

Heritage Impact Assessment

Heritage Impact Assessment for the Proposed Agricultural Development on Portion 2 of the Farm Kwikstaart 431 KQ, near Koedoeskop in the Limpopo Province.

Compiled for:

Allied Farms S.A.

Survey conducted & Report compiled by:

Marko Hutten

October 13, 2014

Hutten Heritage Consultants
P.O. Box 4209
Louis Trichardt
0920
Tel: +27 76 038 4185
E-mail: marko@gravesolutions.co.za

Acknowledgements:

CLIENT: Allied Farms

CONTACT PERSON: Ms. L. du Plessis
PO Box 6
Koedoeskop
0361
+27 (0) 14 785 0600
bothadp@gmail.com / botha@alliedgroup.co.za

CONSULTANT: Hutten Heritage Consultants

CONTACT PERSON: Marko Hutten (BA Hons. Archaeology, UP)
Accredited Member of the Association of Southern African
Professional Archaeologists (#057)

REPORT AUTHOR: Marko Hutten

FIELD WORKERS: Thomas Mulaudzi & Edward Khorommbi

SIGNED OFF:

Marko Hutten

Executive Summary

Site name and location: Proposed agricultural development on Portion 2 of the Farm Kwikstaart 431 KQ, approximately 2km west of Koedoeskop in the Limpopo Province.

Local Authority: Waterberg District Municipality.

Developer: Allied Farms S.A.

Date of field work: 29 & 30 May 2014.

Date of report: 13 October 2014.

Findings: Two sites with heritage significance or value were identified during the survey. Both sites consisted of demolished structures.

The first identified site was most probably the location of a farm worker's dwelling. The structures seemed to be demolished when they were abandoned and most of the building materials were also removed from the site. No further heritage mitigation measures are recommended at this site, as very little heritage resources of significance or value remained.

The second identified structure was most probably the house of a "bywoner" who worked and lived on the farm. According to available information on the structure, it was constructed in 1911 and was demolished in 1939. The structure was more than 60 years old and is protected under Section 34 of the National Heritage Resources Act 25 of 1999, which states that "no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...". It is recommended to apply for a permit for destruction from the Limpopo Heritage Resources Agency (LIHRA). LIHRA will stipulate the requirements for further mitigation work, before the permit of destruction will be issued. Only after the permit for destruction has been obtained can the destruction of the structure continue.

Dr. J.F. Durand concluded and recommended the following regarding the palaeontological resources of the site: "During a previous study a few kilometres to the south east (Durand 2013b), the surface survey did not yield any bony fossils or any noteworthy stromatolites. It was found that the karstification of the dolomite and limestone in the region seems to be superficial and limited to the surface. No caves or fossils are known in the study area and surroundings. It seems unlikely that there are any Plio-Pleistocene caves or cave fills in the region especially in the light of the absence of large-scale solution features such as sinkholes or caves or secondary sedimentary structures such as cave breccia, flowstone or travertine. Due to the improbability of fossils occurring in the study area it is recommended that the project should be exempted from further palaeontological studies."

No other site-specific actions or any further heritage mitigation measures are recommended for the rest of the study area as well, as no other heritage resource sites or finds of any value or significance were identified in the indicated study area. The proposed agricultural development on Portion 2 of the Farm Kwikstaart 431 KQ at the indicated area can only continue if the recommendations as stipulated in this report are adhered to from a heritage point of view.

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

TABLE OF CONTENTS

1. INTRODUCTION	1
2. LEGISLATIVE REQUIREMENTS	1
3. PROPOSED PROJECT	2
4. PROJECT AREA DESCRIPTION	2
5. DESKTOP STUDY FINDINGS	3
5.1. PREVIOUS STUDIES	3
5.2. ARCHAEOLOGICAL & HISTORICAL SEQUENCE	6
5.3. PALAEOLOGY	9
6. METHODOLOGY	11
6.1. PHYSICAL SURVEY	11
6.2. INTERVIEWS	11
6.3. RESTRICTIONS	11
6.4. DOCUMENTATION	11
7. ASSESSMENT CRITERIA	12
7.1. SITE SIGNIFICANCE	12
7.2. IMPACT RATING:	13
7.3. CERTAINTY	13
7.4. DURATION	13
7.5. MITIGATION	14
8. ASSESSMENT OF SITES AND FINDS	14
8.1. SITE KWS 001:	14
8.2. SITE KWS 002:	15
9. CONCLUSION AND RECOMMENDATIONS	16
9.1. SITE KWS 001:	16
9.2. SITE KWS 002:	16
9.3. PALAEOLOGY	16
10. REFERENCES	18

ADDENDUM A Photographs

- Photo 1: General view of the site from the south-east.
- Photo 2: View of the cattle/game loading equipment.
- Photo 3: View of the ploughed fields to the north of the study area.
- Photo 4: View of the landing strip on the property.
- Photo 5: View of the demolished farmhouse on the property.
- Photo 6: View of the tracks across the property.
- Photo 7: View of the identified site at KWS 001.
- Photo 8: View of the double line foundations of the structures.
- Photo 9: View of some of the metal artefacts at site KWS 001.
- Photo 10: View of the identified site at KWS 002.
- Photo 11: View of the slate stone foundations of the structure.
- Photo 12: View of the constructed brick walls of the structure.
- Photo 13: View of the trough at the back of the structure.

ADDENDUM B Location Maps

ADDENDUM C Palaeontological Scoping Report

1. Introduction

Hutten Heritage Consultants was contracted by Allied Farms S.A. to conduct a Heritage Impact Assessment (HIA) on the proposed agricultural development on Portion 2 of the Farm Kwikstaart 431 KQ, approximately 2km west of Koedoeskop in the Limpopo Province.

The aim of the study was to identify all heritage sites, to document and to assess their significance within Local, Provincial and National context. The report outlines the approach and methodology implemented before and during the survey, which includes in Phase 1: Information collection from various sources and social consultations; Phase 2: Physical surveying of the area on foot and by vehicle; and Phase 3: Reporting the outcome of the study.

This HIA forms part of the Environmental Impact Assessment (EIA) as required by various Acts and Laws as described under the next heading and is intended for submission to the provincial South African Heritage Resources Agency (SAHRA) for peer review.

Minimum standards for reports, site documentation and descriptions are set by the Association of Southern African Professional Archaeologists (ASAPA) in collaboration with SAHRA. ASAPA is a legal body representing professional archaeology in the Southern African Development Community (SADC) region.

The extent of the proposed development sites were determined as well as the extent of the areas to be affected by secondary activities (access routes, construction camps, etc.) during the development.

2. Legislative Requirements

The identification, evaluation and assessment of any cultural heritage site, artefact or find in the South African context is required and governed by the following legislation:

National Environmental Management Act (NEMA) Act 107 of 1998
National Heritage Resources Act (NHRA) Act 25 of 1999
Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
Development Facilitation Act (DFA) Act 67 of 1995

The following sections in each Act refer directly to the identification, evaluation and assessment of cultural heritage resources.

National Environmental Management Act (NEMA) Act 107 of 1998
Basic Environmental Assessment (BEA) – Section (23)(2)(d)
Environmental Scoping Report (ESR) – Section (29)(1)(d)
Environmental Impacts Assessment (EIA) – Section (32)(2)(d)
Environmental Management Plan (EMP) – Section (34)(b)

National Heritage Resources Act (NHRA) Act 25 of 1999
Protection of Heritage resources – Sections 34 to 36; and
Heritage Resources Management – Section 38
Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
Section 39(3)
Development Facilitation Act (DFA) Act 67 of 1995
The GNR.1 of 7 January 2000: Regulations and rules in terms of the Development Facilitation Act, 1995. Section 31.

3. Proposed Project

The developer, Allied Farms S.A., has proposed the development of several crop circles on Portion 2 of the Farm Kwikstaart 431 KQ, approximately 2km west of Koedoeskop in the Limpopo Province.

Allied Farms S.A. proposed the development of four separate crop circles of various sizes on the proposed property (see maps: proposed development). The largest crop circle will measure 135ha and the second largest crop circle will measure 115ha. Two half crop circles will measure 55ha and 75ha respectively. The 75ha half circle will connect to another half circle on the neighbouring property to form a large 150ha crop circle. The proposed agricultural development will be located on Portion 2 of the Farm Kwikstaart 431 KQ, which measured approximately 440ha in size. The footprint of the proposed development will be up to 380ha of the proposed area of approximately 440ha.

