

Archaeological Impact Assessment

For the Proposed Kgalagadi Solar Facility, Near Brits, North West Province.

Prepared For

Savannah Environmental (Pty) Ltd

By



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**VERSION 1.0
6 March 2014**

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I, Jaco van der Walt as duly authorised representative of Heritage Contracts and Archaeological Consulting CC, hereby confirm my independence as a specialist and declare that neither I nor the Heritage Contracts and Archaeological Consulting CC have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which the client was appointed as Environmental Assessment practitioner, other than fair remuneration for work performed on this project.

A handwritten signature in black ink, appearing to read "Jaco van der Walt".

SIGNATURE: _____

EXECUTIVE SUMMARY

Site name and location: The proposed Kgabalatsane PV 2 Solar Facility will have a maximum generating capacity of 30MW and is an expansion of the already authorised 2 x 10MW PV facilities on the farm Syferfontein 430 JQ. The study area is located south of the Odi Aerodrome near Kgabalatsane in the North-West Province. The proposed project is to expand the facility that the total facility capacity is 50MW.

Purpose of the study: Phase 1 Archaeological Impact Assessment to determine the presence of cultural heritage sites and the impact of the proposed project on these resources within the areas demarcated for the solar development.

1:50 000 Topographic Map: 2527 DB

Environmental Consultant: Savannah Environmental (Pty) Ltd

Developer: Built Environment Africa Energy Services (Pty) Ltd

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

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Date of Report: 6 March 2014

Findings of the Assessment:

This report endeavoured to give an account of the history of the farm Syferfontein 430JQ. Some particulars could be traced regarding the interactions between whites and blacks in the vicinity. It seems that the Bakwena-ba-Magopa tribe owned the farm and also several other farms in the area from at least the late 1800's. It seems that prospecting and mining of iron ore commenced on the farm during the 1950's. The land was first leased to a Minerals Engineering Company South Africa Pty Ltd and subsequently to the Transvaal Vanadium Co Pty Ltd. The farm became part of the Bophuthatswana homeland in the late 1970's.

No sites of archaeological or heritage significance were identified during the survey and from a archaeological point of view there is no reason why the development cannot commence work.

A Palaeontological desktop study by Prof Marion Bamford (2012) also indicated that the development will have no impact on the fossil record of South Africa.

General

Due to high vegetation cover, archaeological visibility is low. The possible occurrence of unmarked or informal graves and subsurface finds can thus not be excluded. If during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find.

Disclaimer: *Although all possible care is taken to identify sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. Heritage Contracts and Archaeological Consulting CC and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

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- The results of the project;
- The technology described in any report;
- Recommendations delivered to the Client.

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ABBREVIATIONS

AIA: Archaeological Impact Assessment
ASAPA: Association of South African Professional Archaeologists
BIA: Basic Impact Assessment
CRM: Cultural Resource Management
ECO: Environmental Control Officer
EIA: Environmental Impact Assessment*
EIA: Early Iron Age*
EIA Practitioner: Environmental Impact Assessment Practitioner
EMP: Environmental Management Plan
ESA: Early Stone Age
GPS: Global Positioning System
HIA: Heritage Impact Assessment
LIA: Late Iron Age
LSA: Late Stone Age
MEC: Member of the Executive Council
MIA: Middle Iron Age
MPRDA: Mineral and Petroleum Resources Development Act
MSA: Middle Stone Age
NEMA: National Environmental Management Act
PRHA: Provincial Heritage Resource Agency
SADC: Southern African Development Community
SAHRA: South African Heritage Resources Agency

*Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are internationally accepted abbreviations and must be read and interpreted in the context it is used.

GLOSSARY

Archaeological site (remains of human activity over 100 years old)

Early Stone Age (~ 2.6 million to 250 000 years ago)

Middle Stone Age (~ 250 000 to 40-25 000 years ago)

Later Stone Age (~ 40-25 000, to recently, 100 years ago)

The Iron Age (~ AD 400 to 1840)

Historic (~ AD 1840 to 1950)

Historic building (over 60 years old)

1 BACKGROUND INFORMATION

Kind of study	Archaeological Impact Assessment
Type of development	Photovoltaic solar energy facilities
Rezoning/subdivision of land	Rezoning
Developer:	Built Environment Africa Energy Services (Pty) Ltd
Consultant:	Savannah Environmental
Farm owner:	Bakwena-ba-Magopa tribe

The Archaeological Impact Assessment report forms part of the EIA for the proposed project.

The aim of the study is to identify cultural heritage sites, document, and assess their importance within local, provincial and national context. It serves to assess the impact of the proposed project on non-renewable heritage resources, and to submit appropriate recommendations with regard to the responsible cultural resources management measures that might be required to assist the developer in managing the discovered heritage resources in a responsible manner. It is also conducted to protect, preserve, and develop such resources within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, a review of the heritage scoping report that includes collection from various sources and consultations; Phase 2, the physical surveying of the area on foot and by vehicle; Phase 3, reporting the outcome of the study.

During the survey no heritage sites were identified. General site conditions and features on sites were recorded by means of photographs, GPS locations, and site descriptions. Possible impacts were identified and mitigation measures are proposed in the following report.

This report must also be submitted to SAHRA for peer review.

1.1 Terms of Reference

Field study

Conduct a field study to: a) systematically survey the proposed project area to locate, identify, record, photograph and describe sites of archaeological, historical or cultural interest; b) record GPS points identified as significant areas; c) determine the levels of significance of the various types of heritage resources recorded in the project area.

Reporting

Report on the identification of anticipated and cumulative impacts the operational units of the proposed project activity may have on the identified heritage resources for all 3 phases of the project; i.e., construction, operation and decommissioning phases. Consider alternatives, should any significant sites be impacted adversely by the proposed project. Ensure that all studies and results comply with Heritage legislation and the code of ethics and guidelines of ASAPA.

To assist the developer in managing the discovered heritage resources in a responsible manner, and to protect, preserve, and develop them within the framework provided by the National Heritage Resources Act of 1999 (Act 25 of 1999).

1.2. Archaeological Legislation and Best Practice

Phase 1, an AIA or a HIA is a pre-requisite for development in South Africa as prescribed by SAHRA and stipulated by legislation. The overall purpose of a heritage specialist input is to:

- » Identify any heritage resources, which may be affected;
- » Assess the nature and degree of significance of such resources;
- » Establish heritage informants/constraints to guide the development process through establishing thresholds of impact significance;
- » Assess the negative and positive impact of the development on these resources;
- » Make recommendations for the appropriate heritage management of these impacts.

The AIA or HIA, as a specialist sub-section of the EIA, is required under the National Heritage Resources Act NHRA of 1999 (Act 25 of 1999), Section 23(2)(b) of the NEMA and sections 39(3)(b)(iii) of the MPRDA.

The AIA should be submitted, as part of the EIA, BIA or EMP, to the PHRA if established in the province or to SAHRA. SAHRA will be ultimately responsible for the professional evaluation of Phase 1 AIA reports upon which review comments will be issued. 'Best practice' requires Phase 1 AIA reports and additional development information, as per the EIA, BIA/EMP, to be submitted in duplicate to SAHRA after completion of the study. SAHRA accepts Phase 1 AIA reports authored by professional archaeologists, accredited with ASAPA or with a proven ability to do archaeological work.

Minimum accreditation requirements include an Honours degree in archaeology or related discipline and 3 years post-university CRM experience (field supervisor level).

Minimum standards for reports, site documentation and descriptions are set by ASAPA in collaboration with SAHRA. ASAPA is a legal body, based in South Africa, representing professional archaeology in the SADC region. ASAPA is primarily involved in the overseeing of ethical practice and standards regarding the archaeological profession. Membership is based on proposal and secondment by other professional members.

Phase 1 AIAs are primarily concerned with the location and identification of sites situated within a proposed development area. Identified sites should be assessed according to their significance. Relevant conservation or Phase 2 mitigation recommendations should be made. Recommendations are subject to evaluation by SAHRA.

Conservation or Phase 2 mitigation recommendations, as approved by SAHRA, are to be used as guidelines in the developer's decision making process.

Phase 2 archaeological projects are primarily based on salvage/mitigation excavations preceding development destruction or impact on a site. Phase 2 excavations can only be conducted with a permit, issued by SAHRA to the appointed archaeologist. Permit conditions are prescribed by SAHRA and includes (as minimum requirements) reporting back strategies to SAHRA and deposition of excavated material at an accredited repository.

In the event of a site conservation option being preferred by the developer, a site management plan, prepared by a professional archaeologist and approved by SAHRA, will suffice as minimum requirement.

