

**Heritage impact assessment for the
PROPOSED DEVELOPMENT OF PHOTOVOLTAIC POWER PLANTS ON FOUR
DIFFERENT LOCATIONS IN NORTH WEST AND NORTHERN CAPE PROVINCES**

HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF PHOTOVOLTAIC POWER PLANTS ON FOUR DIFFERENT LOCATIONS IN NORTH WEST AND NORTHERN CAPE PROVINCES

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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
June 2012

EXECUTIVE SUMMARY

HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED DEVELOPMENT OF PHOTOVOLTAIC POWER PLANTS ON FOUR DIFFERENT LOCATIONS IN NORTH WEST AND NORTHERN CAPE PROVINCES

Subsolar Energy proposes the construction, installation and operation of four Photovoltaic (Solar) Power Projects, three of which are located in North West Province and one in Northern Cape Province.

In accordance with Section 38 of the NHRA, an independent heritage consultant was therefore appointed by **Subsolar** 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 areas where it is planned to develop the photovoltaic power plants.

The cultural landscape qualities of the larger region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial/mining) component. The second component is an urban landscape (small towns) dating to the colonial period and is linked to the rural colonial landscape. Due to a lack of suitable resources, such as surface water and stone for building, this has always been a region of low population density, accounting for few heritage resources occurring in the region.

Based on the survey, the following were identified.

One of the areas southeast of Vryburg has been identified to contain a relatively high density of stone tools dating mostly to the Middle Stone Age (Section 5.4.1 below). This area is approximately 250 metres by 100 metres in size and occurs on a low ridge on the southern side of this particular property. The high ratio of cores and flakes to tools seems to indicate that this was a factory site where material, obtained from local outcrops, was worked into tools. This area has a density of approximately 5 objects per 2 m^2 .

- This area is viewed as highly sensitive and it is recommended that it is excluded from the proposed development. However, if that is not possible, a systematic surface collection should be made of this area prior to development taking place.

On the other three sites that were surveyed no sites, features or objects of cultural heritage significance were identified. Therefore, from a heritage point of view it is recommended that the proposed development be allowed to continue. However, this is subject to the following to conditions:

- It is requested that should archaeological sites or graves be exposed during construction work, it must 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
June 2012

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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. These people, according to archaeological evidence, spoke early variations of the Bantu Language. Because 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 DEVELOPMENT OF PHOTOVOLTAIC POWER PLANTS ON FOUR DIFFERENT LOCATIONS IN NORTH WEST AND NORTHERN CAPE PROVINCES

1. INTRODUCTION

Subsolar Energy proposes the construction, installation and operation of four Photovoltaic (Solar) Power Projects, three of which are located in North West Province and one in Northern Cape Province. For two of the sites alternatives have been identified.

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), No. 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 **Subsolar** 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 areas where it is planned to develop the photovoltaic power plants.

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

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

2.2 Limitations

The investigation has been influenced by the following factors:

- No information regarding the location of access roads, site offices and construction camps were available during the initial survey. Therefore this report only deals with the sites where the solar plants will be developed.
- The unpredictability of buried archaeological remains.

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>	<p>Provincial Heritage Resources Authority</p> <p>SAHRA Archaeology, Palaeontology and Meteorites Unit</p>	<p>Comments on built environment and decision to approve or not</p> <p>Comments and decision to approve or not</p>

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 five different areas as presented in Section 5 and as illustrated in the various Figures.

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. In this regard, various anthropological, archaeological, historical sources and heritage impact assessment reports were consulted, e.g. Breutz 1957, 1959, 1968; Cloete 2000; Couzens 2004; Lye 1975; Lye & Murray 1980; Richardson 2001; Van Schalkwyk, 2008, 2010, 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 Deed for the farms could not be traced.

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 areas that had to be investigated were identified by **Subsolar** by means of maps. The sites were surveyed by walking transects over each. These can be seen in the track logs that are presented with each site description.

In addition, where possible the various land owners were interviewed – see list of references below.

5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

5.1 Vryburg site 1

5.1.1 Site location and description

The study areas are located southwest of the town of Vryburg (Fig. 1). It consists of two irregular shaped sections of land, one being 19.9ha in size and the other 150ha. For more detail, please see the Technical Summary presented below.

Property details					
Province	North West Province				
Magisterial district	Vryburg				
Topo-cadastral map	2724BB				
Closest town	Vryburg				
Farm name	Waterloo 992				
Portions/Holdings	-				
Coordinates	Polygon (approximate)				
No	Latitude	Longitude	No	Latitude	Longitude
1	-27.01794	24.81009	2	-27.01788	24.80359
3	-27.01440	24.80249	4	-27.01436	24.78977
5	-27.02329	24.79026			
No	Latitude	Longitude	No	Latitude	Longitude
1	-27.00822	24.80421	2	-27.00588	24.80099
3	-27.00586	24.79544	4	-27.00842	24.79583