The agricultural development will include bush clearing and the ripping of the top soil. The bush clearing involves the mechanical up-rooting and removal of trees and other vegetation. The ripping of the top soil involves the mechanical ripping of the soil with a tractor and a ripper across the entire area. The ripping of the top soil will aid in the later ploughing and planting processes. It will also include the installation of water pumps and an irrigation system for the effective irrigation of planted crops.

The purpose of the study was to determine if the proposed area was suitable for the agricultural development from a heritage point of view.

The project was tabled during May 2014 and the developer intends to commence as soon as possible after receipt of the ROD from the Department of Environmental Affairs.

4. Project Area Description

The proposed agricultural development will be situated on Portion 2 of the Farm Kwikstaart 431 KQ, approximately 2km west of Koedoeskop in the Limpopo Province. The proposed development measured approximately 380ha in size and will be situated on a part of the property which measured approximately 440ha in size (see maps).

The proposed site was previously fairly undisturbed and was predominantly used as a cattle grazing facility and was bordered with properties with the same intend (photo 1). The proposed site, however, was not only used as grazing area, as game was noted on the property as well as on neighbouring properties. Cattle/game loading equipment was also identified on the property (photo 2). The property has typical bushveld vegetation similar to the neighbouring properties on the southern, western and eastern sides. Ploughed fields were situated to the north of the study area (photo 3).

The properties to the north, west and south of the study area are currently being used as cattle grazing facilities and/or game farms. Large tracts of land to the north and north-east of the study area were developed for agriculture and crop circles with cash crops were intensely cultivated.

A landing strip was situated in the south-eastern corner of the proposed property (photo 4). The landing strip was and will not be used anymore. A farm house and its associated buildings were situated in the south-western corner of the property. The structures were in the process to be demolished (photo 5). Several tracks also crossed the property (photo 6).

The property was mostly flat with red/brown sandy soils. A rocky reef was situated on the south-western parts of the property.

The proposed development will be situated on the Northam 2427 CD 1:50 000 topographical map (See Appendix B: Location Maps).

5. Desktop Study Findings

The examination of heritage databases, historical data and cartographic resources represents a critical additional tool for locating and identifying heritage resources and in determining the historical and cultural context of the study area. Therefore an internet literature search was conducted and relevant archaeological and historical texts were also consulted. Relevant topographic maps and satellite imagery were studied. Researching the SAHRA APM Report Mapping Project records and the SAHRIS online database (<http://www.sahra.org.za/sahris>), it was determined no previous archaeological studies had been carried out in the study area. However, a number of previous archaeological or historical studies had been performed within the wider vicinity of the study area.

5.1. Previous Studies

Previous studies listed in the APM Report Mapping Project for Quarter Degree Squares 2427CD, 2427CC, 2427DC, 2527AB and 2427CB included the following 12 studies:

Van Schalkwyk, J.A. 1994. **A Survey of Archaeological and Cultural Historical Resources in the Amandelbult Mining Lease Area.** An unpublished report by the National Cultural History Museum on file at SAHRA as: 1994-SAHRA-0024.

Van Schalkwyk, J.A. 2003. **Arch Survey Mantserre-Kraalhoek-Mopyane Water Scheme, NW Province.** An unpublished report by the National Cultural History Museum on file at SAHRA as: 2003-SAHRA-0026.

Van Schalkwyk, J.A., Teichert, F., & Pelsler, A.J. 2003. **A Survey of Archaeological Sites for the Amandelbult Platinum Mine Seismic Exploration Program.** An unpublished report by the National Cultural History Museum on file at SAHRA as: 2003-SAHRA-0086.

Gaigher, S. 2006. **Heritage Impact Assessment for the Proposed Wildlife Estate on the Farm Grootfontein 352 KQ, Limpopo Province.** An unpublished report by Archaeo-Info on file at SAHRA as: 2006-SAHRA-0262.

Roodt, F. 2006. **Heritage Resources Scoping Report: Nooitgedacht Open Cast Mine on the Farm Nooitgedacht 22 JQ Northam: Thabazimbi Municipality.** An unpublished report by R & R Cultural Resource Consultants on file at SAHRA as: 2006-SAHRA-0280.

Pistorius, J.C.C. 2007. **A Phase 1 Heritage Impact Assessment (HIA) Study for Eskom's Proposed New 400 kV Power Line Route Between the Matimba B Power Station and the Marang Substation near Rustenburg.** An unpublished report by Archaeologist and Cultural Heritage Management Consultants on file at SAHRA as: 2007-SAHRA-0048.

Roodt, F. 2007. **Phase 1 Heritage Resources Impact Assessment (Scoping & Evaluation) Rhebokkloof Wild Life Estate Thabazimbi, Limpopo.** An unpublished report by R & R Cultural Resource Consultants on file at SAHRA as: 2007-SAHRA-0072.

Küsel, U. 2007a. **Cultural Heritage Resources Impact Assessment of the Farm Hardekoolbult 548 KQ in the Thabazimbi Municipal Area, Limpopo Province.** An unpublished report by African Heritage Consultants CC on file at SAHRA as: 2007-SAHRA-0337.

Küsel, U. 2007b. **Cultural Heritage Resources Impact Assessment of Hanover 341 KQ in the Thabazimbi Area Limpopo Province.** An unpublished report by African Heritage Consultants CC on file at SAHRA as: 2007-SAHRA-0338.

Van Schalkwyk, J.A. 2007. **Heritage Impact Assessment: Portion 6 Aapieskraal.** An unpublished report by the National Cultural History Museum on file at SAHRA as: 2007-SAHRA-0386.

Maguire, J.M. & van Wyk, C. 2008. **Phase 1 Archaeological Impact Assessment for Portion 128 of the Farm Koedoesdoorns KQ 414, Northam, Limpopo Province.** An

unpublished report by Adansonia Heritage Consultants on file at SAHRA as: 2008-SAHRA-0293.

Küsel, U. 2008. **Cultural Heritage Resources Impact Assessment for Portions 1, 4, 5, 6, 7, 18, 19, 27 and 28 of the Farm Maroeloesfontein 366 KQ, Limpopo Province.** An unpublished report by African Heritage Consultants CC on file at SAHRA as: 2008-SAHRA-0369.

Researching the SAHRIS online database (<http://www.sahra.org.za/sahris>) a further seven studies were identified in the wider vicinity of the study area:

Allison, H. 2012. **Pilanesberg Platinum Mines Proposed Tuschenkomst Pit Extension. Scoping Report.** An unpublished report by SLR consulting. SAHRIS case number 845.

Fourie, W. 2012. **Kumba Iron Ore Thabazimbi Mine Mostert Tunnel Level Cave (MTC) Wachteenbietjesdraai 350 KQ and Kwaggashoek 345 KQ. Heritage Impact Report on proposed mining activities of project Phoenix.** An unpublished report by Professional Grave Solutions .SAHRIS case number 548.

Kruger N. 2012. **Phase 1 Archaeological Impact Assessment Report. Atla Mining Resources (pty) Ltd.: Mine on Rooderand portion 2, Bojanala Municipality, Northwest Province.** An unpublished report by Africa Geo-Environmental Services. SAHRIS case number 357.

Shippon, J. et al. 2012. **Dishaba Mine Backfill Project Draft Scoping Report.** An unpublished report by Prime Resources Environmental Consultants. SAHRIS case number 579.

Thathong Development Consulting, no date. **Environmental Management Plan.** An unpublished report by Thathong Development Consulting. SAHRIS case number 725.

Van Schalkwyk, J. 2012. **Heritage Impact Assessment for the Proposed New Developments at the SAPS Verdrag Training Centre, Thabazimbi Region, Limpopo Province.** An unpublished report for Interdesign Landscape Architects. SAHRIS case number 465.

Furthermore, a comprehensive cultural resource management plan for the Marakele National Park to the north-east of the study site was undertaken in 2002 by Birkholtz & Steyn:

Birkholtz, P.D. & Steyn, H.S. 2002. **Cultural Resource management Plan for Marakele National Park.** Produced for SANParks, Report: SANP – MNP - 2002-05-17/Final Report. Helio Alliance.