After mitigation of a site, a destruction permit must be applied for from SAHRA by the client before development may proceed.

Human remains older than 60 years are protected by the National Heritage Resources Act, with reference to Section 36. Graves older than 60 years, but younger than 100 years fall under Section 36 of Act 25 of 1999 (National Heritage Resources Act), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of SAHRA. The procedure for Consultation Regarding Burial Grounds and Graves (Section 36[5]) of Act 25 of 1999 is applicable to graves older than 60 years that are situated outside a formal cemetery administrated by a local authority. Graves in this age category, located inside a formal cemetery administrated by a local authority, require the same authorisation as set out for graves younger than 60 years, in addition to SAHRA authorisation. If the grave is not situated inside a formal cemetery, but is to be relocated to one, permission from the local authority is required and all regulations, laws and by-laws, set by the cemetery authority, must be adhered to.

Human remains that are less than 60 years old are protected under Section 2(1) of the Removal of Graves and Dead Bodies Ordinance (Ordinance no. 7 of 1925), as well as the Human Tissues Act (Act 65 of 1983), and are the jurisdiction of the National Department of Health and the relevant Provincial Department of Health and must be submitted for final approval to the office of the relevant Provincial Premier. This function is usually delegated to the Provincial MEC for Local Government and Planning; or in some cases, the MEC for Housing and Welfare.

Authorisation for exhumation and reinterment must also be obtained from the relevant local or regional council where the grave is situated, as well as the relevant local or regional council to where the grave is being relocated. All local and regional provisions, laws and by-laws must also be adhered to. To handle and transport human remains, the institution conducting the relocation should be authorised under Section 24 of Act 65 of 1983 (Human Tissues Act).

1.3 Description of Study Area

1.3.1 Location Data

The proposed solar facility is located on the farm Syferfontein 430 JQ which is situated approximately 18 km north east of Brits in the North West Province. North of the site is the Odi Aerodrome that is no longer used as an airport. The study area is considered to be highly desirable for the establishment of a solar facility based on several key factors such as solar resource, climatic conditions, extent of the site, orographic conditions, availability of land, and grid connection.

The topography of the area is relatively flat and was used for agricultural purposes in the past. The study area falls within the bioregion described by Mucina *et al* (2006) as the Central Bushveld Bioregion with the vegetation described as Marikana thornveld. Land use in the general area is characterized by subsistence agriculture, dominated by crops and cattle farming. The study area is characterised by deep sandy to loamy soils.

1.3.2. Location Map

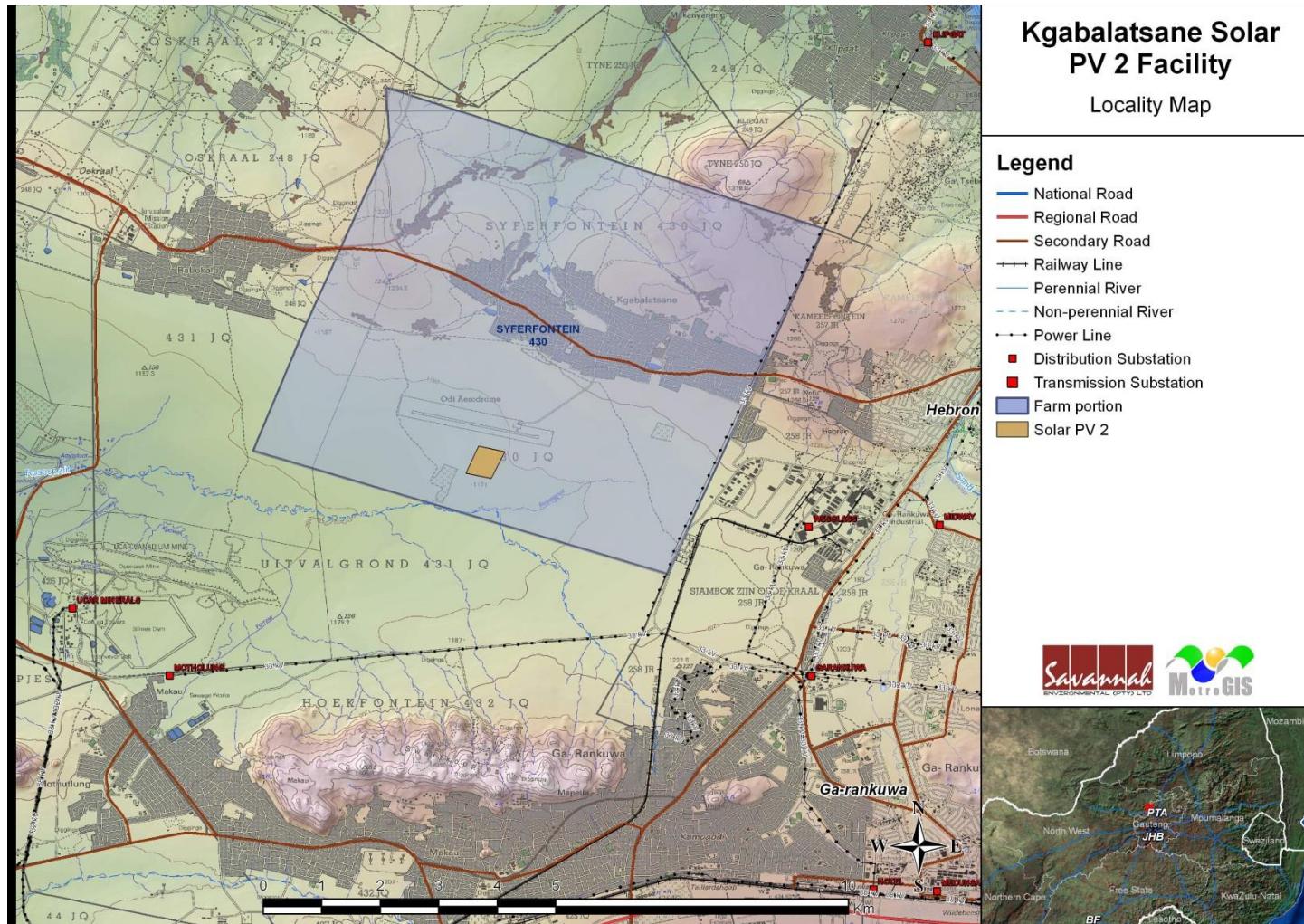


Figure 1: Location map provided by Savannah also indicating the study area in yellow.

2. APPROACH AND METHODOLOGY

The aim of the study is to cover archaeological databases and historical sources to compile a background history of the study area followed by field verification; this was accomplished by means of the following phases.

2.1 Phase 1 - Desktop Study

The first phase comprised a desktop study, gathering data to compile a background history of the area in question.

2.1.1 Literature Search

Utilising data for information gathering stored in the archaeological database at Wits and a search in the National archives. The aim of this is to extract data and information on the area in question, looking at archaeological sites, historical sites and graves of the area.

2.1.2 Information Collection

SAHRIS was consulted to collect data from previously conducted CRM projects in the region to provide a comprehensive account of the history of the study area.

2.1.3 Consultation

No consultation was conducted since no one resides in the study area.

2.1.4 Google Earth and Mapping Survey

Google Earth and 1:50 000 maps of the area were utilised to identify possible places where sites of heritage significance might be located.

2.1.5 Genealogical Society of South Africa

The database of the Genealogical Society was consulted to collect data on any known graves in the area.

2.2 Phase 2 - Physical Surveying

Due to the nature of cultural remains, the majority of which occurs below surface, a field survey of the PV footprint of 100 Ha and the power line alternative was conducted; focussing on drainage lines, hills and outcrops, high lying areas and disturbances in the topography. The study area was surveyed by means of vehicle and extensive surveys on foot by a professional archaeologist 9 March 2012 and again on the 3 March 2014.

All sites discovered inside the proposed development area was plotted on 1:50 000 maps and their GPS co-ordinates noted. Digital photographs were taken at all the sites.

2.3. Restrictions

Due to the fact that most cultural remains may occur below surface, the possibility exists that some features or artefacts may not have been discovered/ recorded during the survey. Low ground visibility of parts of the study area is due to sand cover, and the possible occurrence of unmarked graves and other cultural material cannot be excluded. Only the surface infrastructure footprint areas were surveyed as indicated in the location map, and not the entire farm. Although Heritage Contracts and Archaeological Consulting CC surveyed the area as thoroughly as possible, it is incumbent upon the developer to stop operations and inform the relevant heritage agency should further cultural remains, such as stone tool scatters, artefacts, bones or fossils, be exposed during the process of development.