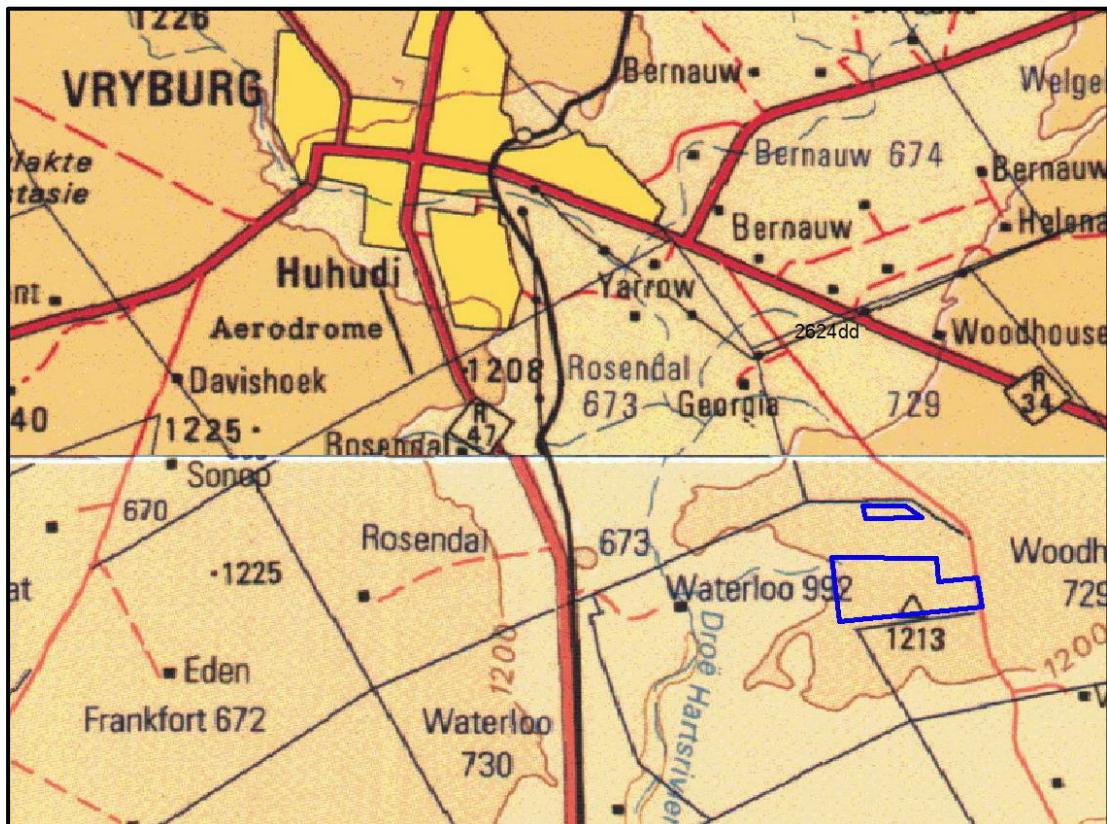


Fig. 1. Location of the study areas in regional context.
(Map 2624, 2724: Chief Surveyor-General)



Fig. 2. Aerial view of the study area.
(Photo: Google Earth)

The geology of the area is made up of siltstone, with dolomite occurring to the south. The original vegetation is classified as Kalahari Plateau Bushveld. The topography is described as low hills and the Dry Harts River occur about to 2 km to the west of the site. The study area is currently used for grazing purposes.

On the study area the vegetation changes from tall grass and thorn trees in the level areas, to shrub land on a low ridge in the south (Fig. 3:3 & 4).

What appear to be some old prospecting pits occur on the smaller northern section of the two study areas (see Fig. 3:2 below).



Fig. 3. Views over the study areas (northern above and southern below).

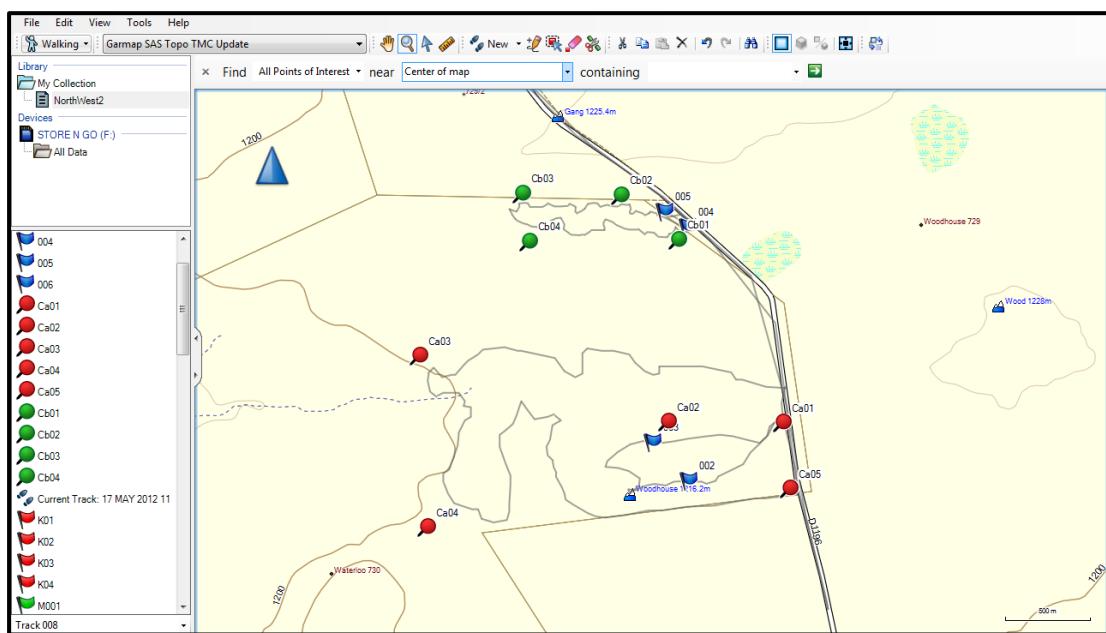


Fig. 4. Track log of the field survey.

5.1.2 Regional overview

Habitation of the larger geographical area took place since Early Stone Age times. According to Breutz (1959), stone tools dating to all phases of the Stone Age are found frequently, especially in the vicinity of watercourses and hills.

However, the largest legacy dating to the Stone Age are the numerous sites with rock engravings found in the region. Some of the farms in the Vryburg region known to have rock engravings are Bernauw, Content, Gemsbok Laagte, Klipfontein, Kinderdam, Melalarig, Schatkist, Verdwaal Vlakte and Wonderfontein, to mention but a few.

As yet, no sites dating to the Early Iron Age have been reported from the region and most sites date to the Late Iron Age. According to Breutz (1959) stone walled sites dating to the Late Iron Age and which can be linked to the Tswana occupation of the area, are found on a number of farms in the region, e.g. Waai Hoek and Brul Pan. However, the historic most important one, named Dithakong, is located some distance to the north-west. This site was first visited by early travellers such as Lichtenstein and John Campbell in the early part of the 19th century.

The town of Vryburg was founded in 1883 as the capital of the Republic of Stellaland. It attained municipal status in 1896. During the Anglo Boer War (1899-1902) a large concentration camp was established on the outskirts of the town.

The Tierkloof Institute, located to the south of Vryburg, on the farm Waterloo, was established in 1904 and served as centre for higher education for Tswana-speaking people.

5.1.3 Identified heritage sites

The following sites, features and objects of cultural significance have been identified to exist in the study region and their location is presented in Fig. 8 below:



Fig. 5. Location of identified sites in relation to the development areas.
(Map 2724BB: Chief Surveyor-General)
(Please note that on the map the farm name is indicated as Woodhouse 729, but that it actually should be Waterloo 992).

5.4.1 Stone Age

- Archaeological sites

NHRA Category	Archaeological and palaeontological sites
Protection status	General Protection - Section 35: Archaeology, palaeontology and meteorites
Location	

Description	A number of stone tools, all dating to the Middle Stone Age were identified on a small ridge that occurs on the southern side of the southern section of the two study areas. The material is mostly chert and jasper (an iron rich chert, resulting in the reddish colour), but some made from quartzite were also identified. Cores, flakes and unspecific tools (probably all scrapers) were identified. The high ratio of cores and flakes to tools seems to indicate that this was a factory site where material, obtained from local outcrops, was worked into tools. In contrast to the rest of the study area where stone tools occur in a very scattered manner on the surface, in this area it has a density of approximately 5 objects per 2 m ² .
Significance	Low on a regional level – Grade III
Mitigation	It is recommended that this ridge, at least for the section indicated in red on the map above, is avoided. This is an area of approximately 250 x 100 metres. If that is not possible, a systematic surface collection should be made of this area prior to development taking place.