In addition a 2010 survey was carried out in the vicinity of the study area:

Pelser A.J. & van Vollenhoven A.C. 2010. **Final report on the results of the cultural heritage walk-down for the final EMP for the Dinaledi-Spitskop 400 KV Eskom power line between Brits and Northam.** An unpublished report, number AE1029, by Archaetnos Culture & Cultural Resource Consultants for Baagi Environmental Consultancy. Available online at http://recruitment.eskom.co/content/Appendix%206_3-HIA%20report.pdf, accessed 24th July 2012.

The studies listed above located a number of heritage sites. Some 20 km to the north-west of the study area, Middle Stone Age and Late Stone Age artefacts were described as being well represented as well as a large number of Late Iron Age sites of the Kwena baPhalane, some settled as late as the 1820s, and a number of possible Early Iron Age sites (Van Schalkwyk 1994; Shippon, J. et al. 2012). In the same area a later study identified further Late Iron Age sites, all stone-walled and characterised by large deposits containing ash, faunal remains and potsherds. These sites were related to Tswana habitation from the late 17th Century to the late 19th Century (Van Schalkwyk et al. 2003). To the south-east of the study area further indications of Early and Middle Stone Age occupation in the form of flakes were found although no important sites were identified (Küsel 2007a). North of Pilanesberg and to the west of the study area surface occurrences of stone tools and lithics, dating mostly to the Middle Stone Age, were identified as well as an early (1500 AD) Sotho-Tswana Iron Age settlement, possible 17th Century Iron Age stone walling and an Iron Age smelting site lacking any clear temporal markers (Kruger 2012). In the vicinity of Thabazimbi the Mostert Tunnel Cave contains speleothems that would qualify as rare geological specimens under the National Heritage Resources Act (Fourie 2012). Most studies reported no indications of heritage sites or artefacts (Van Schalkwyk 2003; Gaigher 2006; Roodt 2007; Küsel 2007b; Van Schalkwyk 2007; Küsel 2008; Thathong Development Consulting no date) although a number mention large numbers of graves and historical heritage resources including farmsteads. Some reports were incomplete copies or not located on the SAHRA & SAHRIS databases (e.g. Roodt 2006; Maguire & van Wyk 2008).

5.2. Archaeological & Historical Sequence

The historical background and timeframe of the study area and other areas in Southern Africa can be divided into the Stone Age, Iron Age and Historical period. These can be divided as follows:

Stone Age sites

The Stone Age is divided into the Early; Middle and Late Stone Age. The *Early Stone Age* (ESA) includes the period from 2.5 million years B.P. to 250 000 years B.P. and is associated with Australopithecines and early *Homo* species who practiced stone tool industries such as the Oldowan and Acheullian. The *Middle Stone Age* (MSA) covers various tool industries, for example the Howiesons Poort industry, in the period from 250 000 years B.P. to 25 000 years B.P. and is associated with archaic and modern *Homo sapiens*. The *Late Stone Age* (LSA) incorporates the period from 25 000 years B.P. up to the Iron Age and Historical Periods and contact between hunter-gatherers and Iron Age

farmers or European colonists. This period is associated with modern humans and characterised by lithic tool industries such as Smithfield and Robberg.

Although no ESA sites were recorded within Marakele National Park (Birkholtz & Steyn 2002), excavations at several well known sites in the region attest to ESA occupation. Makapansgat provided evidence of long occupation, initially by *Australopithecus africanus* from approximately 3.3 million years B.P. (Bergh 1999) while the Olieboompoort shelter indicated the presence of ESA people from between 1 million to 400 000 years B.P. (Birkholtz & Steyn 2002). A number of MSA sites are known from Marakele as well as the wider region including an MSA layer in the Olieboompoort Shelter dated to 33 000 year B.P. (Mason 1962) and MSA sites at New Belgium 608 LR, Schurfpoort 112 KR and Goergap 113 KR (Birkholtz & Steyn 2002).

Interestingly, research on the LSA in the Waterberg Plateau suggests a discontinuity between MSA and LSA settlement of several thousand years, with settlement of the area by LSA hunter gatherers occurring in the 11th and 12th Centuries and coinciding with settlement by Iron Age peoples (van der Ryst 1998). While the relationship between stone-age people and Iron Age settlers was initially characterised by peaceful interaction and trade, the relationship seems to have degraded into one of subjugation of the former, exacerbated by increasing numbers of white settlers. The farm Vaalpenspan 90 KQ located some distance to the north of the study area is a reminder of the marginalised remnants of the hunter gatherers, 'Vaalpense' being the name given to people of mixed Bantu and hunter gatherer descent (van der Ryst 1998; Birkholtz & Steyn 2002). In Southern Africa the Late Stone Age is characterised by the appearance of rock art in the form of paintings and engravings and the Waterberg is known for its many rock art sites including those containing shaded paintings such as at Haakdoorndraai (Pager, 1973) and the depiction of a fat tailed sheep at Dwaalhoek 185 KQ (van der Ryst 1998).

Iron Age

The Iron Age incorporates the arrival and settlement of Bantu speaking people and overlaps the Pre-Historic and Historical Periods. It can be divided into three phases. The *Early Iron Age* includes the majority of the first millennium A.D. and is characterised by traditions such as Happy Rest and Silver Leaves. The *Middle Iron Age* spans the 10th to the 13th Centuries A.D. and includes such well known cultures as those at K2 and Mapungubwe. The *Late Iron Age* is taken to stretch from the 14th Century up to the colonial period and includes traditions such as Icon and Letaba.

The earliest Iron Age site in the region lies some 150 km to the north-east of the study area at Ongelukskraal 48 KR, dated to 140 A.D. and is associated with the Bambata ceramic typology (van der Ryst 1998). Research on the Waterberg Plateau and within the Motlhabatsi (Matlabas) River valley to the north of the study area and in the Rooiberg area to the west has indicated three phases of Early Iron Age settlement. The first phase is characterised by ceramics of the Western Stream similar to those from Happy Rest and Klein Africa and dated to Circa 570 A.D. (Huffman 1990; van der Ryst 1998). The second phase, circa 700 A.D., is similar to the Rooiberg Unit 1 (Hall 1981; Huffman 1990) ceramics described from a site to the north-east of the study area and the third

phase, circa 1000 A.D. is associated with the Eiland tradition, marking the end of the Early Iron Age in the area (Huffman 1990). The site at Diamant on the western edge of the Waterberg has yielded Middle Iron Age imported glass beads like those excavated at Schroda on the Limpopo, the latter being the likely centre of distribution for this early trade (Huffman 2007).

Several Sotho-Tswana communities settled in the North-west Province, Gauteng, Limpopo Province and in Botswana during the 14th and 15th centuries. These communities spread over the region as several lineages developed under their separate leaders. One of these lineages was the Bahurutshe-Bakwena which divided into the Bakwena, Bahurutshe and Bakgatla chiefdoms. The Bakgatla settled at first in the Hammanskraal area during the 17th century. Over the years and after several succession disputes, the divided and separated Bakgatla tribes settled in a much wider region. This region extended to the north of Pretoria up to Nylstroom and further to the north-west to the Marico River (Pistorius, 1992; Bergh, 1999; Huffman, 2007). Later Iron Age presence in the region was associated with the arrival in the area of the Northern Ndebele in the 16th and 17th Centuries with characteristic hilltop settlements (van der Ryst 1998). It must be noted that the influx of Ndebele people was not to uninhabited country given the established Kwena and Kgatla groups of Sotho-Tswana lineage, Kgatla people still predominating in the study area today (Hall 1981; Birkholtz & Steyn 2002).