3. NATURE OF THE DEVELOPMENT

The solar energy facility is proposed to comprise the following infrastructure:

- » Photovoltaic (**PV**) panels with an installed capacity of up to 50 MW
- » A new on-site substation to evacuate the power from the facility via a 132kV power line into the Eskom grid. There are two alternatives for grid connection, i.e. a distribution substation located approximately 5km from the site, and a transmission substation located approximately 10km from the site.
- » Mounting structure to be either rammed steel piles or piles with pre-manufactured concrete footings to support the PV panels.
- » Cabling between the project components, to be lain underground where practical.
- » Internal access roads and fencing.
- » Workshop area for maintenance, storage, and offices.

The overall aim of the design and layout of the facility is to maximise electricity production through **exposure to the solar radiation**, while minimising infrastructure, operation and maintenance costs, as well as **social and environmental impacts**. The use of solar energy for power generation can be described as a non-consumptive use of natural resources which emits zero greenhouse gas emissions. The generation of renewable energy contributes to South Africa's electricity generating market which has been dominated by coal-based power generation.

4. HISTORICAL AND ARCHAEOLOGICAL BACKGROUND OF THE STUDY AREA

4.1 Databases Consulted

Wits Archaeological Data Bases

Thirty seven previously recorded sites are on record for the 2527 DB topographic map at the Wits database. These sites all consist of MSA, LSA, Rock paintings and LIA Moloko stonewalled sites. None of these sites are in close proximity to the study area.

SAHRA Report Mapping Project

The SAHRA Report Mapping project (version 1) does not have any surveys on record close to the study area (in a radius of 1.6km). Several unpublished CRM projects were conducted to the south east (van der Walt 2008 & 2012, Pelser 2007, Kusel 2003, Van Schalkwyk. & Moifatswane 2003 and van Vollenhoven 1992.

Genealogical Society and Google Earth Monuments

Neither the Genealogical Society nor the monuments database at Google Earth (Google Earth also include some archaeological sites and historical battlefields) have any recorded sites in the study area.

4.2 Archaeological and Historical Information Available on the Study Area

The following report will endeavour to give an account of the history of this farm and also a brief overview of the history of the area and district in which it is located. The report has been divided into several sections that will focus on the following aspects:

- General history of human settlement in the area
- The history of black and white interaction in the area
- A history of specific land ownership and development of the farm where this could be traced

4.2.1. Historiography and Methodology

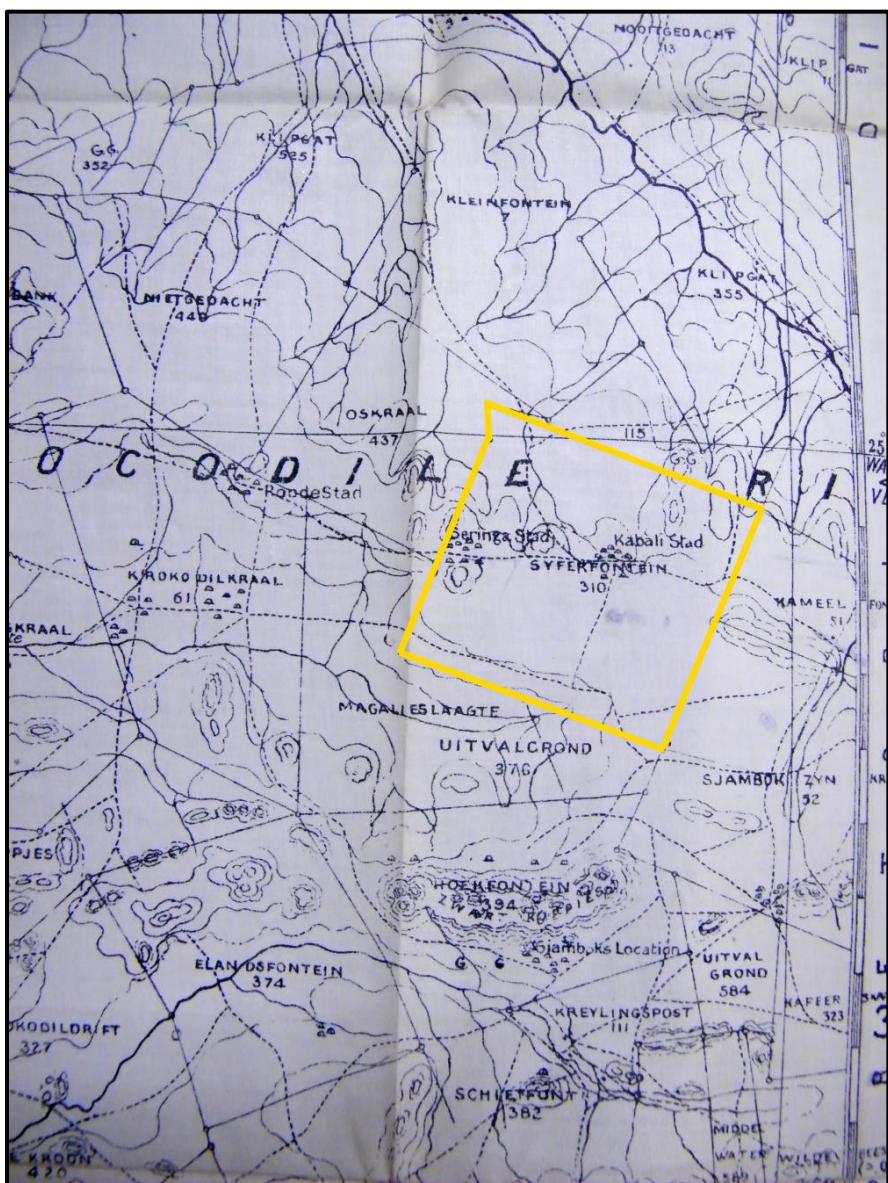
It was necessary to use a wide range of sources in order to give an accurate account of the history of the area in which the Syferfontein 430JQ is located. Sources include secondary source material, maps, electronic sources and archival documents. It was possible to trace a number of documents in the National Archives that specifically relates to issues on the farm Syferfontein 430JQ.

4.2.2. Maps of the Area under Investigation

Since the mid 1800's up until the present, South Africa has been divided and re-divided into various different districts. Since 1857, the farm Syferfontein 430JQ formed part of the Pretoria District. (Geskiedenisatlas van Suid-Afrika 1999: 17) In 1902 the Pretoria District was subdivided into various wards and the farm was now located in the Crocodile Ward of the Pretoria District.(Geskiedenisatlas van Suid-Afrika 1999: 18) In 1928 the District of Brits was established and the farm was now located in this district. This remained the case up until 1977, when South Africa was divided into various smaller Magisterial Districts. The area of the farm became part of the Odi Magisterial District. (Geskiedenisatlas van Suid-Afrika 1999: 25) Since the late 1970's, however, the farm was located in the Bophuthatswana Bantustan or homeland. This area was however reintegrated into South Africa in 1994. (Geskiedenisatlas van Suid-Afrika 1999: 26-27) It will also be noted that the farm was first known as Syferfontein 310 and later Syferfontein 430 JQ. The farm was also spelled as Cyferfontein in certain sources.



Figure 2. 1900 Map of the Transvaal. (Holmden1900[?])



