

# ARCHAEOLOGICAL IMPACT ASSESSMENT

## WOLVEKRANS COLLIERY NORTH EXPANSION

Archaeological Assessment at the  
Wolvekrans Colliery North Section, Middelburg, Mpumalanga  
Province.

Life of Asset Opencast Expansion and Dispatch Rider project

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## Executive Summary

**Site name and location:** The Wolvekrans Colliery is situated 20 km south of Middelburg in Mpumalanga Province and is owned by South32 SA Coal Holdings (Pty) Ltd.

**Purpose of the study:** Phase 1 Archaeological Impact Assessment (AIA) to determine the presence of cultural heritage sites and the impact of the proposed project on these resources within the opencast mining footprint.

**1:50 000 Topographic Map:** 2529 CD.

**Environmental Consultant:** Prism EMS.

**Developer:** South32 SA Coal Holdings (Pty) Ltd formerly known as BHP Billiton Energy Coal South Africa (Pty) Limited (BECSA).

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

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**Date of Report:** 9 May 2016

**Findings of the Assessment:**

In terms of the built environment of the area (Section 34), no standing buildings older than 60 years occur within the opencast areas. The study area was therefore assessed in terms of the archaeological component of Section 35 of the NHRA and the ephemeral remains of a Late Iron Age settlement was recorded in the north western portion of the study area. The site is of low heritage significance due to disturbance to the site and the lack of features that can be excavated.

The farms Hartbeestfontein 339 JS and Goedehoop 315 JS were previously surveyed (de Jong 2006) who recorded an engraving of a game board, a large cemetery (referenced in this report as cemetery 4) and a mining village that is located outside of the current area of impact. During the current study additional features were recorded consisting of the demolished remains of 5 ruins, 3 cemeteries and a low density scatter of isolated Later Stone Age artefacts. Within the opencast areas **ruin 1 and 2** and a cemetery (**cemetery 1**) located on the farm Vaalbank 289 JS will be directly impacted on, this area was not assessed by the de Jong in 2006.

In the dispatch rider area on the farm Hartbeestfontein two cemeteries and a few Late Stone Age (LSA) miscellaneous flakes were recorded next to a pan. These Stone Age artefacts made from crypto crystalline silica (CCS) are scattered too sparsely to be of any significance apart from noting their presence, which has been done so in this report. The dispatch rider area consists of underground mining and no direct impact is foreseen on the recorded features in this area.

Apart from the cemeteries, no red flags were identified during the AIA, although some management actions are necessary to manage the recorded heritage sites in an appropriate manner. Subject to approval from SAHRA there is, from an archaeological point of view, no reason why the development should not proceed if the recommendations as made in this report are adhered to.

## General

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## Abbreviations

Table 1 is a list of abbreviations commonly used throughout this document.

**Table 1: List of abbreviations**

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

\*Although EIA refers to both Environmental Impact Assessment and the Early Iron Age both are 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

Prism Environmental Management Services was requested by Jones and Wagener to undertake an Archaeological Impact Assessment on the Middelburg Mine properties for the proposed mine expansion project. South32 SA Coal Holdings (Pty) Ltd (South32 CSA) formerly known as BHP Billiton Energy Coal South Africa (Pty) Limited, ("BECSA") is the holder of an amended mining right for coal, granted by the Minister of Mineral Resources, in terms of the Mineral and Petroleum Resources Development Act (MPRDA) and notarially executed on the 21st of May 2015 under DMR reference MP30/5/1/2/2/379MR, in respect of its Middelburg Mine, now known as Wolvekrans Colliery North.

Wolvekrans Colliery has an expected life of mine to 2039. The mine comprises of the following sites/sections:

- Wolvekrans North Section which is the northern operations, covering Hartbeestfontein, Bankfontein (mining now ceased), Goedehoop and Klipfontein. This was previously known as Middelburg Colliery;
- Wolvekrans South Section which is the southern operations, covering Wolvekrans, Vlaklaagte (mining ceased); Driefontein, Boschmanskrans, Vandyksdrift and Steenkoolspruit; and
- South32 Coal Processing Services, focusing on beneficiation plants within the whole mine complex.