Pistorius mentioned the occurrence of damaged stone walled sites and a graveyard along the base of Sefikile hill at Sefikile village approximately 30 km to the south-west of the study area where Phetso of the Kgatla Kgafela had his settlement (Pistorius 2012). There is quite some evidence, in the form of defensive hilltop settlement and aggregation that the Late Iron Age in the region was a time of upheaval and conflict, initially as a result of the influx of the Ndebele and later by European settlers (Hall 1985). The Difaqane period saw Mzilikazi settling in the Marico River valley in the 1830's, unsettling many people who fled east to seek refuge (Huffman 1990) where the Kransberg were known as 'Marakeli' or 'place of refuge' (Coetzee undated) or fled south as did the Bakgatla Chief Kgamanyane who settled at Saulspoort south-west of the study area. Since 1995, an ongoing archaeological survey has been conducted in the Pilanesberg National Park to the south-west of the study area which has documented Late Iron Age archaeological sites within a temporal and spatial framework, for example indicating Moloko settlement between AD 1300 and AD 1600 (L'abbé et al. 2008).

Historical Period

The beginning of the Historical Period overlaps the demise of the late Stone and Iron Ages and is characterised by the first written accounts of the region from 1600 A.D. A number of early European travellers visited the area from the early 19th Century onwards including Cowan & Donovan in 1808, David Hume in 1825, Cornwallis Harris in 1836, Livingstone in 1847 and Carl Mauch in 1869 (Birkholtz & Steyn 2002). Carl Mauch described how he found himself at the base of the "Marikele Point... a mighty mountain mass with its three peaks" (Burke 1969).

The first settlers in the area and up to the Waterberg established themselves in the late 1830's and initially sustained themselves through hunting, particularly of elephant, before

the emergence of cattle farming and later, agriculture (Pont 1965; Naudé 1998). The town of Nylstroom was established in 1865 and the Waterberg District declared in 1866. The outbreak of the Boer War in 1899 had a considerable impact on the region with many Boer homesteads abandoned or destroyed as part of the British scorched earth policy and many women and children interned in concentration camps, one located in then-Nylstroom. Black involvement in the war in the region was significant with the Kgatla under Linchwe 1 taking the side of the British and becoming actively involved in the fighting (Birkholtz & Steyn 2002).

The discovery of iron ore deposits at Thabazimbi to the north and the Merensky Reef with platinum and chrome deposits at Rustenburg in the south during the 1920's introduced the region to mining activities. These mining activities continued to grow and expand up to what we see today (Bergh, 1999).

5.3. Palaeontology

The SAHRIS online database (<http://www.sahra.org.za/sahris>) was accessed and the Palaeontological Sensitivity Map was consulted. This map is colour coded to indicate the varied palaeontological sensitivities across the country. The following guidelines/recommendations are provided in the table below regarding the palaeontological sensitivity for each identified colour.

PalaeoSensitivity Map Action Guideline.

Colour	Sensitivity	Required Action
RED	VERY HIGH	Field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	Desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	Desktop study is required
BLUE	LOW	No palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	No palaeontological studies are required
WHITE/CLEAR	UNKNOWN	These areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.



Palaeontological Sensitivity Map of the study area (Sahris Palaeosensitivity Map).

It was found that the palaeontological sensitivity for the study area was HIGH and that a palaeontological desktop study is required.

Dr. J.F. Durand completed a Palaeontological Desktop Study for the proposed development. The Palaeontological Desktop Study is added in Addendum C. The following is an excerpt from that study:

“The study site is largely situated on Pretoria Group sediments while the southern margin overlaps the Penge Formation of the Chuniespoort Group. These late Archaean to early Proterozoic Transvaal Supergroup metamorphosed sediments consist mostly of iron-rich mudrock (Eriksson *et al.*, 2006).

Red-brown, iron-rich rocks underlie the largest part of the study area. These rocks form part of the ferruginous shales of the Pretoria Group.

The finely-laminated banded ironstone found along the southern part of the study area form part of the Chuniespoort Group. Banded ironstone dominates the geology in the southern part of the study area.

During a previous field survey done on the farms Buffelskraal and Krokodilkraal (7 and 9 kilometres to the southeast respectively), the dolomite and limestone rich Crocodile River Fragment were studied (see Durand, J.F., 2013b).

The study area is situated near the contact between the Bushveld Igneous Complex and the Crocodile River Fragment of the Transvaal Supergroup. The Bushveld Igneous Complex intruded into the older Transvaal Sequence approximately 2.1 Ga ago. The Bushveld Igneous Complex is represented in the study area by coarse grained granite of the Nebo Granite of the Lebowa Granite Suite. The limestone and dolomite of the Crocodile River Fragment underwent folding and thermal metamorphism due to the emplacement of the Bushveld Igneous Complex.

Karstification seems to be limited to the surface of the limestone and no crevasses, sinkholes, caves or cave breccia were found in the region during the previous field surveys.”

6. Methodology

6.1. Physical Survey

The extent of the proposed development sites were determined as well as the extent of the areas to be affected by secondary activities (access route, construction camp, etc.) during the development.

The physical survey was conducted on foot over the entire area proposed for development. Priority was placed on the undisturbed areas. A systematic inspection of the area on foot along linear transects resulted in the maximum coverage of the proposed area. The author and two experienced field workers, transected the study area in parallel transects of approximately 50m between them. The field work was conducted on May 29 and 30, 2014 and most of the two days were spent on the survey, which was performed by M. Hutten and field workers T. Mulaudzi and E. Khorommbi. The survey focused on the indicated study area as provided by the developer where the proposed development will be situated. Areas outside of the indicated study area were not surveyed.

6.2. Interviews

The manager of the farm, Mr. Botha du Plessis, was questioned during the survey and he indicated that he was aware of one old ruin in the proposed area.

6.3. Restrictions

Dense vegetation after a good rainy season restricted surface visibility in certain areas.

6.4. Documentation

All sites/findspots if any located during the foot surveys were briefly documented. The documentation included digital photographs and descriptions as to the nature and

condition of the site and recovered materials. The sites/findspots were plotted using a Global Positioning System (GPS) (Garmin GPSmap 60CSx) and numbered accordingly.

7. Assessment Criteria

This chapter describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The significance of archaeological and heritage sites were based on the following criteria:

- The unique nature of a site
- The amount/depth of the archaeological deposit and the range of features (stone walls, activity areas etc.)
- The wider historic, archaeological and geographic context of the site
- The preservation condition and integrity of the site
- The potential to answer present research questions.

7.1. Site Significance

Site significance classification standards prescribed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used for the purpose of this report.

<i>FIELD RATING</i>	<i>GRADE</i>	<i>SIGNIFICANCE</i>	<i>RECOMMENDED MITIGATION</i>
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 (GP.A)	A	Grade 4A	High / Medium Significance	Mitigation before destruction
Generally Protected (GP.B)	B	Grade 4B	Medium Significance	Recording before destruction
Generally Protected (GP.C)	C	Grade 4C	Low Significance	Destruction

7.2. Impact Rating:

Low or No Significance:

The constraint is absent, but in instances where present, poses a negligible significance on the proposed development in terms of heritage concerns.

Moderate Significance:

The constraint is present and poses a notable but not major significance on the proposed development in terms of heritage concerns. If the constraint can not be avoided, appropriate mitigation measures must be implemented to minimize the significance.

High Significance:

The constraint is present and poses a high significance on the proposed development in terms of heritage concerns. It is recommended that the constraint be avoided or appropriate mitigation measures must be implemented to minimize the significance.

7.3. Certainty

DEFINITE: More than 90% sure of a particular fact. Substantial supportive data exist to verify the assessment.

PROBABLE: Over 70% sure of a particular fact, or of the likelihood of an impact occurring.

POSSIBLE: Only over 40% sure of a particular fact, or of the likelihood of an impact occurring.

UNSURE: Less than 40% sure of a particular fact, or of the likelihood of an impact occurring.

7.4. Duration

SHORT TERM: 0 – 5 years

MEDIUM: 6 – 20 years

LONG TERM: more than 20 years

DEMOLISHED: site will be demolished or is already demolished

7.5. Mitigation

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be classified as follows:

- **A** – No further action necessary
- **B** – Mapping of the site and controlled sampling required
- **C** – Preserve site, or extensive data collection and mapping required; and
- **D** – Preserve site

8. Assessment of Sites and Finds

This section will contain the results of the heritage site/find assessment.

Kwikstaart Agricultural Development

8.1. Site KWS 001:

GPS: 24,92331° S
27,47319° E

The remains and foundations of two square structures were identified at this location (photo 7). The foundations consisted of two lines of mud-bricks and/or rocks (photo 8). The two structures were approximately 10m from each other and they both measured approximately 5m x 5m in size. No other walls were identified and only the remaining foundations indicated the existence of these structures. The other building materials for these two structures were most probably removed from the site when the structures were abandoned. Several metal artefacts were found scattered around the two structures (photo 9).