References

- Territorial Boundaries -----
- District -----
- Ward -----
- Location -----
- Farm Names Beacons
and Boundaries } WATerval
544
- Sub-divisions of Farms
with names if any } HILLside
- Unsurveyed Farms
are marked thus } (U)

Figure 3. 1905 Major Jackson map of Syferfontein No. 310. (Major Jackson Series 1905)

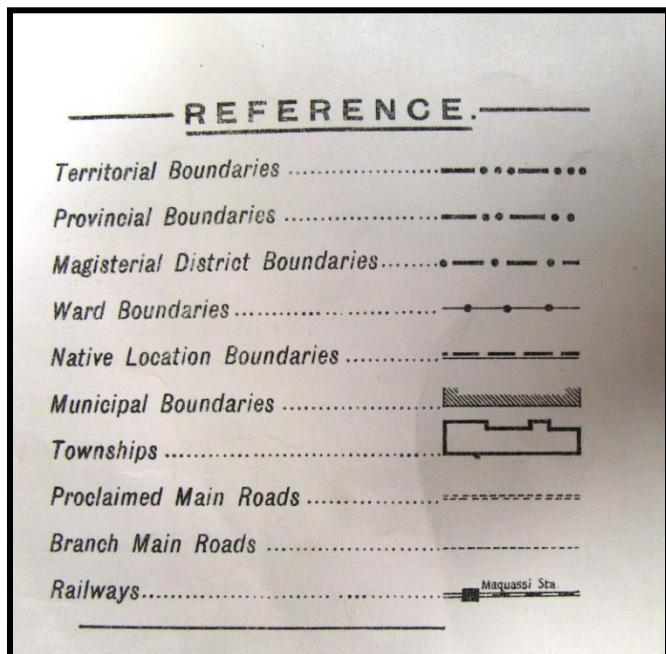
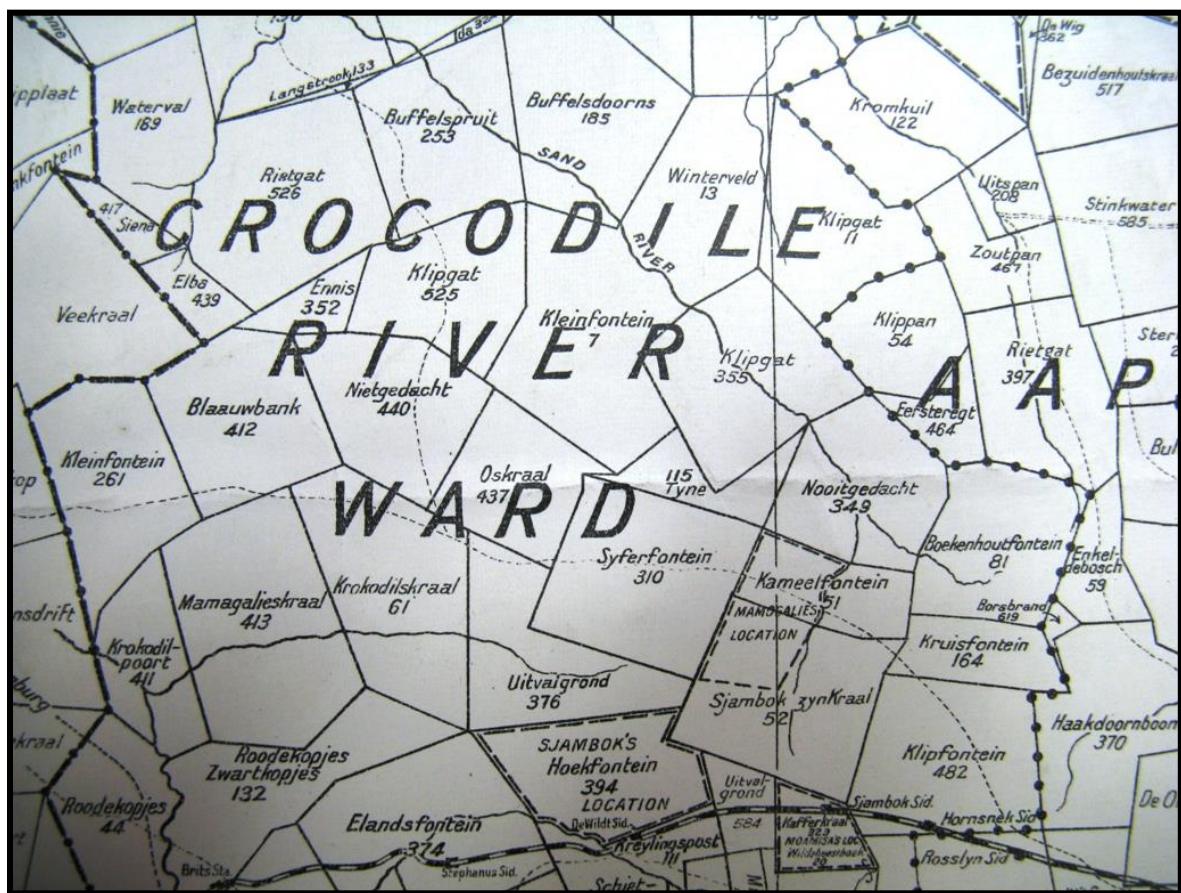
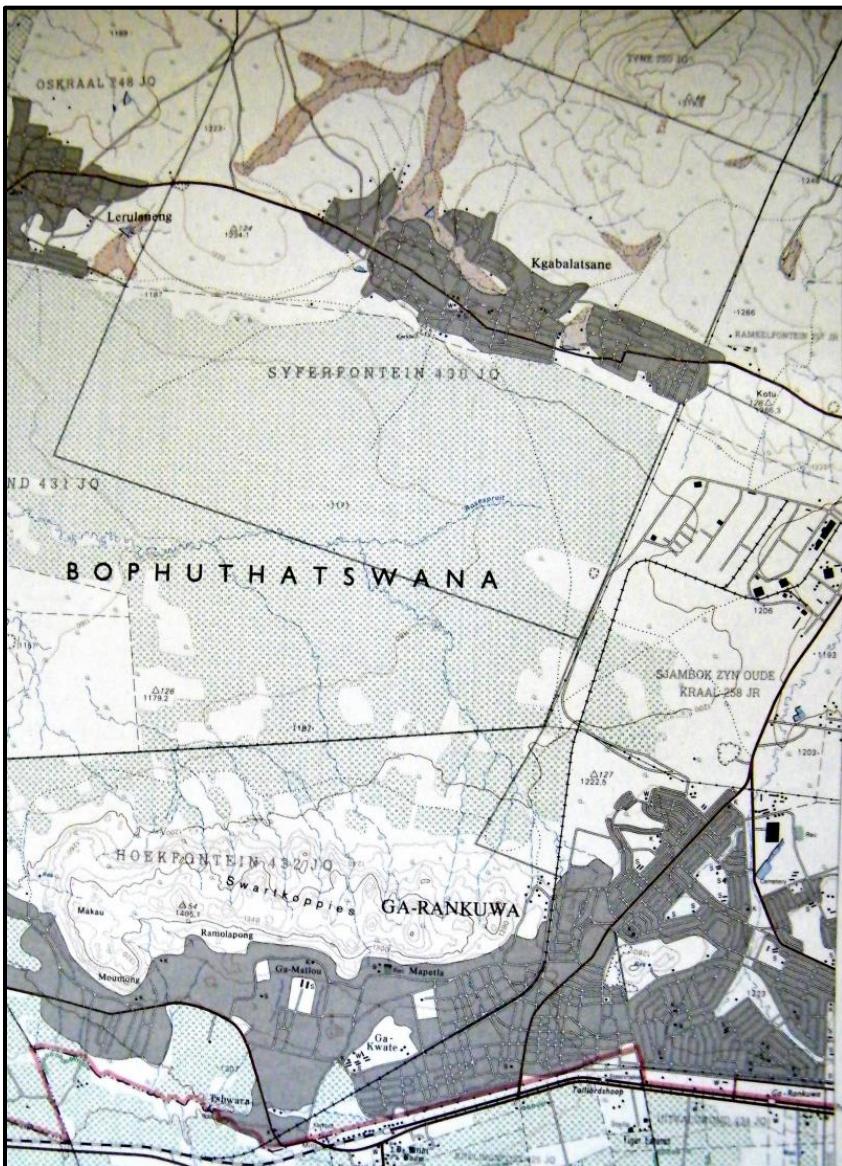


Figure 4. Map showing the location of the farm in the Crocodile Ward, Pretoria District. (Magisterial District of Pretoria Map 1917)



VERKLARING		REFERENCE	
Internationale Grense	International Boundaries	Provinciale Grense	Provincial Boundaries
Veelvoudige Spoorlyne	Multiple Track Railways	Enekispoorlyne	Single Track Railways
Geelektrifiseerde Spoorlyne	Electrified Railways	Smalspoorlyne	Narrow Gauge Railways
Densspoerlyne	Service Railways	Deurpaale en Hoofverkeerspaale	Freeways and Arterial Roads
Hoofpaale	Main Roads	Sekondêre Paale	Secondary Roads
Ander Paale	Other Roads	Douwe Paale en Voetslaanpaale	Tracks and Hiking Trails
Kraglyne	Power Lines	Telefoonlyne	Telephone Lines
Postkantore, Polisiestasies en - poste,	Post Offices, Police Stations and Posts,	Winkels, Hotelle, Skole en	Stores, Hotels, Schools and
Plekke van Aanbidding	Places of Worship	Lighthouses and Marine Lights	Lighthouses and Marine Lights
Vuurtorings en Seevaartligte		Seevaartbakens	Marine Beacons
★	★	◆	◆