There are several EMPRs for the Wolvekrans Colliery:

- 2000 EMPR for Klipfontein (approved in 2004);
- 2002 EMPR for the North and South Sections (approved in 2004);
- 2006 EMPR amendment for the North and South Sections (approved in 2007);
- 2000 EMPR for Douglas Colliery (approved in 2003);
- 2000 EMPR for Boschmanskrans Section of Douglas Colliery (approved in 2001);
- 2005 EMPR amendment for the Boschmanskrans Lubrication Facility (approved in 2007);
- 2005 EMPR amendment for Boschmanskrans Mini Pit Operation at Douglas Colliery (approved in 2007, but not implemented);
- 2006 EMPR amendment for Steenkoolspruit DMO Project at Douglas Colliery (approved in 2007);
- 2012 EIA Report and EMPR for Extension of Mining Operations in Boschmanskrans Section of Douglas Colliery (approved in 2013); and
- 2013 consolidated EMPR for the Wolvekrans Middelburg Complex (WMC) (awaiting approval).

There are two Water Use Licences (WULs) for Wolvekrans Colliery North Section. One is for Klipfontein section and another for the Middelburg Mine North and South sections.

## 1.1 Proposed project

South32 CSA proposes to mine the remnants at Hartbeesfontein and Goedehoop sections using opencast mining, as well as to mine the No. 1, No. 2 and No. 4 seam coal using underground mining in the south of the Hartbeesfontein section.

The main components of the proposed expansion project are:

- Extension of the approved opencast coal mining pit boundaries within the Hartbeesfontein and Goedehoop sections (Life of Asset (LoA) mining expansion); and
- Underground mining in the south of the Hartbeesfontein section (called the Dispatch Rider project) with associated infrastructure development.

Authorisation is needed for the proposed opencast and underground mining extension at Wolvekrans Colliery North.

## 1.2 Terms of Reference

The Archaeological Impact Assessment report forms part of the Environmental Impact Assessment (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 within the development footprint. 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 (NHRA) (Act 25 of 1999).

The report outlines the approach and methodology utilized before and during the survey, which includes: Phase 1, a desktop study 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 10 features were recorded. 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 the South African Heritage Resource Authority (SAHRA) for review. The following phased approach was followed to cover the study area.

### Phase 1: Desktop study

Conducting a brief desktop study where information on the area is collected to provide a background setting of the archaeology that can be expected in the area.

### Phase 2: 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.

### Phase 3: 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 (Association of South African Professional Archaeologists).

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).

### 1.3 Archaeological Legislation and Best practice

Phase 1, an Archaeological Impact Assessment (AIA) or a Heritage Impact Assessment (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 National Environmental Management Act (NEMA) and section 39 (3) (b)(iii) of the MPRDA.

The AIA should be submitted, as part of the EIA, Basic Impact Assessment (BIA) or Environmental Management Plan (EMP), to the Provincial Heritage Resource Authority (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 Cultural Resource Management (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 Member of the Executive Council (MEC) for Local Government and Planning; or in some cases, the MEC for Housing and Welfare.

Authorisation for exhumation and reinternment 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).

## 1.4 Description of Study Area

### Location Data

The South32 CSA Wolvekrans Colliery North section is located within the Nkangala District Municipality, which is approximately 20 km south of Middelburg, Mpumalanga province, South Africa (Figure 1). Wolvekrans Colliery has an expected life of mine to 2036. The mine comprises of the following sites/sections:

- Wolvekrans North Section which is the northern operations, covering Hartbeestfontein, Bankfontein (mining now ceased), Goedehoop and Klipfontein. This was previously known as Middelburg Colliery;
- Wolvekrans South Section which is the southern operations, covering Wolvekrans, Vlaklaagte (mining ceased); Driefontein, Boschmanskrans, Vandyksdrift and Steenkoolspruit; and
- South32 Coal Processing Services, focusing on beneficiation plants within the whole mine complex.

The proposed expansion of the Wolvekrans North section is limited to the Goedehoop and Hartbeestfontein sections. It is situated on Portions 6, 7, 9, 11, 12, 13, 14, 15, 16, 17, 24, 25, 26, 27, 28, 29, 30 and 31 as well as the remaining portions 1, 5, 6, 12, 9, 10, 11, of the Farm Goedehoop 315 and portions 7 (RE 1), 9, 10, 11, 12, 13, 14 of the Farm Hartbeestfontein 339, Portion 3 of Vaalbank 289 JS and Portion 1 of Boschmanskrans 22 IS. The Wolvekrans Colliery North is accessed via the R575.