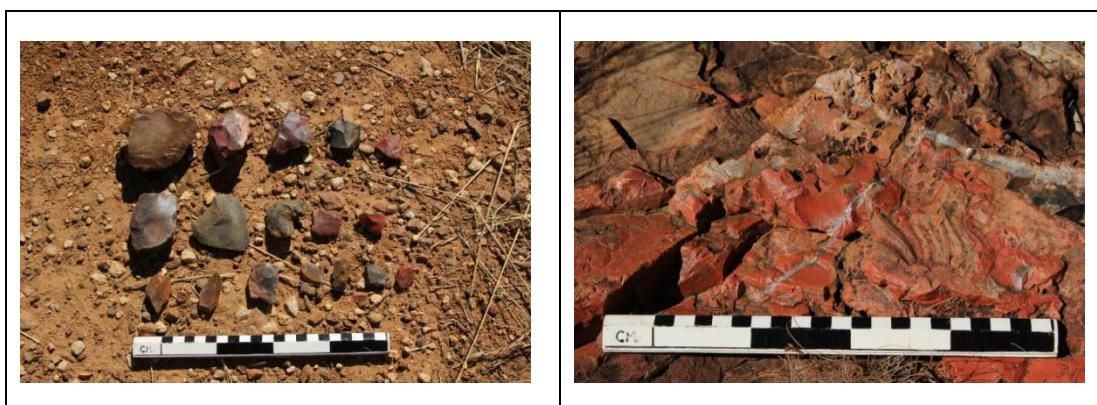


Fig. 6. The stone tools and possible quarry site that were identified.

5.4.2 Iron Age

- No sites, features or objects dating to the Iron Age were identified in the study areas.

5.4.3 Historic period

- No sites, features or objects dating to the historic period were identified in the study areas.

5.1.4 *Impact assessment*

An area located on a small ridge on the southern side of the southern section of the two study areas (Fig. 5), has been identified to have a relative high density of Middle Stone Age cores, flakes and tools.

This area stretches from just to the west of the trigonometrical beacon, eastwards for a distance of approximately 250 metres, and from the southern boundary fence, for a distance of approximately 100 metres northwards should be viewed as highly sensitive and it is recommended that it is excluded from the proposed development.

5.2 Vryburg site 2

5.2.1 Site location and description

This study area is located south of the town of Vryburg, on the western side of the N18 towards Hartswater (Fig. 5 & 6). It consists of a rectangular section of land approximately 150 ha in extent. For more detail, please see the Technical Summary presented below.

Property details					
Province	North West Province				
Magisterial district	Vryburg				
Topo-cadastral map	2724BA				
Closest town	Vryburg				
Farm name	Rosendal 673				
Portions/Holdings	-				
Coordinates	Polygon (approximate)				
No	Latitude	Longitude	No	Latitude	Longitude
1	-27.02066	24.75131	2	-27.01444	24.74619
3	-27.01695	24.73421	4	-27.02777	24.73486

The geology of the area is made up of tillite and the original vegetation is classified as Kalahari Plateau Bushveld. The topography is described as plains and pans and no hills, outcrops or rivers occur in the study area or immediate surrounding area. The study area is currently used for grazing purposes.

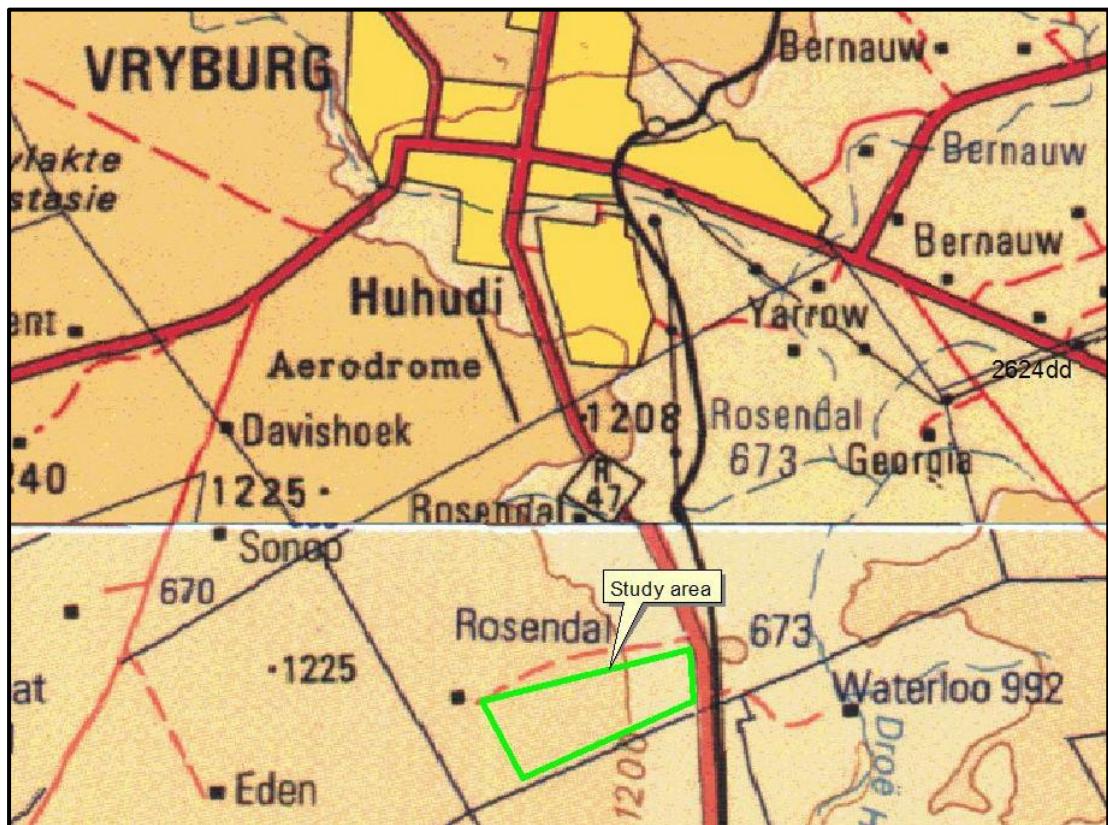


Fig. 7. Location of the study area in regional context.
(Map 2724, 2726: Chief Surveyor-General)



Fig. 8. Aerial view of the study area.
(Photo: Google Earth)



Fig. 9. Views over the study area looking north and east.