VERKLARING		REFERENCE	
Trig. Bakens (Nommer en grondhoogte)	Trig. Beacons (Number and ground height)
Magnetiese Stasies en Grondtekens	Magnetic Stations and Ground Signs
Monumente	+	Monuments	
Dipbakke	—	Dipping Tanks	
Windpompe	—	Windmills	
Mure	—	Walls	
Grondbewaringswalle	—	Anti - erosion Walls	
Uitgravings	—	Excavations	
Standhouende Water	—	Perennial Water	
Nie - standhouende Water	—	Non - perennial Water	
Droë Panne	—	Dry Pans	
Fontene, Watergate en Putte	—	Springs, Waterholes and Wells	
Moerasse en Vlie	—	Marsches, Swamps and Vles	
Pyplyne	—	Pipelines	
Prominente Klipbanke	—	Prominent Rock Outrops	
Terrasse	—	Terraces	
Bewerkte Lande	—	Cultivated Lands	
Boorde en Wingerde	—	Orchards and Vineyards	
Bome en Bos	—	Trees and Bush	

Figure 5. 1985 Topographical Map of the farm Syferfontein 430 JQ. One can see that about 50% of the land was cultivated at the time, and that the settlement of Kgabalatsane was located on the farm. Bophuthatswana and Ga-Rankuwa are visible to the south of the property. (Topographical Map [2527DB] 1985)



Figure 6. 1989 Topographical Map of the farms Syferfontein No. 430. (Topographical Map 1989)

4.2.3. A Brief History of Human Settlement and Black And White Interaction in the Brits Area

J. S. Bergh's historical atlas of the four northern provinces of South Africa is a very useful source for the writing of local and regional history. Through this source it could be ascertained that there might have been sporadic occurrences of Malaria infections in the area of the farm Syferfontein 430JQ during the rainy season, up until the 1930's. Tsetse flies were however not present in the area at that time. (Geskiedenisatlas van Suid-Afrika 1999: 2)

There are no signs of Stone Age or Early Iron Age remains in the immediate vicinity of Syferfontein 430JQ. The closest Stone Age site is located to the southeast of the present day town of Rustenburg. This rock engraving is however located too far from the farm to give any indication that Stone Age people may have settled there in the past. (Geskiedenisatlas van Suid-Afrika 1999: 4-6) There are however signs that the present-day Rustenburg is located in an area that used to be a large Late Iron Age (1000-1800) site. (Geskiedenisatlas van Suid-Afrika 1999: 7)

Archaeological excavations on the farm Roodekoopjes located about 1.5km west of the town of Brits confirm the material heritage of Sotho and Tswana tribal origin in this area. It would seem that the Tswana tribes settled in the Rustenburg area around 1500 AD. There is evidence that the Bakwena-Ba-Magopa (which has as its totem the crocodile) settled on the banks of the Crocodile River in the 17th century. According to local reminiscences the Magaliesberg was named after one of their chiefs, either Mogale or Mamogale. (Steyn et al, 1978)

The Difaqane (Sotho), or Mfecane ("the crushing" in Nguni) was a time of bloody upheavals in Natal and on the Highveld, which occurred around the early 1820's until the late 1830's. (Geskiedenisatlas van Suid-Afrika 1999: 10) It came about in response to heightened competition for land and trade, and caused population groups like gun-carrying Griquas and Shaka's Zulus to attack other tribes. (Geskiedenisatlas van Suid-Afrika 1999: 14; 116-119) In 1825 as a result of the Mfecane Mzilikazi of the Matabeles conquered the area and displaced the Tswana tribes that used to live in the area. Mzilikazi established his kraal north of the Magaliesberg in the vicinity of the present day Hartbeespoort Dam. (Steyn et al, 1978) By the late 1820's that a mass-movement of Dutch speaking people in the Cape Colony started advancing into the northern areas. This was due to feelings of mounting dissatisfaction caused by economical and other circumstances in the Cape. This movement later became known as the Great Trek. This migration resulted in a massive increase in the extent of that proportion of modern South Africa dominated by people of European descent. (Ross 2002: 39)

In 1837 the Voortrekkers drove Mzilikazi into territory now located in present day Zimbabwe. As a result many of the Tswana tribes returned to their ancestral land and settled in the areas occupied by them before the advent of the Mfecane. (Steyn et al 1978) As can be expected, the movement of whites into the northern provinces would have a significant impact on the black people who populated the land. This was also the case in the North West Province, where Syferfontein 430JQ is located. The first white people settled on the farm De Kroon near Brits in the 1840's. At first many of these settlers lived in Hartbeeshuisies which later developed into more permanent structures. Water furrows were laid from the Crocodile River to irrigate their agricultural fields. (Steyn et al, 1978)

The area next to the Crocodile River north of the Magaliesberg was seen as a good place for human settlement. Although, there were malaria outbreak during the rainy seasons the area had adequate water supplies and game was plentiful. (Steyn et al, 1978) By 1860, the population of whites in the central Transvaal was already very dense and the administrative machinery of their leaders was firmly in place. Many of the policies that would later be entrenched as legislation during the period of apartheid had already been developed. (Geskiedenisatlas van Suid-Afrika 1999: 170)

By 1899, some farms in the area of Brits were owned by blacks. The title deeds to these farms were usually registered in the name of missionary societies. The Bakwena-Ba-Magopatribe owned Syferfontein 430JQ (then no. 310). The following table compiled from P.L. Breutz, *The Tribes of Rustenburg and Pilansberg Districts*, indicates the farms owned by this tribe in the Brits area.

Farm name and number	Morgen
Berseba 503	5046
Boschport 841	4459
Karreepoort 623	623
Leeuwkop 501	5374
Leeuwpan 1047	155
Losperfontein 119	3677
Pearl 395	98
Waaikraal 206	1718
Wolwekraal 512	2827
Wonderkop 835	373
Nooitgedacht 908	475
Kameelfontein 51	2199
Sjambokzyn Kraal 52	4264
Syferfontein 310	5110
Oskraal 437	1015
Uitvalgrond 376	494
Palmietfontein 59	5823
Kaalzandbult 34	3437
Uitvalgrond 326	494
Elandsfontein 20	5335
Elandsfontein21	2923

The ownership of these farms by the Bakwena-Ba-Magopa can be traced back at least to 16 March 1885. On this date the Location Commission of the South African Republic (ZAR) was informed by the then Chief of the Bakwena-Ba-Magopa, Jacobus More Mamogale that the tribe owned several farms with the Hermansburg Missionary Society. (Geskiedenisatlas van Suid-Afrika 1999: 217) The Location Commission had to report to the ZAR government on what land in the ZAR had to be set aside for black occupation.

During the twentieth century the 1913 Natives Land Act and the 1936 Native Trust and Land Act ensured that black "homelands" were to be established in various areas in South Africa. The farms mentioned above were assimilated into what was to become the "Independent Black State" of Bophuthatswana. (Geskiedenisatlas van Suid-Afrika 1999: 43) As part of Apartheid policy the town of Brits ideally located to become what was known as a border industry town. The town and surrounding farms provided work for black people residing in Bophuthatswana. In 1976 about 10 500 black labourers commuted daily between this town and the homeland. (Steyn et al, 1978)

4.2.4. Historical Overview of The Ownership And Development Of The Farm Syferfontein 430JQ

The following section gives an overview of some primary sources that could be located in the National Archives of South Africa, Pretoria. The documents mainly deal with the granting of business licenses to various people who wanted to operate business ventures on the farm. Some applications were submitted with sketches as to where the stores were to be located. Although the farm belonged to the Bakwena-Ba-Magopa Tribe it was held in guardianship for them by the Department of Native Affairs. Thus, the Minister of Native Affairs had to approve any development that occurred on the farm.

