by a buffer of at least 10 metres from the outer edge of the fence, or the last visible graves if there is no fence.
- The farming related feature should be demarcated by a buffer of at least 10 metres from the outer edge of the individual structures.

## 8. CONCLUSIONS

The aim of the survey was to locate, identify, evaluate and document sites, features and objects of cultural heritage significance found within the area in which it is proposed to develop a wind farm as well as a Photovoltaic solar facility.

The cultural landscape qualities of the region essentially consist of one component. It is a rural area in which the human occupation is made up of a pre-colonial element (Stone Age) as well as a much later colonial (farmer) component.

The following sites, features and objects of cultural heritage significance have been identified (Section 5.4):

- A number of open sites with surface scatterings of stone tools dating to the Middle and Later Stone Age were identified. These are mostly located on small hills or at the foot of the hill.

Because of its location in the open, it is highly likely that there would be a physical impact on it arising from the development of the wind farm and PV facility.

As first option it is recommended that these areas are avoided if possible. If that is not possible, it is recommended that systematic surface collections are made and that this material is housed at a museum. This can only be done under a permit from SAHRA.

- One old farmstead was identified. It dates to beginning of the 20<sup>th</sup> century and includes a house, barn and stock enclosures, all dating to slightly different periods in time. The structures were built with stone and bricks and have corrugated iron roofs.

Because of its location in the area classified as buildable for the wind turbines, it is highly likely that there would be a physical impact on it arising from the development of the wind farm.

If the buildings cannot be retained, it should be documented (photograph and mapped) in full before they are demolished, for which a permit from SAHRA would be required.

- A small informal cemetery with two graves. Only one has a headstone, that of HGJ Lintvelt, a young boy who died in 1913. These graves can probably be linked to the farmstead discussed above. These graves are probably linked to the homestead discussed above.

Because of its location in the area classified as buildable for the wind turbines, it is highly likely that there would be a physical impact on it arising from the development of the wind farm.

If the graves cannot be retained, they should be relocated to a formal cemetery after consultation with descendants and obtaining of all the relevant permits.

In order to safeguard the identified sites, it is recommended that buffer zones are set out around each of the identified sites (Section 7.3).

Based on current information regarding sites in the surrounding area, is viewed to have Grade III significance and therefore would not prevent the proposed development for continuing after the implementation of the proposed mitigation measures and its acceptance by SAHRA.

Therefore, from a heritage point of view we recommend that the proposed development and all alternatives proposed can continue. However, we request that if archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

## 9. REFERENCES

### 9.1 Data bases

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Environmental Potential Atlas, Department of Environmental Affairs and Tourism.  
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SAHRA Archaeology and Palaeontology Report Mapping Project (2009)

### 9.2 Literature

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### **9.3 Maps and aerial photographs**

1: 50 000 Topocadastral maps  
Google Earth

### **9.4. Interviews**

Mr Abram Mouton, who grew up in the region and is the foreman on the farm.

## APPENDIX 1: CONVENTIONS USED TO ASSESS THE IMPACT OF PROJECTS ON HERITAGE RESOURCES

### Significance

According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by its aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

<b>1. Historic value</b>			
Is it important in the community, or pattern of history			
Does it have strong or special association with the life or work of a person, group or organisation of importance in history			
Does it have significance relating to the history of slavery			
<b>2. Aesthetic value</b>			
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group			
<b>3. Scientific value</b>			
Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage			
Is it important in demonstrating a high degree of creative or technical achievement at a particular period			
<b>4. Social value</b>			
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons			
<b>5. Rarity</b>			
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage			
<b>6. Representivity</b>			
Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects			
Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class			
Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.			
<b>7. Sphere of Significance</b>	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			
Specific community			
<b>8. Significance rating of feature</b>			

1.	Low	
2.	Medium	
3.	High	

## APPENDIX 2. RELEVANT LEGISLATION

All archaeological and palaeontological sites and meteorites are protected by the National Heritage Resources Act (Act no 25 of 1999) as stated in Section 35:

(1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.

(2) Subject to the provisions of subsection (8)(a), all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

(4) 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.

In terms of cemeteries and graves the following (Section 36):

(1) Where it is not the responsibility of any other authority, SAHRA must conserve and generally care for burial grounds and graves protected in terms of this section, and it may make such arrangements for their conservation as it sees fit.

(2) SAHRA must identify and record the graves of victims of conflict and any other graves which it deems to be of cultural significance and may erect memorials associated with the grave referred to in subsection (1), and must maintain such memorials.

(3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority-

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation equipment, or any equipment which assists in the detection or recovery of metals.

(4) SAHRA or a provincial heritage resources authority may not issue a permit for the destruction or damage of any burial ground or grave referred to in subsection (3)(a) unless it is satisfied that the applicant has made satisfactory arrangements for the exhumation and re-interment of the contents of such graves, at the cost of the applicant and in accordance with any regulations made by the responsible heritage resources authority.