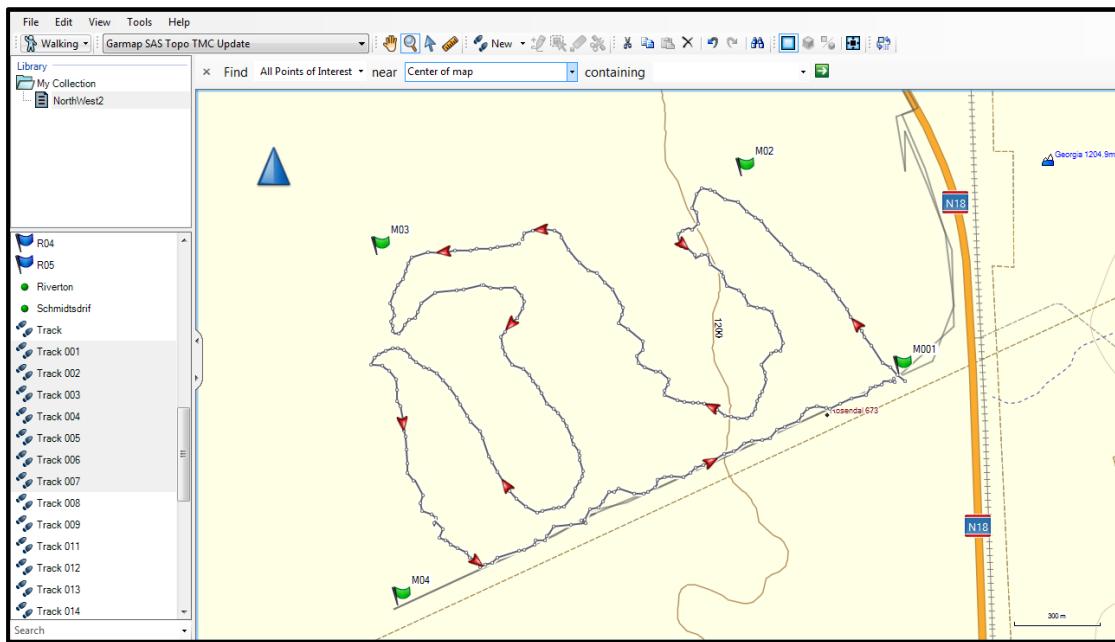


Fig. 10. Track log of the field survey.

5.2.2 ***Regional overview***

Habitation of the larger geographical area took place since Early Stone Age times. According to Breutz (1959), stone tools dating to all phases of the Stone Age are found frequently, especially in the vicinity of watercourses and hills.

However, the largest legacy dating to the Stone Age are the numerous sites with rock engravings found in the region. Some of the farms in the Vryburg region known to have rock engravings are Bernauw, Content, Gemsbok Laagte, Klipfontein, Kinderdam, Melalarig, Schatkist, Verdwaal Vlakte and Wonderfontein, to mention but a few.

As yet, no sites dating to the Early Iron Age have been reported from the region and most sites date to the Late Iron Age. According to Breutz (1959) stone walled sites dating to the Late Iron Age and which can be linked to the Tswana occupation of the area, are found on a number of farms in the region, e.g. Waai Hoek and Brul Pan. However, the historic most important one, named Dithakong, is located some distance to the north-west. This site was first visited by early travellers such as Lichtenstein and John Campbell in the early part of the 19th century.

The town of Vryburg was founded in 1883 as the capital of the Republic of Stellaland. It attained municipal status in 1896. During the Anglo Boer War (1899-1902) a large concentration camp was established on the outskirts of the town.

The Tierkloof Institute, located to the south of Vryburg, on the farm Waterloo, was established in 1904 and served as centre for higher education for Tswana-speaking people.

5.2.3 ***Identified sites***

The following sites, features and objects of cultural significance have been identified to exist in the study region and their location is presented in Fig. 11 below:

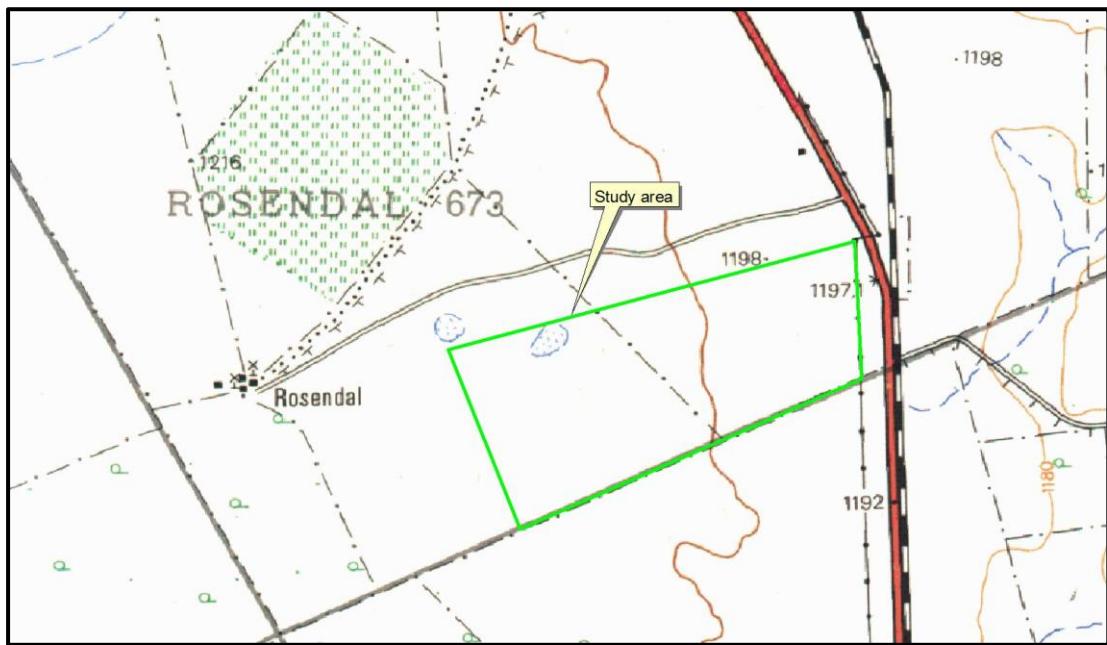


Fig. 11. Layout of the study area.
(Map 2724BA: Chief Surveyor-General)

5.2.3.1 Stone Age

- No sites, features or objects dating to the Stone Age were identified in the study area.

5.2.3.2 Iron Age

- No sites, features or objects dating to the Iron Age were identified in the study area.

5.2.3.3 Historic period

- No sites, features or objects dating to the historic period were identified in the study area.

5.2.4 **Impact assessment**

As no sites, features or objects of cultural significance were found in the study area, there would be no impact as a result of the proposed development.

5.3 Vryburg site 3

5.3.1 Site location and description

The study area is located to the southwest of Vryburg (Fig. 12). It is proposed to do two developments here, but for the purpose of this report both sections of the farm was surveyed at the same time. For more information, please see the Technical Summary presented below.

Property details					
Province	North West Province				
Magisterial district	Vryburg				
Topo-cadastral map	2624DC, 2724BA				
Closest town	Vryburg				
Farm name	Klondike 670				
Portions/Holdings	-				
Coordinates	Polygon (approximate)				
No	Latitude	Longitude	No	Latitude	Longitude
1	-26.99359	24.69524	2	-27.01434	24.68847
3	-27.00172	24.70984	4	-26.99071	24.70153

The geology of the area is made up of sand, with tillite to the east and dolomite to the west. The original vegetation is classified as Kalahari Plateau Bushveld. The topography is described as plains and pans and no hills, outcrops or rivers occur in the study area or immediate surrounding area. The study area is currently used for grazing purposes.