On 11 July 1918 the Governor-General approved in terms of section one of the Natives Land Act of 1913 and Clause Three of 1898 (Transvaal), a lease between Abraham Frederic Memorable, the registered owner of Syferfontein 310 and sub-chief of the Bakwena-Ba-Magopa Tribe and Gerhardus Petrus Johannes Erasmus. Erasmus wanted to establish a Blacksmith and Farrier business on the farm. The lease was approved for a period of 5 years for an annual rental sum of £9. This lease was renewed for another 5 years in 1923. (NASA, TAB, NTS, 1153: 94/162)

On 30 July 1919 a memorandum of agreement was drawn up between Johannes Otto More Mamogale, Paramount Chief of the Bakwena Tribe, and one Solly Ziman. Ziman wanted to establish a general dealer and butchery on the farm. The following sketch shows the location of the proposed store on Syferfontein:

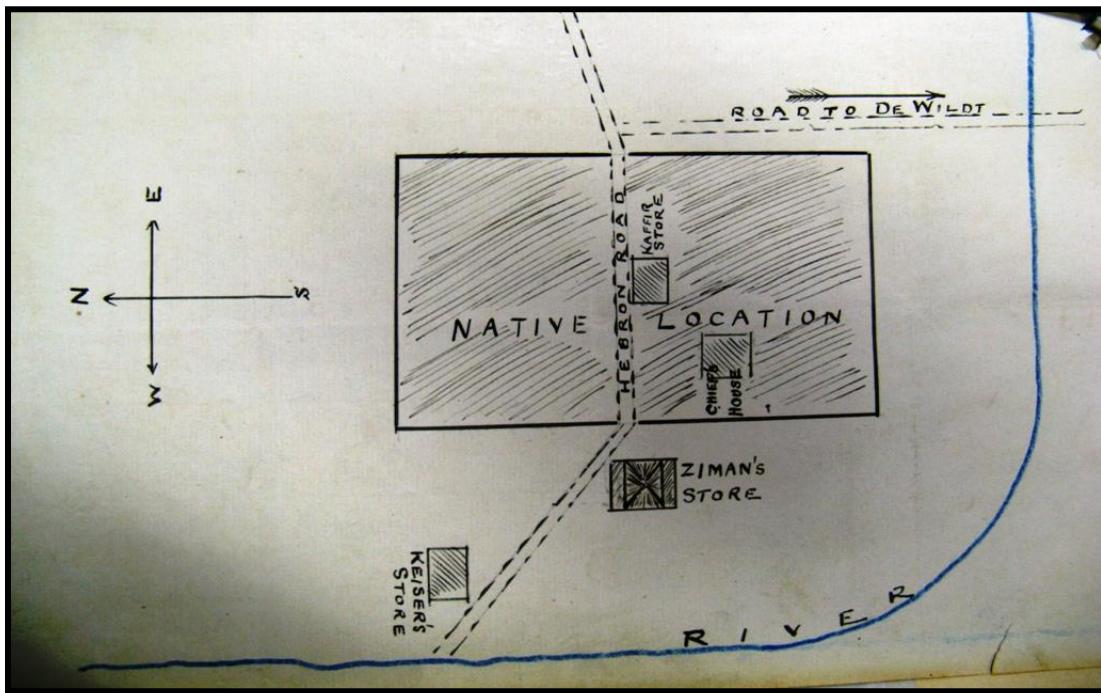


Figure 7. Sketch showing the proposed site for Ziman's store on Syferfontein. Source: NASA, TAB, NTS, 1156: 118/162

However, before the Ziman could establish his store he died. On 10 March 1924 the Governor General approved the cession of the lease from Solly Ziman's insolvent estate to the one A.F. Trouw. It would seem that Trouw was now going to establish this business venture on the farm. No mention is made in the file whether this actually happened. (NASA, TAB, NTS, 1156: 118/162)

Nevertheless, on 10 October 1924 various members of the Bakwena tribe signed a memorandum granting their chief J.O.M. Mamogale the right to enter into a lease with one John Ziman (no mention is made whether he is a relation to S. Ziman mentioned above) for trading rights on the farm Syferfontein no. 310 for a period of 5 years at a rental sum of £24 per annum. This lease was approved by the Governor General on 12 March 1925. Mention was made that there were already four businesses located on the property. Ziman was to establish a general dealer and butchery. However, the lease was not renewed in

1930 as the tribe unanimously refused to agree to a renewal of the lease as Ziman did not conduct his business in the past to the satisfaction of the tribe. (NASA, TAB, NTS, 1158: 136/162)

On 27 September 1926 the Prime Minister recommended to the Governor General to approve a first mortgage bond in terms of Clause Three of Law Three of 1989 (Transvaal) and of Section one of the Natives Land Act, 1913 in trust for the Bakwena Tribe under Chief Johannes Otto More Mamogale in favour of Johannes Wilhelmus Wessels for the sum of £3084. 19. 0 for a certain quitrent of the farm Syferfontein no. 310 measuring 5110 morgen and 502 square roods. As well as a certain quitrent on the farm Kaalzandbult no. 341 measuring 3437 morgen 52 square roods. Both farms were situated in the district of Pretoria. (NASA, TAB, URU, 875:3003)

At a tribal meeting held at Hebron, of the Bakwena-Ba-Magopa tribe in 30 March 1950 it was resolved that Ishmail Peege would be granted a trading site at Kgabaltsane on the farm Syferfontein 310. The lease was granted subject to rental of £12 per annum and the site could not exceed 40 by 40 yards. The Minister of Native affairs approved the lease agreement between Captain George More on behalf of the Tribe and Peege on 23 May 1950. (NASA, TAB, NTS, 1277: 1971/162)

At a tribal meeting held at Hebron, of the Bakwena-Ba-Magopatribe in 30 March 1950 it was resolved that Thomas Sepeng would be granted a trading site at Kgabaltsane on the farm Syferfontein 310. The lease was granted subject to rental of £12 per annum and the site could not exceed 40 by 40 yards. The Minister of Native affairs approved the lease agreement between Captain George More on behalf of the Tribe and Sepeng on 23 May 1950. (NASA, TAB, NTS, 1277: 1972/162)

At a tribal meeting held at Hebron, of the Bakwena-Ba-Magopatribe in 30 March 1950 it was resolved that Petrus Thipe would be granted a trading site at Kgabaltsane on the farm Syferfontein 310. The lease was granted subject to rental of £12 per annum and the site could not exceed 40 by 40 yards. The Minister of Native affairs approved the lease agreement between Captain George More on behalf of the Tribe and Thipe on 23 May 1950. (NASA, TAB, NTS, 1277: 1975/162) The following sketch accompanied the three above mentioned applications:

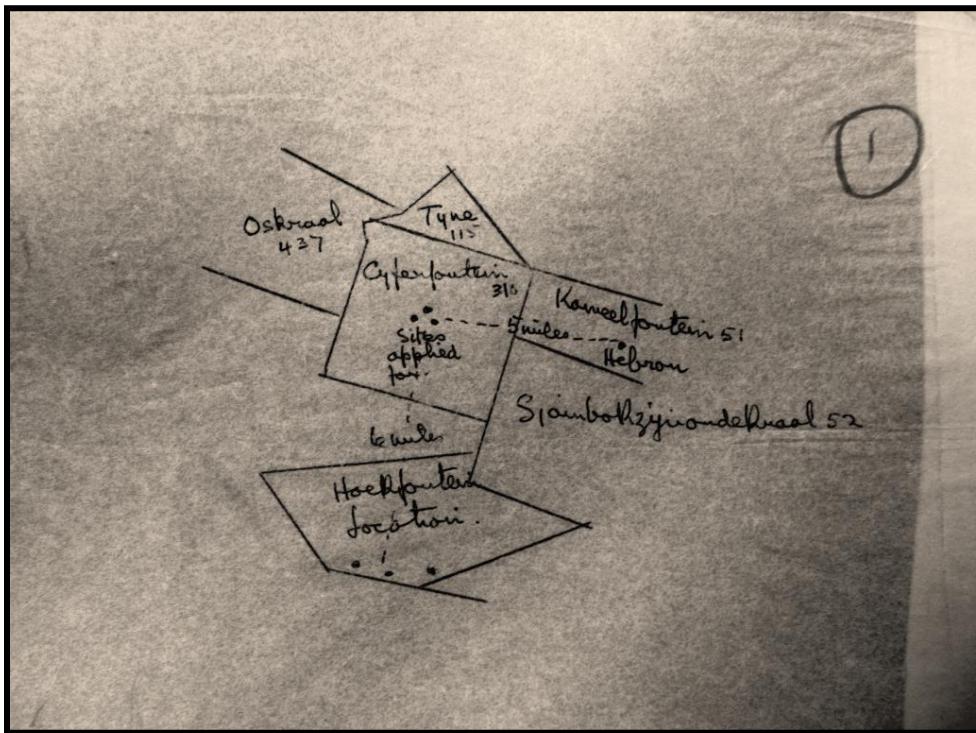


Figure 8. Sketch showing the proposed trading sites applied for on "Cyferfontein 310". From: NASA, TAB, NTS, 1277: 1975/162

According to a tribal resolution taken at a public meeting of the Bakwena-Ba-Magopa on 25 June 1956 one Lazarus Mothlabi was granted the authority to trade as a butcher on the farm Syferfontein for a rental of

£1 per month. Mention was made of one Pego who had a General's Dealer license on the farm and there were some issues asked as to whether these two businesses would not be too closely located to one another. (NASA, TAB, NTS, 1323: 2819/162) The following sketch was included to indicate the respective geographically locations of the two businesses on the farm.