The site was not very big and measured approximately 30-40m in diameter. The number of artefacts and building remains were not numerous and indicated that the site was small with only a few structures and were not occupied for an extended period.

The site was most probably the remains of a farm labourer's dwelling. The site and finds were however, damaged to such an extent that it holds very little heritage value or significance.

Field Rating:	Generally Protected C. Grade 4C
Heritage Significance:	Low
Impact:	Low
Certainty:	Possible
Duration:	Demolished
Mitigation:	A – No further action necessary

8.2. Site KWS 002:

GPS: 24,92331° S
27,47319° E

The remains and foundations of a brick-built structure were identified at this location (photo 10). The structure was in a demolished state and building rubble were scattered around the site. The structure had a slate and cement foundation (photo 11), on which brick walls were constructed (photo 12). Some of these walls were plastered with cement. There were no remains of any doors, windows or anything from the roof. The structure measured approximately 15m x 15m in size and it had a 3m veranda on the eastern side. The structure also had a cement floor (photo 11). A stone and cement trough was situated on the western side of the structure (photo 13).

The site measured approximately 30-40m in diameter and building rubble were scattered around the site.

It was not clear what the purpose of the structure or how old the structure was. The farm manager, Mr. Du Plessis, said that rumour was that the structure was built by Mr. Hannes van Tonder, a previous owner of the farm. It was built in 1911 and served as accommodation for a “bywoner” (someone who worked and stayed on the farm). The structure was demolished in 1939 and was not occupied again. The site and finds were however, damaged to such an extent that it had little heritage value or significance.

Field Rating:	Generally Protected C. Grade 4C
Heritage Significance:	Low
Impact:	Low
Certainty:	Possible
Duration:	Demolished
Mitigation:	B – Mapping of the site and controlled sampling required

After intensive investigations across the rest of the study area, no other sites or finds of any heritage value or potential were identified.

9. Conclusion and Recommendations

The following steps and measures are recommended regarding the investigated area:

Kwikstaart Agricultural Development

9.1. Site KWS 001:

The identified site was most probably the location of the remains of a farm worker's dwelling. The structures seemed to be demolished when they were abandoned and that most of the building materials were also removed from the site.

- No further heritage mitigation measures are recommended at this site, as very little heritage resources of significance or value remained.

9.2. Site KWS 002:

The identified structure was most probably the house of a “bywoner” who worked and lived on the farm.

- According to available information on the structure, it was constructed in 1911 and was demolished in 1939. The structure was more than 60 years old and is protected in Section 34 of the National Heritage Resources Act 25 of 1999, which states that “no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority...”.
- It is recommended to apply for a permit for destruction from the Limpopo Heritage Resources Agency (LIHRA). LIHRA will stipulate the requirements for further mitigation work, before the permit of destruction will be issued
- Only after the permit for destruction has been obtained can the destruction of the structure continue.

9.3. Palaeontology

Dr. J.F. Durand concluded and recommended the following regarding the palaeontological resources of the site: During a previous study a few kilometres to the south east (Durand 2013b), the surface survey did not yield any bony fossils or any noteworthy stromatolites. It was found that the karstification of the dolomite and limestone in the region seems to be superficial and limited to the surface. No caves or fossils are known in the study area and surroundings. It seems unlikely that there are any Plio-Pleistocene caves or cave fills in the region especially in the light of the absence of large-scale solution features such as sinkholes or caves or secondary sedimentary structures such as cave breccia, flowstone or travertine. Due to the improbability of fossils occurring in the study area it is recommended that the project should be exempted from further palaeontological studies.

No other site-specific actions or any further heritage mitigation measures are recommended for the rest of the study area as well, as no other heritage resource sites or finds of any value or significance were identified in the indicated study area. The proposed agricultural development on Portion 2 of the Farm Kwikstaart 431 KQ at the indicated area can only continue if the recommendations as stipulated in this report are adhered to from a heritage point of view.

10. References

- Bergh, J.S. 1999. Geskiedenisatlas van Suid-Afrika. Die vier Noordelike Provinsies. Pretoria: J.L. van Schaik.
- Birkholtz, P.D. & Steyn, H.S. 2002 Cultural Resource management Plan for Marakele National Park. Produced for SANParks, Report: SANP – MNP - 2002-05-17/Final Report. Helio Alliance.
- Burke, E.E., (Ed.) 1969. The Journals of Carl Mauch: His Travels in the Transvaal and Rhodesia 1869-1872. National Archives of Rhodesia. Salisbury.
- Coetzee, T.A., undated. Thabazimbi: Gister en Vandag. Pretoria Drukkers, Pretoria.
- Hall, S.L. 1981 Iron Age sequence and settlement in the Rooiberg, Thabazimbi Area. M.A. Thesis, University of the Witwatersrand.
- Hall, S. L., 1985. Archaeological Indicators of Stress in the Western Transvaal Region between the Seventeenth and Nineteenth Centuries. In: Hamilton, C., (Ed). The Mfecane Aftermath: Reconstructive Debates in Southern African History. Witwatersrand University Press/University of Natal Press.
- Huffman, T. N., 1990. The Waterberg Research of Jan Aukema. South African Archaeological Bulletin, 45:117-119.
- Huffman, T. N., 2007. Handbook to the Iron Age, The Archaeology of Pre-Colonial Farming Societies in Southern Africa. University of Kwa-Zulu Natal Press.
- L'abbé, E., Coetzee, F.P., & Loots, M. 2008. A description of Iron Age skeletons from the Pilanesberg National Park, South Africa. South African Archaeological Bulletin 63 (187): 28–36.
- Mason, R.J. 1962. Prehistory of the Transvaal. University of the Witwatersrand Press, Johannesburg.
- Naudé, M., 1998. Oral Evidence of Vernacular Buildings and Structures on Farmsteads in the Waterberg (Northern Province). Research by the National Cultural History Museum, 7:47-91.
- Pager, H. 1973. Shaded rock-paintings in the Republic of South Africa, Lesotho, Rhodesia and Botswana. The South African Archaeological Bulletin.
- Pistorius, J.C.C. 2012. A Phase 1 Heritage Impact Assessment (HIA) study for chrome mining activities on various portions of the farms Groenfontein 138JP, Vlakfontein 163JP

and Vogelstruisnek 174JP west of the Pilanesberg in the North-West Province of South Africa. An unpublished report prepared for Golder Associates Africa (Pty) Ltd.

Pont, A.D., 1965. Die Nededuitsch Hervormde Gemeente Waterberg. Kerkraad van die Nederduitsch Hervormde Gemeente Waterberg. Krugersdorp.

South African Heritage Resources Agency, 2009. Archaeology and Palaeontology Report Mapping Project. DVD Version 1.0. Cape Town.

South African Heritage Resources Information System, <http://www.sahra.org.za/sahris>. Accessed 29th November 2012.

Van der Ryst, M.M., 1998. The Waterberg Plateau in the Northern Province, Republic of South Africa, in the Later Stone Age. BAR International Series 715, Archaeopress, Oxford.

APPENDIX A

Photographs



Photo 1: General view of the proposed site from the south-east.



Photo 2: View of the cattle/game loading equipment.



Photo 3: View of the ploughed fields to the north of the study area.



Photo 4: View of the landing strip on the property.



Photo 5: View of the demolished farmhouse on the property.



Photo 6: View of the tracks across the property.



Photo 7: View of the identified site at KWS 001.



Photo 8: View of the double line foundations of the structures.



Photo 9: View of some of the metal artefacts at site KWS 001.



Photo 10: View of the identified site at KWS 002.



Photo 11: View of the slate stone foundations of the structure.



Photo 12: View of the constructed brick walls of the structure.