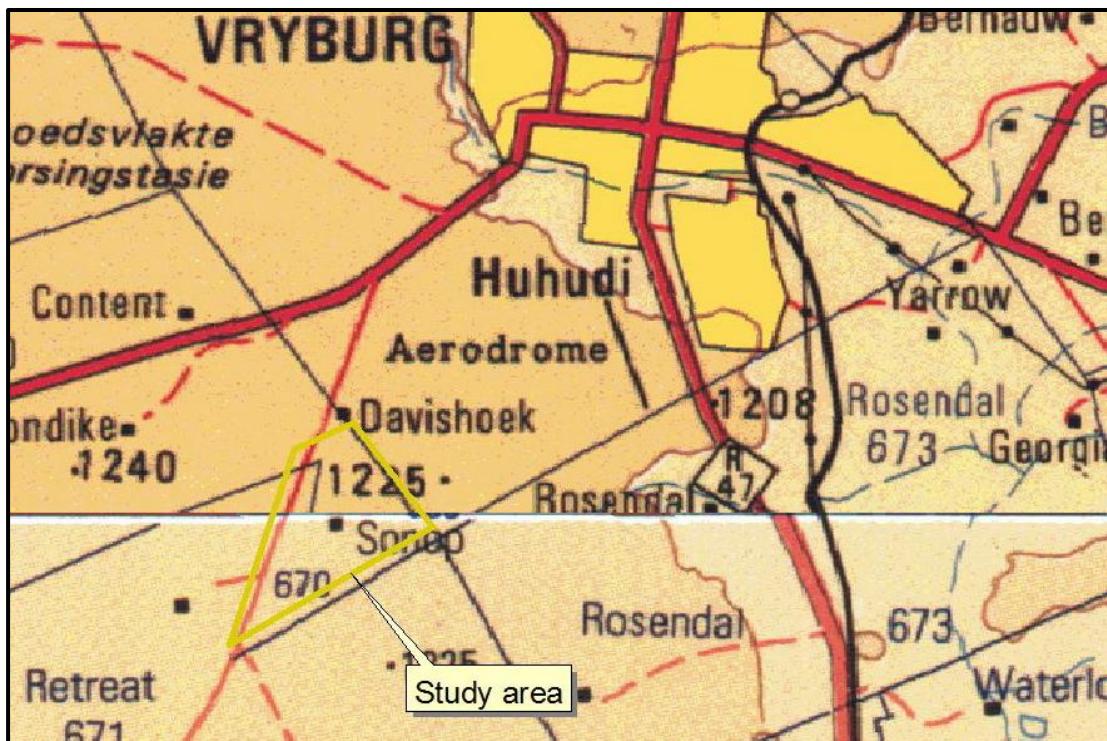


Fig. 12. Location of the study area in regional context.
(Map 2624, 2724: Chief Surveyor-General)

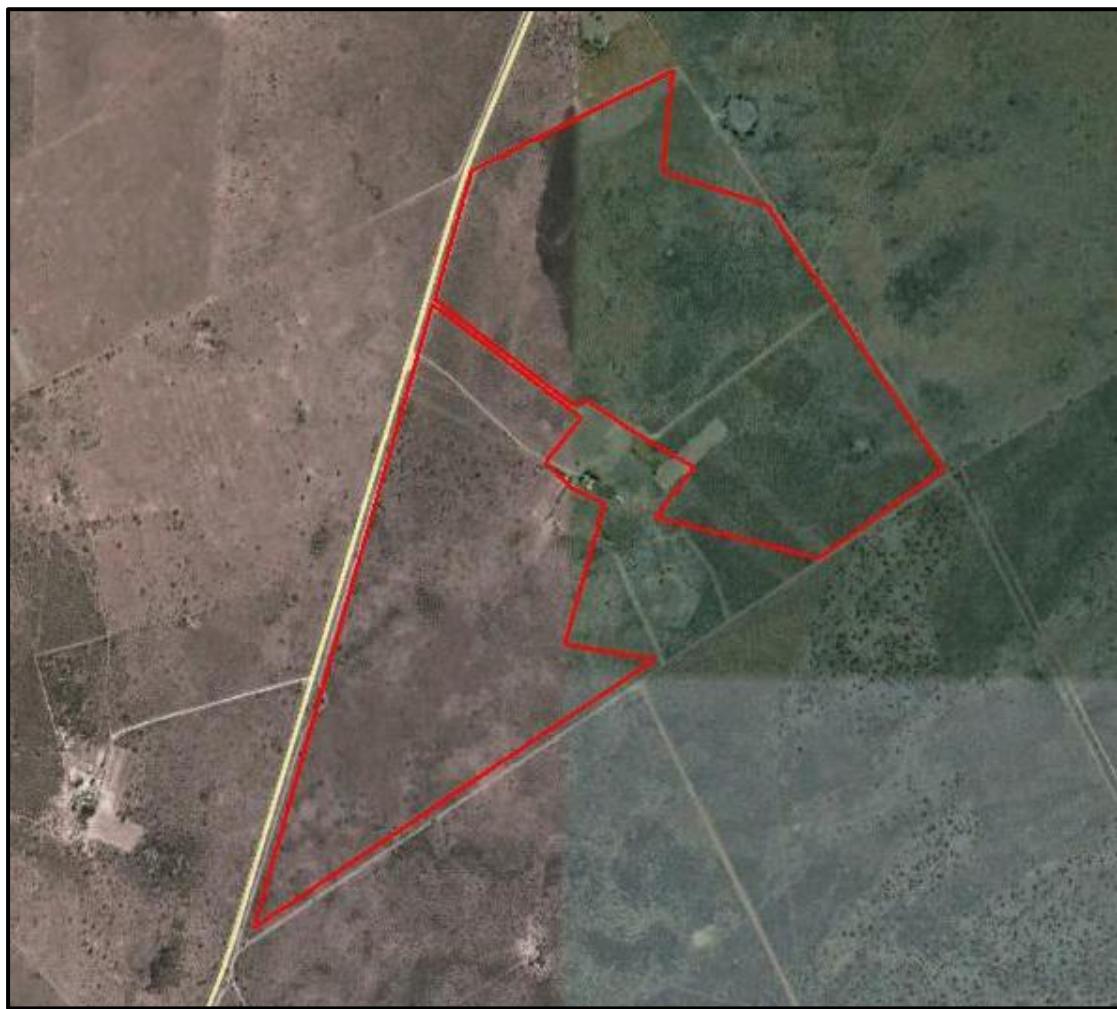


Fig. 13. Layout of the study area.
(Photo: Google Earth)



Fig. 14. Views over the study area looking south and west.