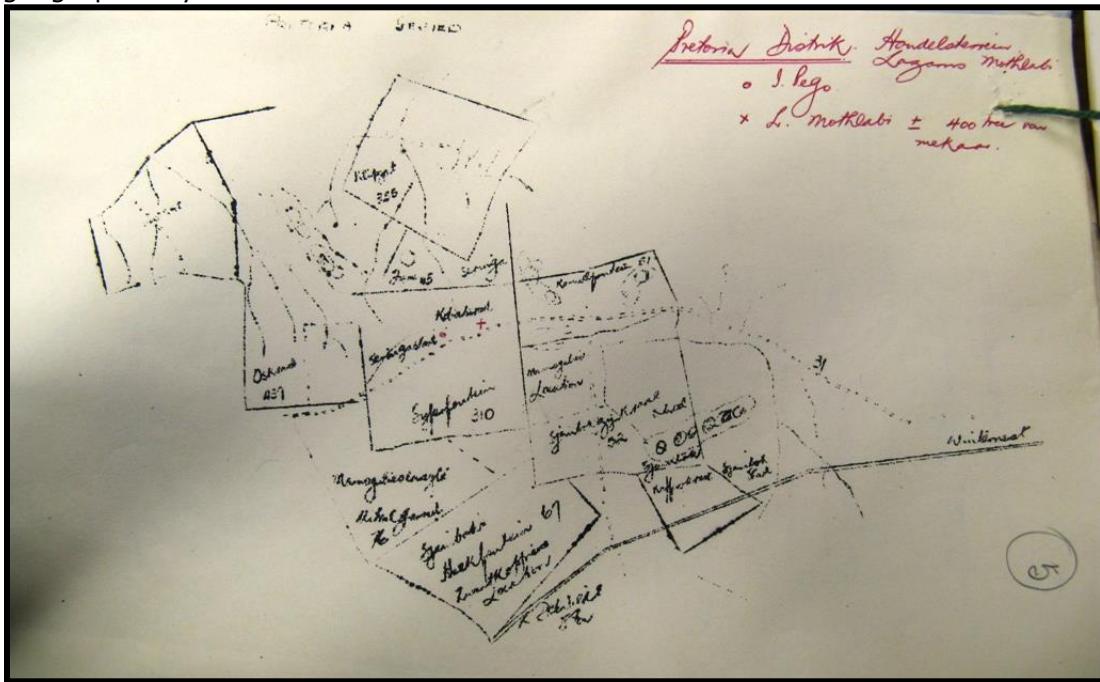


Figure 9. Sketch showing the respective locations of the stores of J. Pego and L. Mothlabi. Source: NASA, TAB, NTS, 1323: 2819/162

On 15 August 1957 a mineral lease for the farm Syferfontein 310, in the Pretoria District was entered into between Minister H.F. Verwoerd (in his capacity of Trustee for the Bakwena-Ba-Magopa Tribe) and Minerals Engineering Company South Africa Pty Ltd. The lease was entered into for the exclusive right to mine, win and recover iron ore on the farm. The agreement was entered into for a period of 5 years. The conditions of the lease stated that no permanent buildings could be erected on the lease area without the consent of the Minister of Native Affairs. It further stated that no new roads could be constructed without the approval of the Native Commissioner of Pretoria. The lessee was granted the right to drill for water and to sink boreholes. The lessee had to comply strictly with any provision, maintenance, repair or removal of housing for black staff. The lease was subject to the lessee paying a minimum royalty of £50 per quarter for the rights to the iron ore. It was also mentioned that the lessee had to employ black staff from the Bakwena-Ba-Magopa Tribe. (NASA, TAB, BAO, 10086/17: D52/1093/29) According to a handwritten memo in the file the company changed its name to Transvaal Vanadium Co Pty Ltd in December 1960. This came about after Anglo-American purchased shares in the company. The lease was renewed for a period of 5 years on 21 August 1962 and again on 31 December 1968. (NASA, TAB, BAO, 10086/17: D52/1093/29)

On 28 January 1975 UCAR Minerals Corporation a Vanadium extraction plant near Brits situated on the farms Krokodilkraal and Uitvalgrond wanted permission to secure an assured water supply for their mining operations from the farms Uitvalgrond and Syferfontein. It was noted that the territory was Bantu Trust Property. The company wanted permission to proceed with survey and exploratory drill work for the sinking of boreholes. Mention is made that the company would in future employ 250 black people from the area. However, in response to the request a letter dated 11 April 1975 by the Magistrate at Odi states that the land was in fact not Bantu Trust Property, but owned Tribal land and that Syferfontein belonged to the Bakwena-ba-Magopa tribe. The Chief of the tribe was J.E.L Mamogale and the company was instructed to ascertain from the tribe as to whether any servitudes can be granted on the property. Once the tribal authority was to give its consent the matter can be approved by the State President. There is no correspondence in the file which states whether this request was indeed subsequently approved. (NASA, TAB, BAO, 10139: D52/1547/13)



Figure 10. Sketch indicating the red lines on Syferfontein for the sinking of potential boreholes on the farm.
From: NASA, TAB, BAO, 10139: D52/1547/13.

5. HERITAGE SITE SIGNIFICANCE AND MITIGATION MEASURES

The presence and distribution of heritage resources define a 'heritage landscape'. In this landscape, every site is relevant. In addition, because heritage resources are non-renewable, heritage surveys need to investigate an entire project area, or a representative sample, depending on the nature of the project. In the case of the proposed PV Solar Facility the local extent of its impact necessitates a representative sample and only the footprint of the areas demarcated for development were surveyed. In all initial investigations, however, the specialists are responsible only for the identification of resources visible on the surface.

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The following criteria were used to establish site significance:

- » The unique nature of a site;
- » The integrity of the archaeological/cultural heritage deposits;
- » The wider historic, archaeological and geographic context of the site;
- » The location of the site in relation to other similar sites or features;
- » The depth of the archaeological deposit (when it can be determined/is known);
- » The preservation condition of the sites;
- » Potential to answer present research questions.

Furthermore, The National Heritage Resources Act (Act No 25 of 1999, Sec 3) distinguishes nine criteria for places and objects to qualify as 'part of the national estate' if they have cultural significance or other special value. These criteria are:

- » Its importance in/to the community, or pattern of South Africa's history;
- » Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
- » Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- » Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- » Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- » Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- » Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- » Its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa;
- » Sites of significance relating to the history of slavery in South Africa.

5.1. Field Rating of Sites

Site significance classification standards prescribed by SAHRA (2006), and approved by ASAPA for the SADC region, were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 9 of this report.

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction

Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

5.2 Impact Rating of Assessment

The criteria below are used to establish the impact rating of a site. as provided by the client:

- » The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- » The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- » The **duration**, wherein it will be indicated whether:
 - * the lifetime of the impact will be of a very short duration (0-1 years), assigned a score of 1;
 - * the lifetime of the impact will be of a short duration (2-5 years), assigned a score of 2;
 - * medium-term (5-15 years), assigned a score of 3;
 - * long term (> 15 years), assigned a score of 4; or
 - * permanent, assigned a score of 5;
- » The **magnitude**, quantified on a scale from 0-10 where; 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- » The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1-5 where; 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- » The **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- » the **status**, which will be described as either positive, negative or neutral.
- » the degree to which the impact can be reversed.
- » the degree to which the impact may cause irreplaceable loss of resources.
- » the *degree* to which the impact can be mitigated.

The **significance** is calculated by combining the criteria in the following formula:

$$S = (E + D + M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- » < 30 points: Low (i.e., where this impact would not have a direct influence on the decision to develop in the area),
- » 30-60 points: Medium (i.e., where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- » > 60 points: High (i.e., where the impact must have an influence on the decision process to develop in the area).

6. BASELINE STUDY-DESCRIPTION OF SITES

For the area in question the history and archaeology of the Sotho Tswana are of interest. The ceramic sequence for the Sotho Tswana is referred to as Moloko and consists of different facies with origins in either the Icon facies or a different branch associated with Nguni speakers. Several sites belonging to the Madikwe and Olifantspoort facies (from Icon) have been recorded close to the project area. These sites date to between AD 1500 and 1700 and predate stone walling ascribed to Sotho-Tswana speakers.