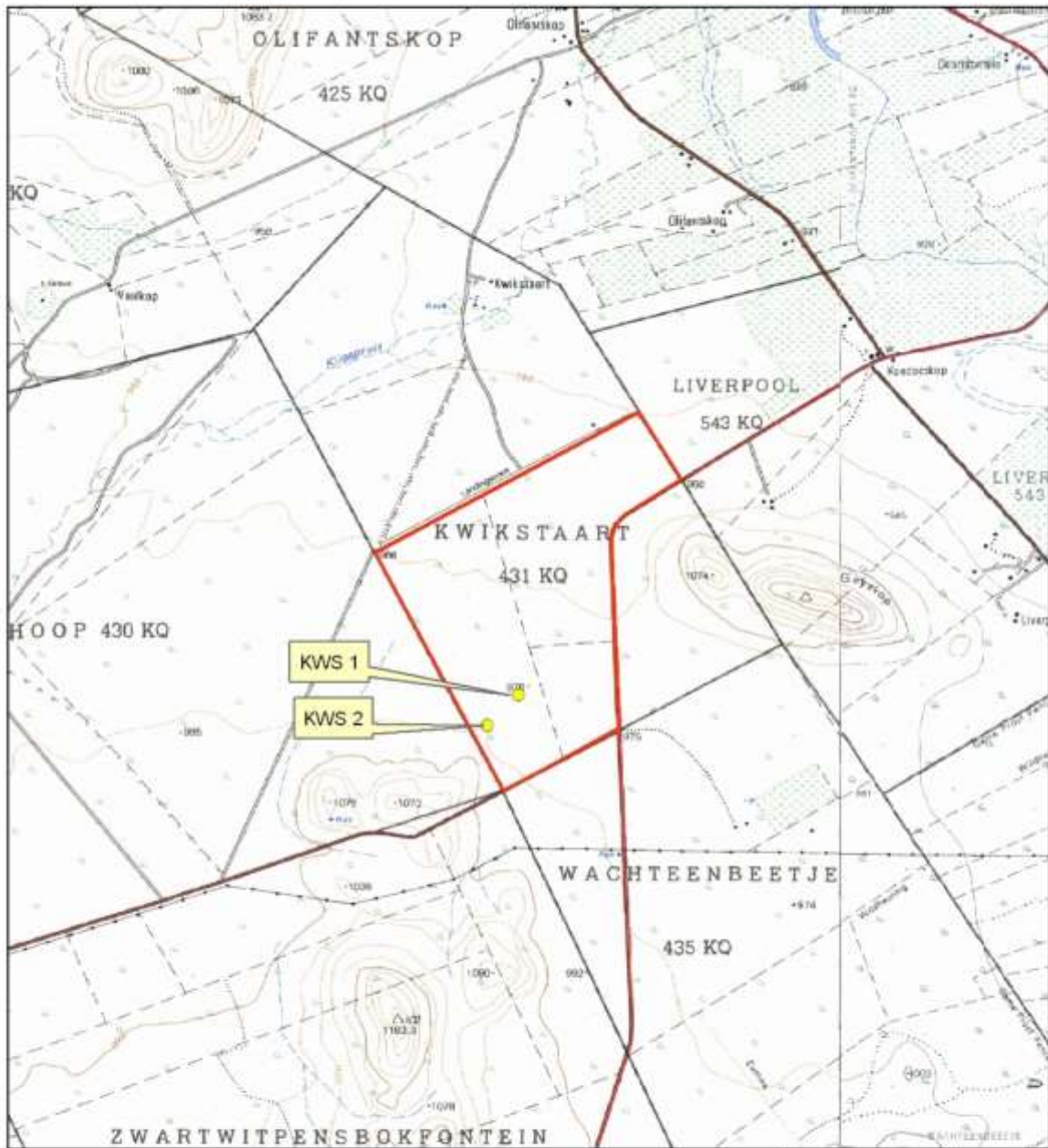


Photo 13: View of the trough at the back of the structure.

APPENDIX B

Location Maps

Kwikstaart Agricultural Development



0 1 2
Kilometres

1:50,000

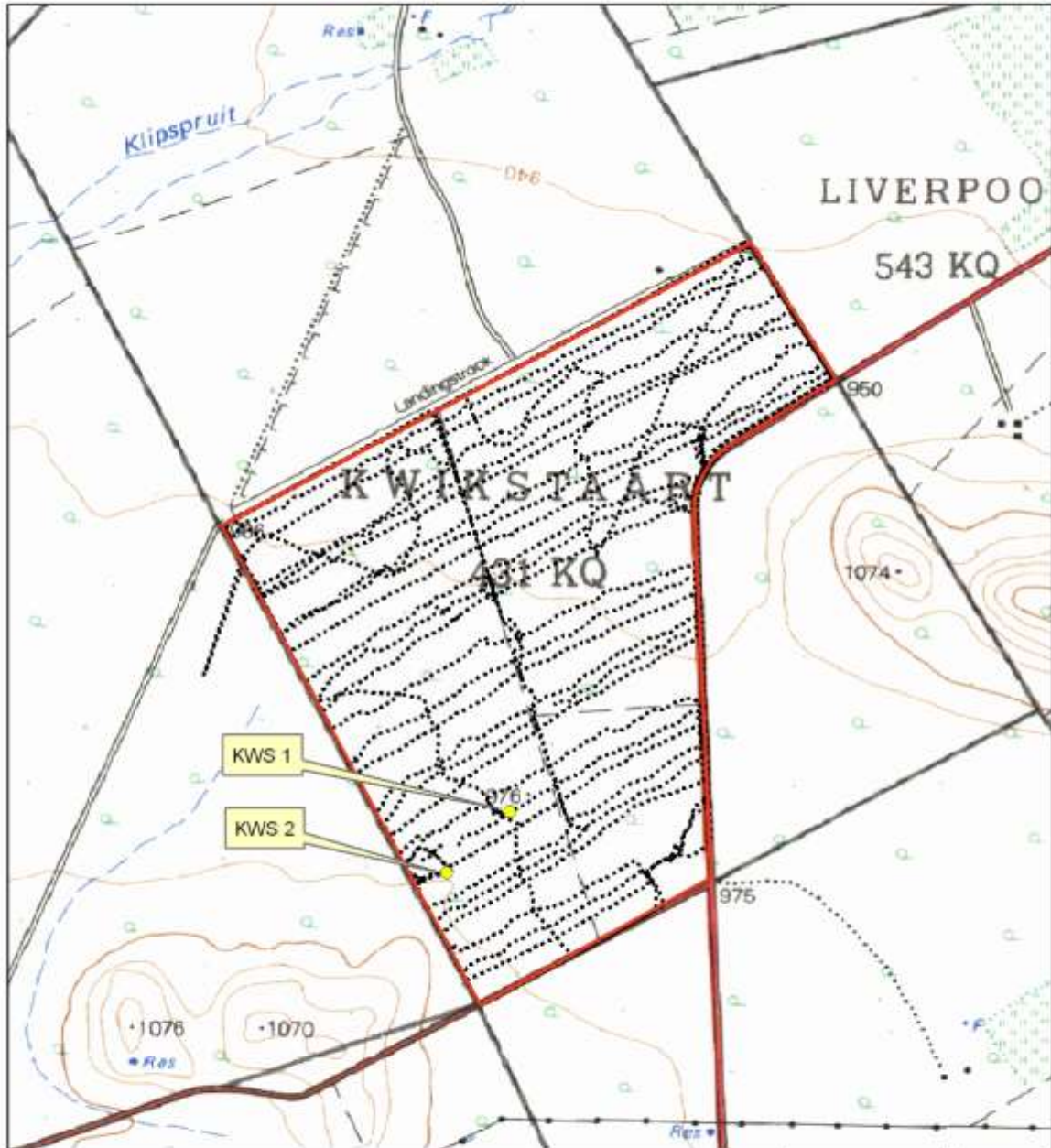


● Heritage site

— Study area

Image: WGS2427CD.TIF & WGS2427DC.TIF
Source: Chief Directorate National Geo-spatial Information
Datum: WGS84
Study Area: Part of the farm Kwikstaart 431 KQ

Kwikstaart Agricultural Development



0 0.5 1
Kilometres

1:25,000



-  Heritage site
-  Study area
-  Track log

Image: WGS2427CD.TIF
Source: Chief Directorate National Geo-spatial Information
Datum: WGS84
Study Area: Part of the farm Kwikstaart 431 KQ

Kwikstaart Agricultural Development



0 0.5 1
Kilometres

1:25,000



-  Heritage site
-  Study area
-  Track log

Image: 2427C.jp2
Source: Spot Image / CSIR
Datum: WGS84
Study Area: Part of the farm Kwikstaart 431 KQ

APPENDIX C
Palaeontological
Scoping Report

Proposed erection of spill points on the
Farm Kwikstaart 431 KQ Portion 2,
Thabazimbi, Limpopo Province

**SCOPING REPORT
PALAEOLOGY**

Compiled by: Dr JF Durand (Sci.Nat.)