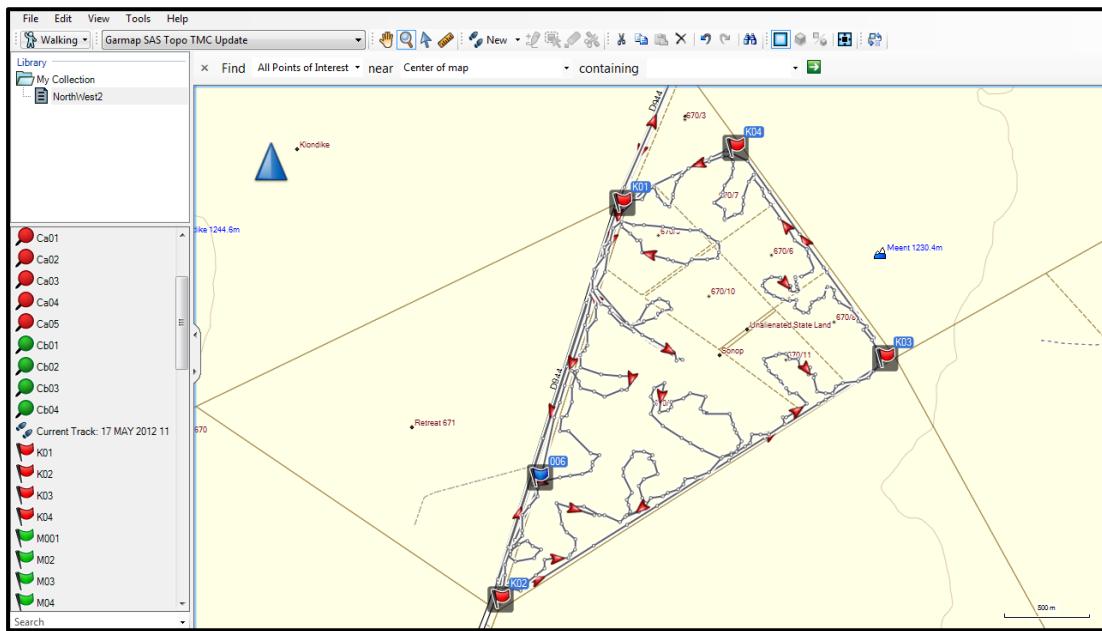


Fig. 15. Track log of the field survey.

5.3.2 ***Regional overview***

Habitation of the larger geographical area took place since Early Stone Age times. According to Breutz (1959), stone tools dating to all phases of the Stone Age are found frequently, especially in the vicinity of watercourses and hills.

However, the largest legacy dating to the Stone Age are the numerous sites with rock engravings found in the region. Some of the farms in the Vryburg region known to have rock engravings are Bernauw, Content, Gemsbok Laagte, Klipfontein, Kinderdam, Melalarig, Schatkist, Verdwaal Vlakte and Wonderfontein, to mention but a few.

As yet, no sites dating to the Early Iron Age have been reported from the region and most sites date to the Late Iron Age. According to Breutz (1959) stone walled sites dating to the Late Iron Age and which can be linked to the Tswana occupation of the area, are found on a number of farms in the region, e.g. Waai Hoek and Brul Pan. However, the historic most important one, named Dithakong, is located some distance to the north-west. This site was first visited by early travellers such as Lichtenstein and John Campbell in the early part of the 19th century.

The town of Vryburg was founded in 1883 as the capital of the Republic of Stellaland. It attained municipal status in 1896. During the Anglo Boer War (1899-1902) a large concentration camp was established on the outskirts of the town.

The Tierkloof Institute, located to the south of Vryburg, on the farm Waterloo, was established in 1904 and served as centre for higher education for Tswana-speaking people.

5.3.3 ***Identified sites***

The following sites, features and objects of cultural significance have been identified to exist in the study region and their location is presented in Fig. 12 below:

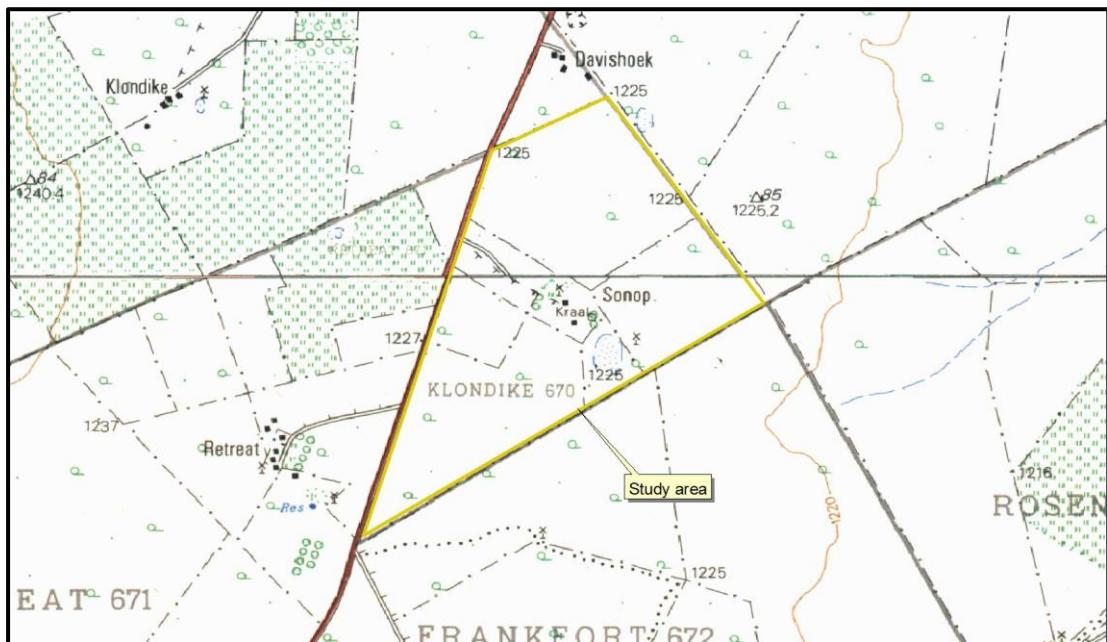


Fig. 16. Layout of the study area.
(Map 2624DC, 2724BA: Chief Surveyor-General)

5.3.3.1 Stone Age

- No sites, features or objects dating to the Stone Age were identified in the study area.

5.3.3.2 Iron Age

- No sites, features or objects dating to the Iron Age were identified in the study area.

5.3.3.3 Historic period

An old farmhouse, built c. 1944, occurs on the property (Fig. 13). According to Mr Jors Viljoen, owner of the farm, this property is definitely excluded from the proposed development.



Fig. 17. The old farmhouse on the farm Klondike.

- No sites, features or objects dating to the historic period were identified in the study area.

5.3.4 *Impact assessment*

As no sites, features or objects of cultural significance were found in the study area, there would be no impact as a result of the proposed development.

5.4 Riverton site

5.4.1 Site location and description

The study areas are located about 25 km north of the town of Kimberley (Fig. 17 & 18). It consists of an irregular shaped section of land, approximately 150ha in extent. For more detail, please see the Technical Summary presented below.