What is of interest here is the Swartkoppies mountain range that extends into the southern part of the study area this area is renowned for its LIA stone walled settlements. A detailed survey of the mountain range on the farm Hoekfontein (located to the west of the current study area) identified 470 individual archaeological sites (Kusel 2003) covering an area of about 1000 hectares (Pelser 2007). Unfortunately almost 110 of these sites were already negatively impacted on in 2007. Another site worth mentioning is the LIA stone walled complex at Medunsa on the southern border of the prospecting area. The sites are currently being researched as part of a Master's Thesis project. Following the classification system used for Makau these sites belong to Mike Taylor's (1979) group 2, particularly group 2a. These sites date to between AD 1650 and AD 1840.

Sotho Tswana stonewalled sites with Uitkomst pottery have been found close to the study area and dates to the seventeenth to nineteenth centuries.

It is important to note that the entire farm was not surveyed but only the footprint of the proposed PV layout area, access roads and power line as indicated in Figure 11. The study area has been used extensively for agricultural purposes in the past, these activities would have destroyed any surface indications of heritage sites. Currently these areas are now fallow with knee to waist high grass limiting archaeological visibility (Figure 12 -15). The proposed access route follows a dirt track to the south east of the Odi airfield (figure 16). The proposed power line option traverses old agricultural fields from the PV plant in an easterly direction where it links up with the Garankua substation (Figure 17). For the most part the powerlines follow existing power lines. (Figure 18 & 19). During the survey no sites of heritage significance was identified. A desktop study by Prof Marion Bamford (2012) indicated that the proposed development will not have negative effect on palaeontological heritage.



Figure 11:PV footprint, access route and power line connection (blue) and track logs of the area that was surveyed.



Figure 12: PV area viewed from the North



Figure 13: PV area viewed from the South



Figure 14:PV area viewed from the west



Figure 15. PV area viewed from the east.



Figure 16: Access route viewed from the North



Figure 17: Garankuwa substation



Figure 18: Eastern section of power line



Figure 19: Site conditions for power line option 2

Impact evaluation of the proposed project on heritage resources

Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological and paleontological material or objects.

	Without mitigation	With mitigation
Extent	Local (2)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low (1)
Probability	Probable (1)	Probable (1)
Significance	9 (low)	8 (low)
Status (positive or negative)	Negative	Negative
Reversibility	Not reversible	Not reversible
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	

Mitigation:

No sites were identified during the survey. However, if any archaeological or cultural material is uncovered during construction or operation a qualified archaeologist must be contacted to verify and record the find. Mitigation will then include documentation and sampling of the material. This will also be required if any paleontological material is uncovered. In the case of the power line a heritage walk down is recommended when the alignment has been finalised. Any sites recorded during this exercise can ideally be preserved by micro adjustments to pylon positions.

Cumulative impacts:

Archaeological and cultural sites are non-renewable and impact on any archaeological context or material will be permanent and destructive.

Residual Impacts: Depletion of archaeological record of the area.

7. RECOMMENDATIONS

No sites of archaeological or heritage significance were identified during the survey. A Palaeontological desktop study by Prof Marion Bamford (2012) for the area also indicated that there is no impact foreseen on the fossil record of South Africa. However, if during construction, any archaeological finds are made (e.g. stone tools, skeletal material), the operations must be stopped, and the archaeologist must be contacted for an assessment of the finds.

Connection to the power grid consists of two options. The power line will have a low impact on archaeological resources since the area it will be traversing is highly disturbed by agricultural activities. It is however recommended that the final route option preferred by the developers is subjected to an archaeological walk down before development can start.

Due to low archaeological visibility in the study area caused by high vegetation growth it is also recommended that as part of the public consultation process the possibility of graves in the area should be verified.

8. CONCLUSIONS

This report endeavoured to give an account of the history of the farm Syferfontein 430JQ. Some particulars could be traced regarding the interactions between whites and blacks in the vicinity. It seems that the Bakwena-ba-Magopa tribe owned the farm and also several other farms in the area from at least the late 1800's. Sites on the farm were at different stages leased to individuals to establish business ventures. It seems that prospecting and mining of iron ore commenced on the farm during the 1950's. The land was first leased to a Minerals Engineering Company South Africa Pty Ltd and subsequently to the Transvaal Vanadium Co Pty Ltd. The farm became part of the Bophuthatswana homeland in the late 1970's.

No sites of heritage significance were found during a desktop study and subsequent field survey and from an archaeological point of view there is no reason why the development cannot commence (based on approval from SAHRA) if the recommendations made in Section 7 are adhered to.

9. PROJECT TEAM

Jaco van der Walt, Project Manager

Cornelius Muller, Archival Research

10. STATEMENT OF COMPETENCY

I (Jaco van der Walt) am a member of ASAPA (no 159), and accredited in the following fields of the CRM Section of the association: Iron Age Archaeology, Colonial Period Archaeology, Stone Age Archaeology and Grave Relocation. This accreditation is also valid for/acknowledged by SAHRA and AMAFA.

Currently, I serve as Council Member for the CRM Section of ASAPA, and have been involved in research and contract work in South Africa, Botswana, Zimbabwe, Mozambique and Tanzania; having conducted more than 300 AIAs since 2000.

11. REFERENCES

Secondary Sources:

- Breuts, P. L. 1953. Union of South Africa. Department of Native Affairs. Ethnological Publications No. 28. The Tribes of Rustenburg and Pilansberg Districts. Pretoria: The Government Printer.
- Berg, J.S. (Ed.), Geskiedenisatlas van Suid-Afrika. Die vier noordelike provinsies. Edited by J. S. Bergh. 1999. Pretoria: J. L. van Schaik Uitgewers.
- Ross, R. 2002. A concise history of South Africa. Cambridge: Cambridge University Press.
- Steyn, J.N., Smit, P., Booysen, J.J., & Ferreira, C.E., Die Britsomgewing. Pretoria. Die Suid-Afrikaanse Geografiese Vereniging. 1978.

Primary Sources:

- Mucina, L. & Rutherford, M.C. 2006. The vegetation map of South Africa, Lesotho and Swaziland. SANBI, Pretoria.
- National Heritage Resources Act NHRA of 1999 (Act 25 of 1999)
SAHRA Report Mapping Project Version 1.0, 2009

ARCHIVAL SOURCES (National Archive, Pretoria)

- South Africa. National Archives of South Africa. NASA, TAB, URU, 875:3003. Pretoria.
- South Africa. National Archives of South Africa. NASA, TAB, NTS, 1153: 94/162. Pretoria.
- South Africa. National Archives of South Africa. NASA, TAB, NTS, 1156: 118/162. Pretoria.
- South Africa. National Archives of South Africa. NASA, TAB, NTS, 1158: 136/162. Pretoria.
- South Africa. National Archives of South Africa. NASA, TAB, NTS, 1277: 1971/162. Pretoria.
- South Africa. National Archives of South Africa. NASA, TAB, NTS, 1277: 1972/162. Pretoria.
- South Africa. National Archives of South Africa. NASA, TAB, NTS, 1277: 1975/162. Pretoria.
- South Africa. National Archives of South Africa. NASA, TAB, NTS, 1323: 2819/162). Pretoria.
- South Africa. National Archives of South Africa. 1938. NASA, TAB, BAO, 10086/17: D52/1093/29). Pretoria.
- South Africa. National Archives of South Africa. 1944. NASA, TAB, BAO, 10139: D52/1547/13). Pretoria.

MAPS

- Topographical Map. 1985. South Africa. 1:50 000 Sheet. 2527DB Brits. Fourth Edition. Pretoria: Government Printer.
- Google Earth. 2012. 25°34'30.76" S 27°57'58.61" E elev 1195m. [Online].[Cited 20 March 2012].
- Holmden. 1900 (?). Holmden's Map of the Transvaal and Swaziland. Compiled from registered diagrams and information supplied by the various land owners and from other authentic sources. Johannesburg: the Map Office.
- Major Jackson Series. 1905. Transvaal. Sheet. Rustenburg. Pretoria. Compiled and drawn in Surveyor General's Office under direction of Major H. M. Jackson.
- Topographical Map. 1989. South Africa. 1:250 000 Sheet. 2526 Rustenburg. Fourth Edition. Pretoria: Government Printer.
- Magisterial District of Pretoria Map, 1917. Government Printer

Electronic Sources:

MAPS

- Google Earth. 2012. 25°34'30.76" S 27°57'58.61" E elev 1195m. [Online].[Cited 20 March 2012].

Appendix A: Power line options