For:

Jonk Begin Environmental Services

Allied Power
Main Street 1
Koedoeskop
0361

bothadp@gmail.com

4 August 2014

Table of Contents:

1. Introduction.....	3
2. Terms of reference for the report.....	4
3. Details of study area and the type of assessment.....	7
4. Geological setting of the study area	8
5. Palaeontological heritage of southern Limpopo.....	11
6. Conclusion and Recommendations.....	12

List of Figures:

Figure 1: Google Earth photo indicating the study area in the yellow polygon	7
Figure 2: Geological Map of the study area and surroundings (adapted from the 2426 THABAZIMBI 1:250 000 Geology Map, Council for Geoscience, 1978).....	8
Figure 3: Red-brown, iron-rich rocks forming part of the ferruginous shales of the Pretoria Group at 24° 54' 21.75"S 27° 29' 14.22"E.....	9
Figure 4: Banded ironstone of the Chuniepoort Group which occurs in the southern part of the study area.....	9
Figure 5: Folded and metamorphosed dolomite of the Crocodile River Fragment.....	10
Figure 6: Fossiliferous cave breccia at the field research station of the University of the Witwatersrand in Makopane Valley containing thousands of fossils.....	11

1. Introduction

The palaeontological heritage of South Africa is unsurpassed and can only be described in superlatives. The South African palaeontological record gives us insight in *i.a.* the origin of life, dinosaurs and humans. Fossils are also used to identify rock strata and determine the geological context of the geological formations and the chronostratigraphy of Southern Africa.

The first evidence of tectonic plate movement was discovered after studying the distribution of Karoo-age fossils in South Africa and other continents and subcontinents such as India, Antarctica, South America and Australia. Fossils are also used to study evolutionary relationships, sedimentary processes and palaeoenvironments.

The Heritage Act of South Africa stipulates that fossils and fossil sites may not be altered or destroyed. The purpose of this document is to detail the probability of finding fossils in the study area which may be impacted by the proposed development.

2. Terms of reference for the report

According to the South African Heritage Resources Act (Act 25 of 1999) (Republic of South Africa, 1999), certain clauses are relevant to palaeontological aspects for a terrain suitability assessment.

- **Subsection 35(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 with the detection or recovery of metals or archaeological material or objects, or use such equipment for the recovery of meteorites.
- **Subsection 35(5)** When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedures in terms of section 38 has been followed, it may-
- (a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
- (b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
- (c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and
- (d) recover the costs of such investigation from the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

South Africa's unique and non-renewable palaeontological heritage is protected in terms of the NHRA. According to this act, heritage resources may not be excavated, damaged, destroyed or otherwise impacted by any development without prior assessment and without a permit from the relevant heritage resources authority.

As areas are developed and landscapes are modified, heritage resources, including palaeontological resources, are threatened. As such, both the environmental and heritage legislation require that development activities must be preceded by an assessment of the impact undertaken by qualified professionals. Palaeontological Impact Assessments (PIAs) are specialist reports that form part of the wider heritage component of:

- Heritage Impact Assessments (HIAs) called for in terms of Section 38 of the National Heritage Resources Act, Act No. 25, 1999 by a heritage resources authority.
- Environmental Impact Assessment process as required in terms of other legislation listed in s. 38(8) of NHRA;
 - Environmental Management Plans (EMPs) required by the Department of Mineral Resources.

HIAs are intended to ensure that all heritage resources are protected, and where it is not possible to preserve them in situ, appropriate mitigation measures are applied. An HIA is a comprehensive study that comprises a palaeontological, archaeological, built environment, living heritage, etc specialist studies. Palaeontologists must acknowledge this and ensure that they collaborate with other heritage practitioners. Where palaeontologists are engaged for the entire HIA, they must refer heritage components for which they do not have expertise on to appropriate specialists. Where they are engaged specifically for the palaeontology, they must draw the attention of environmental consultants and developers to the need for assessment of other aspects of heritage. In this sense, Palaeontological Impact Assessments that are part of Heritage Impact Assessments are similar to specialist reports that form part of the EIA reports. The standards and procedures discussed here are therefore meant to guide the conduct of PIAs and specialists undertaking such studies must adhere to them. The process of assessment for the palaeontological (PIA) specialist components of heritage impact assessments, involves:

Scoping stage in line with regulation 28 of the National Environmental Management Act (No. 107 of 1998) Regulations on Environmental Impact Assessment. This involves an **initial assessment** where the specialist evaluates the scope of the project (based, for example, on NID/BIDs) and advises on the form and extent of the assessment process. At this stage the palaeontologist may also decide to compile a **Letter of Recommendation for Exemption from further Palaeontological Studies**. This letter will state that there is little or no likelihood that any significant fossil resources will be impacted by the development. This letter should present a reasoned case for exemption, supported by consultation of the relevant geological maps and key literature.

A Palaeontological Desktop Study – the palaeontologist will investigate available resources (geological maps, scientific literature, previous impact assessment reports, institutional fossil collections, satellite images or aerial

photos , etc) to inform an assessment of fossil heritage and/or exposure of potentially fossiliferous rocks within the study area. A Desktop studies will conclude whether a further field assessment is warranted or not. Where further studies are required, the desktop study would normally be an integral part of a field assessment of relevant palaeontological resources.

A Phase 1 Palaeontological Impact Assessment is generally warranted where rock units of high palaeontological sensitivity are concerned, levels of bedrock exposure within the study area are adequate; large-scale projects with high potential heritage impact are planned; and where the distribution and nature of fossil remains in the proposed project area is unknown. In the recommendations of Phase 1, the specialist will inform whether further monitoring and mitigation are necessary. The Phase 1 should identify the rock units and significant fossil heritage resources present, or by inference likely to be present, within the study area, assess the palaeontological significance of these rock units, fossil sites or other fossil heritage, comment on the impact of the development on palaeontological heritage resources and make recommendations for their mitigation or conservation, or for any further specialist studies that are required in order to adequately assess the nature, distribution and conservation value of palaeontological resources within the study area.

A Phase 2 Palaeontological Mitigation involves planning the protection of significant fossil sites, rock units or other palaeontological resources and/or the recording and sampling of fossil heritage that might be lost during development, together with pertinent geological data. The mitigation may take place before and / or during the construction phase of development. The specialist will require a Phase 2 mitigation permit from the relevant Heritage Resources Authority before Phase 2 may be implemented.

A **'Phase 3' Palaeontological Site Conservation and Management Plan** may be required in cases where the site is so important that development will not be allowed, or where development is to co-exist with the resource. Developers may be required to enhance the value of the sites retained on their properties with appropriate interpretive material or displays as a way of promoting access of such resources to the public.

The assessment reports will be assessed by the relevant heritage resources authority, and depending on which piece of legislation triggered the study, a response will be given in the form of a Review Comment or Record of Decision (ROD). In the case of PIAs that are part of EIAs or EMPs, the heritage resources authority will issue a comment or a record of decision that may be forwarded to the consultant or developer, relevant government department or heritage practitioner and where feasible to all three.

3. Details of study area and the type of assessment:



Figure 1: Google Earth photo indicating the study area in the yellow polygon

The study area lies west of the township Koedoeskop, approximately 36km south of Thabazimbi in the Limpopo Province.

Geomorphologically the study area lies at the foot of a hill. The soil has a red colour due to the erosion of the underlying iron-rich rocks. The slope is covered in typical Bushveld vegetation. The adjacent flat areas to the east of the study area are under cultivation (see Fig.1).

The adjacent farm and two farms 7 and 9 kms respectively to the south were visited last year (Durand, J.F. (2013a, 2013b) and the relevant literature and geological maps for the study area in which the development is proposed to take place, have been studied for a Scoping Report.