Property details					
Province	Northern Cape Province				
Magisterial district	Kimberley				
Topo-cadastral map	2824BD, 2428DB				
Closest town	Riverton				
Farm name	Hanskop Fontein 40				
Portions/Holdings	-				
Coordinates	Polygon (approximate)				
No	Latitude	Longitude	No	Latitude	Longitude
1	-28.49422	24.82399	2	-28.49009	24.81109
3	-28.49597	24.80474	4	-28.50068	24.80616
5	-28.49866	24.82497			

The geology of the area is made up of shale and the original vegetation is classified as Kimberley Thorn Bushveld. The topography is described as slightly irregular plains and pans and no hills or rivers occur in the study area or immediate surrounding area.

The study area can be described as greenfield veld and is currently used for agricultural (grazing) purposes.

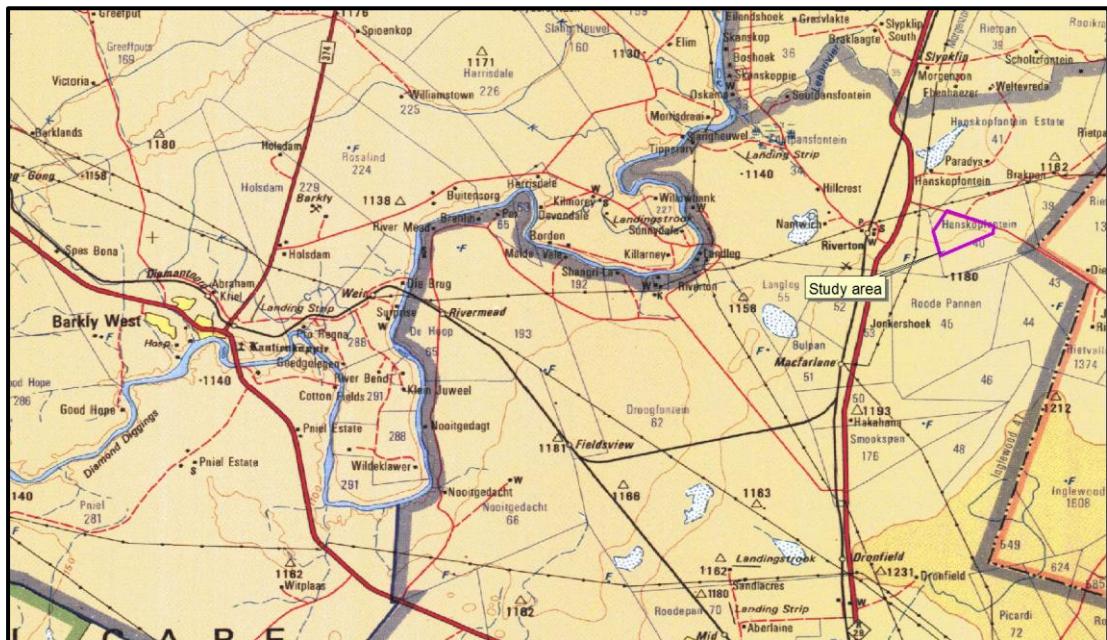


Fig. 17. Location of the study area in regional context.



Fig. 18. Aerial view of the study area.
(Photo: Google Earth).



Fig. 19. View over the study area.

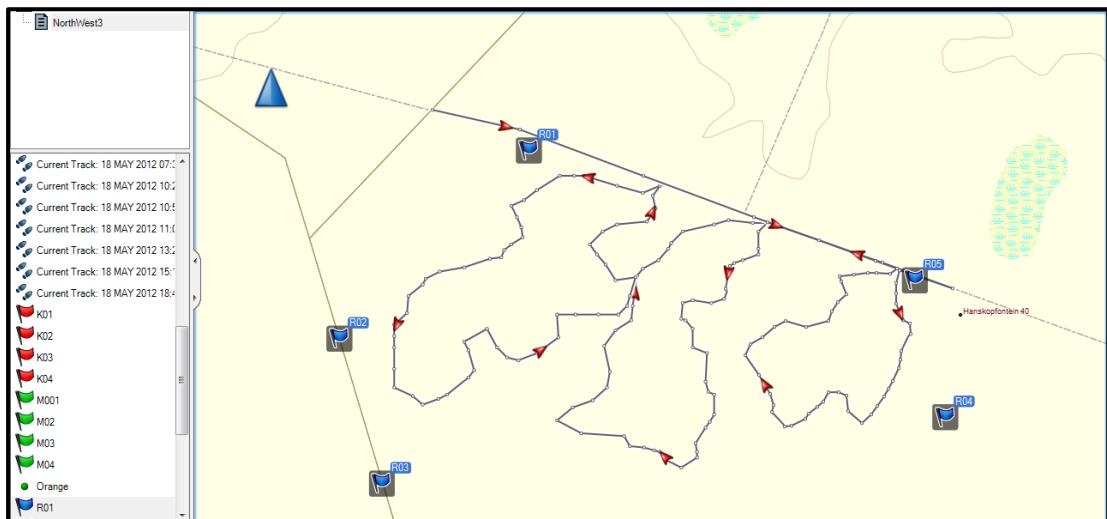


Fig. 20. Track log of the field survey.

5.4.2 Regional overview

Stone tools dating to the various phases of the Stone Age are reported to occur all over the larger region. Stone Age tools associated with the Early and Middle Stone Age are apparently common in the area, especially along the Vaal River. These are viewed as find spots rather than sites per se. That means that as most of these are surface finds, they are viewed to be out of context and do not have any significance. No stratified sites are known from the region.

A number of rock engraving sites dating to the Later Stone Age are known to exist in the larger region, especially in the region on the northern side of the Vaal River.

The town of Kimberley developed as a diamond-mining camp originally known as Colesberg Kopje. In 1873 it was declared a township and in 1877 attained municipal status. It was renamed after the British Colonial Secretary, the Earl of Kimberley. However, diamond mining was not only limited to the Kimberley area, but took place on a large scale all along the banks of the Vaal River, although in the latter region it was mostly alluvial mining activities.

During the Anglo Boer War (1899-1902), with the railway line passing through the region as well as the Vaal River, it was an important region and a number of blockhouses were erected by the British to protect the railway line and bridges across the river. The blockhouses were built Royal Engineers from masonry (Tomlinson 1997).

5.4.3 Identified sites

The following sites, features and objects of cultural significance have been identified to exist in the study region and their location is presented in Fig. 20 below:

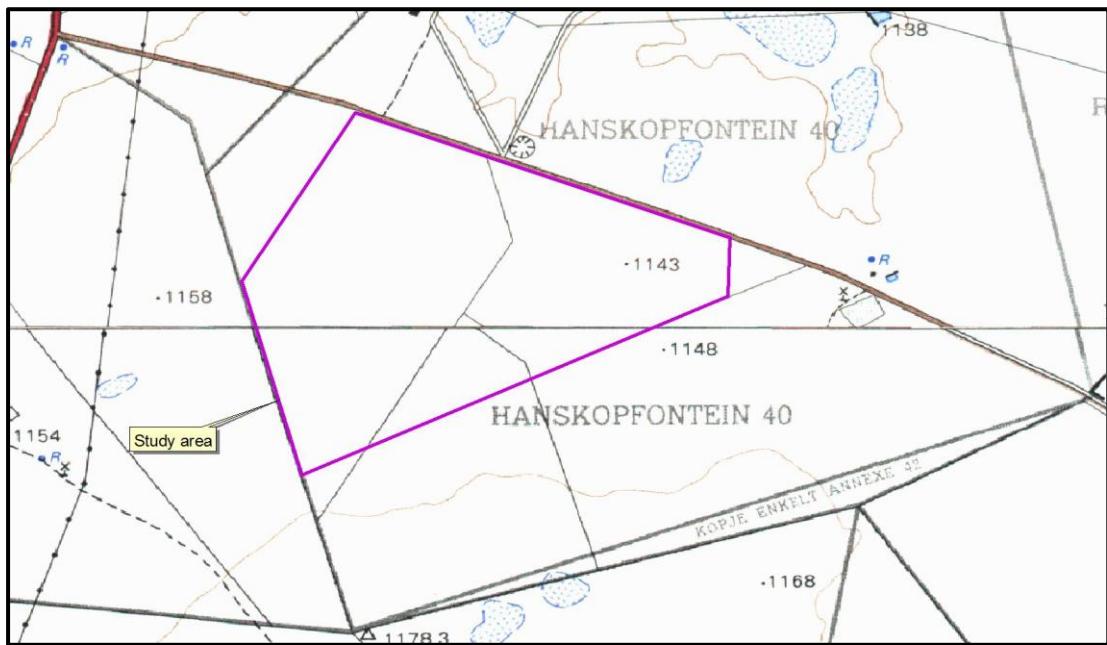


Fig. 21. Layout of the study area.
(Map 2824BD, 2428DB: Chief Surveyor-General)

5.4.3.1 Stone Age

- No sites, features or objects dating to the Stone Age were identified in the study area.

5.4.3.2 Iron Age

- No sites, features or objects dating to the Iron Age were identified in the study area.

5.4.3.3 Historic period

- No sites, features or objects dating to the historic period were identified in the study area.

5.1.4 ***Impact assessment***

As no sites, features or objects of cultural significance were found in the study area, there would be no impact as a result of the proposed development.

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 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.

Based on current information regarding sites in the surrounding area, all sites that might have occurred in the study region would have been judged to have Grade III significance.

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

Identified heritage resources	
<i>Category, according to NHRA</i>	<i>Identification/Description</i>
Formal protections (NHRA)	
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
General protections (NHRA)	
structures older than 60 years (Section 34)	None
archaeological site or material (Section 35)	Yes
palaeontological site or material (Section 35)	None
graves or burial grounds (Section 36)	None
public monuments or memorials (Section 37)	None
Other	
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 development.

- Objective: Protection of heritage resources**

Archaeological or other heritage materials occurring in the path of any surface or sub-surface disturbances associated with any aspect of the development are highly likely to be subject to destruction, damage, excavation, alteration, or removal. The objective should be to limit such impacts to the primary activities associated with the development and hence to limit secondary impacts during the medium and longer term working life of the facility.

Project Component/s	Excavation activities, construction of access roads and establishment of water supply pipeline and transmission pylons and staff accommodation.
Potential Impact	Wider areas or extended linear developments may result in further destruction, damage, excavation, alteration, removal or collection of heritage objects from their current context on the site.
Activity/Risk Source	Activities which could impact on achieving this objective include deviation from the planned lay-out of road/s and infrastructure without taking heritage impacts into consideration.
Mitigation: Target/Objective	A facility EMP that takes cognisance of heritage resources in the event of any future extensions of roads or other infrastructure.

Mitigation: Action/control	Responsibility	Timeframe
Provision for on-going heritage monitoring which provides guidelines on what to do in the event of any major heritage feature being encountered during any phase of development or operation.	ECO	Before commencement of development
Performance Indicator		Inclusion of further heritage impact consideration in any future extension of infrastructural elements. Immediate reporting to relevant heritage authorities of any heritage feature discovered during any phase of development or operation of the facility.
Monitoring		Officials from relevant heritage authorities (National and Provincial) to be permitted to inspect the operation on agreement with the contractor relating to the heritage component of the EMP.

7. CONCLUSIONS

The aim of this survey was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the areas of the proposed developments, to assess the significance thereof and to consider alternatives and plans for the mitigation of any adverse impacts.

The cultural landscape qualities of the larger region essentially consist of two components. The first is a rural area in which the human occupation is made up of a pre-colonial element (Stone Age and Iron Age) as well as a much later colonial (farmer and industrial/mining) component. The second component is an urban landscape (small towns) dating to the colonial period and is linked to the rural colonial landscape. Due to a lack of suitable resources, such as surface water and stone for building, this has always been a region of low population density, accounting for few heritage resources occurring in the region.

Based on the survey, the following were identified.

One of the areas southeast of Vryburg has been identified to contain a relatively high density of stone tools dating mostly to the Middle Stone Age (Section 5.4.1 above). This area is approximately 250 metres by 100 metres in size and occurs on a low ridge on the southern side of this particular property. The high ratio of cores and flakes to tools seems to indicate that this was a factory site where material, obtained from local outcrops, was worked into tools. This area has a density of approximately 5 objects per 2 m².

- This area is viewed as highly sensitive and it is recommended that it is excluded from the proposed development. However, if that is not possible, a systematic surface collection should be made of this area prior to development taking place.

On the other three sites that were surveyed no sites, features or objects of cultural heritage significance were identified. Therefore, from a heritage point of view it is recommended that the proposed development be allowed to continue. However, this is subject to the following to conditions:

- It is requested that should archaeological sites or graves be exposed during construction work, it must immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made.

8. REFERENCES

8.1 Data bases

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

8.2 Literature

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8.3 Maps and aerial photographs

1: 50 000 Topocadastral maps
Google Earth

8.4 Interviews

Mr Leon Weenink, owner of the farm at Riverton.

Mr J Viljoen, owner of the farm Klondike.

APPENDIX 1: CONVENTIONS USED TO ASSESS THE SIGNIFICANCE OF CULTURAL 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

1. Historic value			
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			
2. Aesthetic value			
It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group			
3. Scientific value			
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			
4. Social value			
Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons			
5. Rarity			
Does it possess uncommon, rare or endangered aspects of natural or cultural heritage			
6. Representivity			
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.			
7. Sphere of Significance		High	Medium
International			
National			
Provincial			
Regional			
Local			
Specific community			
8. Significance rating of feature			
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.