4. Geological setting of the study area



[The study area is indicated by the yellow polygon]

Figure 2: Geological Map of the study area and surroundings (adapted from the 2426 THABAZIMBI 1:250 000 Geology Map, Council for Geoscience, 1978)

GEOLOGICAL LEGEND

3G1	Course grained granite	Nebo Granite	Lebowa Granite Suite	Bushveld Complex
T3tQ	Quartzite		Pretoria Group	Transvaal Supergroup
T3tS	Shale (ferruginous) and hornfels – locally with conglomerate and quartzite near base and higher up			
T2I	Banded ironstone, locally with shaly dolomitic limestone at top	Penge Formation	Chuniespoort Group	
T2	Dolomite, chert, shale, locally with interbedded quartzite	Malmani Subgroup		

The study site is largely situated on Pretoria Group sediments while the southern margin overlaps the Penge Formation of the Chuniespoort Group (Fig.2). These late Archaean to early Proterozoic Transvaal Supergroup metamorphosed sediments consist mostly of iron-rich mudrock (Fig. 3) (Eriksson *et al.*, 2006).

Red-brown, iron-rich rocks underlie the largest part of the study area. These rocks form part of the ferruginous shales of the Pretoria Group (Fig.3).



Figure 3: Red-brown, iron-rich rocks forming part of the ferruginous shales of the Pretoria Group at 24° 54' 21.75"S 27° 29' 14.22"E



Figure 4: Banded ironstone of the Chuniepoort Group which occurs in the southern part of the study area

The finely-laminated banded ironstone found along the southern part of the study area form part of the Chuniespoort Group. Banded ironstone dominates the geology in the southern part of the study area (Fig.4).

During a previous field survey done on the farms Buffelskraal and Krokodilkraal (7 and 9 kilometres to the southeast respectively), the dolomite and limestone rich Crocodile River Fragment were studied (see Durand, J.F., 2013b)



Figure 5: Folded and metamorphosed dolomite of the Crocodile River Fragment

The study area is situated near the contact between the Bushveld Igneous Complex and the Crocodile River Fragment of the Transvaal Supergroup (Fig.2). The Bushveld Igneous Complex intruded into the older Transvaal Sequence approximately 2.1 Ga ago. The Bushveld Igneous Complex is represented in the study area by course grained granite of the Nebo Granite of the Lebowa Granite Suite. The limestone and dolomite of the Crocodile River Fragment underwent folding and thermal metamorphism due to the emplacement of the Bushveld Igneous Complex (Fig. 5).

Karstification seems to be limited to the surface of the limestone and no crevasses, sinkholes, caves or cave breccia were found in the region during the previous field surveys.

5. Palaeontological heritage of southern Limpopo

The 2.6 – 2.4 Ga Chuniespoort Group consists largely of stromatolitic dolomite and limestone. Stromatolites and caves are common in this geological unit in places such as the Cradle of Humankind towards the south and Makopane Valley towards the east (see Fig.6) of the study area. The fossils and artefacts of this region play an important role in the understanding of human origins, early human evolution and technological development (MacFadden, 1980; Mason, 1988; Maguire, 1992). The scientific, educational and economic importance of these fossils which are found in petrified Plio-Pleistocene cave infills in the dolomite of the Chuniespoort Group necessitated this study.



Figure 6: Fossiliferous cave breccia at the field research station of the University of the Witwatersrand in Makopane Valley containing thousands of fossils

References:

Durand, J.F. (2013a) Palaeontological Desk Top Report for proposed development of a 10 MW Solar Energy facility on the Farm Liverpool 543 KQ Portion 2 at Koedoeskop.

Durand, J.F. (2013b) Palaeontological Desk Top Report for proposed limestone mining on the farms Buffelskraal 554 KQ Portion1 and Krokodilkraal 545 KQ

Eriksson, P.G.; Altermann, W. & Hatzer, F.J., (2006) The Transvaal Supergroup and its precursors. *In: Johnson, M.R.; Anghauysse, C.R. & Thomas, R.J. (Eds.) The Geology of South Africa*. Johannesburg: Geological Society of South Africa.

Geological Survey (1978) Thabazimbi 2426 1: 250 000 Geology Map.

Maguire, J.M. (1992) *A guide to the palaeontological and archaeological sites of the Makapansgat Valley*. South African Society for Amateur Palaeontologists, Pretoria.

Mason, R.J. (1988) Cave of Hearths Makapansgat. *Occasional Paper 21 Archaeological Research Unit*, University of the Witwatersrand, Johannesburg.

McFadden, P.L. (1980) An overview of palaeomagnetic chronology with special reference to the South African hominid sites. *Palaeontologia africana* 23:75-98.

6. Conclusion and recommendations:

During a previous study a few kilometres to the south east (Durand 2013b), the surface survey did not yield any bony fossils or any noteworthy stromatolites. It was found that the karstification of the dolomite and limestone in the region seems to be superficial and limited to the surface (see Fig.5). No caves or fossils are known in the study area and surroundings. It seems unlikely that there are any Plio-Pleistocene caves or cave fills in the region especially in the light of the absence of large-scale solution features such as sinkholes or caves or secondary sedimentary structures such as cave breccia, flowstone or travertine. Due to the improbability of fossils occurring in the study area it is recommended that the project should be exempted from further palaeontological studies.



Palaeontological specialist:

Dr JF Durand (Sci. Nat.)

BSc Botany & Zoology (RAU), BSc Zoology (WITS), Museology Dipl. (UP),
Higher Education Diploma (RAU), PhD Palaeontology (WITS)

Experience:

Palaeontological assessments:

- Urban development in Cradle of Humankind World Heritage Site (Gauteng): Letamo, Honingklip, Windgat, Sundowners, Ekutheni
- Urban development at Goose Bay, Vereeniging, Gauteng

- Upgrade of R21 between N12 and Hans Strydom Drive, Gauteng
- Vele Colliery, Limpopo Province
- 50 MW Solar Power Station, De Wildt, Gauteng
- 10 MW PV Plant Potchefstroom, North West Province
- Omega 342 50MW Solar Power Station, Viljoenskroon, Free State
- Solar energy facility at Prieska, Northern Cape Province
- Solar energy facility near Windsorton, Northern Cape
- Springfontein wind and solar energy facility, Free State
- Solar power facility, Bethal, Mpumalanga
- Diamond mine on Endora, Limpopo Province
- Development at Tubatse Ext.15, Limpopo Province
- Development at 24 Riviere, near Vaalwater, Limpopo Province
- Manganese mine south of Hotazel, Northern Cape
- Wind energy facility at Cookhouse, Eastern Cape
- Energy facility at Noupoot, Northern Cape
- Fluorspar mine near Wallmannsthal, Gauteng
- ESKOM power line, Dumo, KwaZulu-Natal
- ESKOM Gamma-Omega 765KV transmission line, Western Cape
- ESKOM 44KV power line at Elandspruit near Middelburg, Mpumalanga
- ESKOM Platreef Substation and power lines from Borutho MTS Substation to Platreef, Limpopo Province
- ESKOM Mokopane Substation, Limpopo Province
- ESKOM Aurora-Omega power line, Western Cape
- ESKOM Juno-Aurora power line, Western Cape
- Upgrading of storm water infrastructure in Valencia, Addo of the Sundays River Valley Municipality, Eastern Cape
- Development of a 10 MW Solar Energy facility on the Farm Liverpool 543 KQ Portion 2 at Koedoeskop, Limpopo Province
- Extension of limestone mine on the farms Buffelskraal 554 KQ Portion1 and Krokodilkraal 545 KQ, Limpopo Province
- Marang B - a new 3 x 500MVA 400/132kV Main Transmission Substation east of Rustenburg, North West Province

Palaeontological research:

- Gauteng: Wonder Cave
- KwaZulu/Natal: Newcastle, Mooi River, Rosetta, Impendle, Himeville Underberg, Polela & Howick Districts, Sani Pass
- Eastern Cape: Cradock District, Algoa Basin
- Western Cape: Clanwilliam District
- Free State: Memel & Warden Districts
- Limpopo Province: Nyalaland (KNP), Vhembe Reserve, Pont Drift
- Zimbabwe: Sentinel Ranch, Nottingham