### Location Map

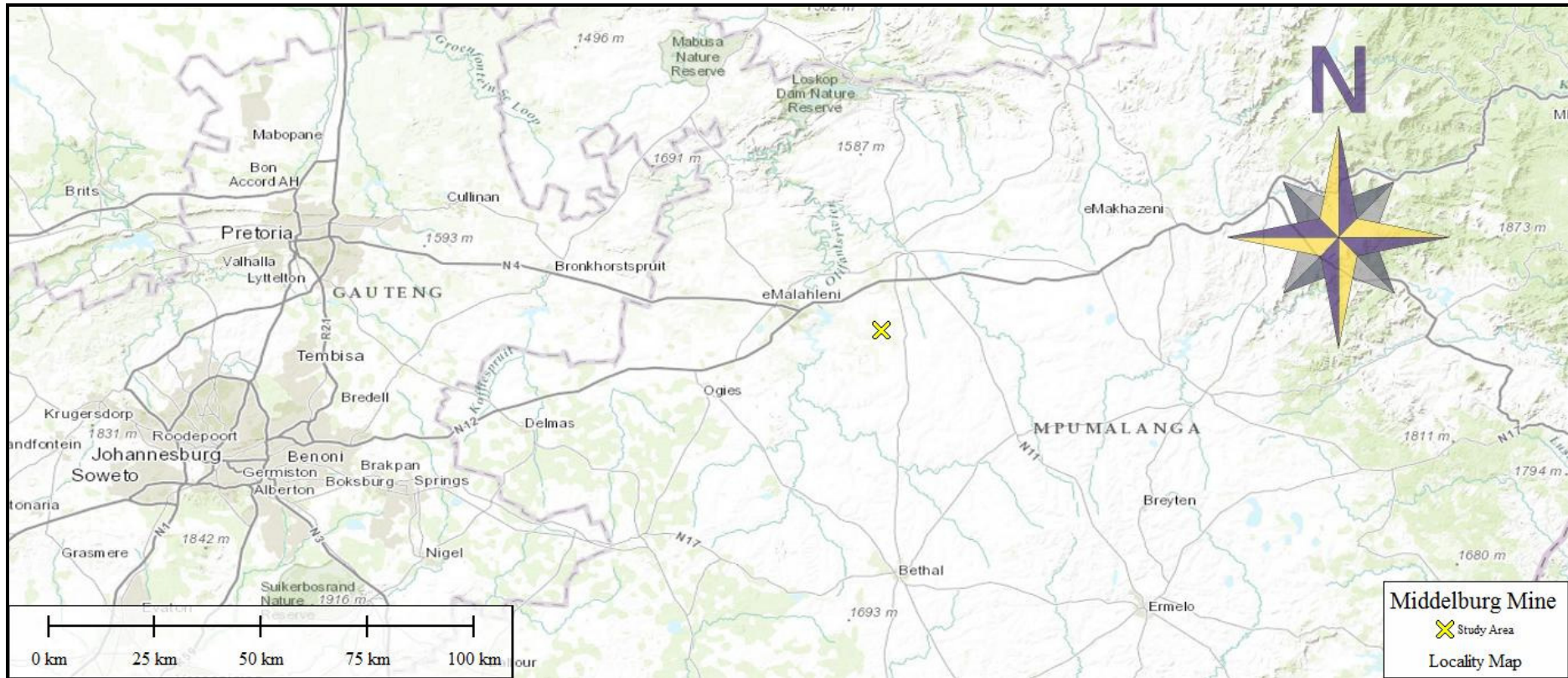


Figure 1: Location map

## 2 Approach and Methodology

The aim of the study is to cover archaeological databases to compile a background of the archaeology that can be expected in 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 scanning existing records for archaeological sites, historical sites, graves, architecture (structures older than 60 years) of the area.

#### Literature Search

Utilising data for information gathering stored in the National archives, the archaeological database at Wits and previous CRM reports done in the area. The aim of this is to extract data and information on the area in question.

#### Information Collection

The South African Heritage Information System (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.

#### Consultation

A public consultation process is conducted as part of the EIA process.

#### 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.

#### Genealogical Society of South Africa

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

### 2.1 Phase 2 – Physical Surveying

Due to the nature of cultural remains, the majority of which occurs below surface, a field survey of the study area was conducted. The study area was surveyed by means of vehicle and extensive surveys on foot by a professional archaeologist, as part of a team of specialists and Prism who indicated the study areas during April and May 2015.

### 2.2 Restrictions

Due to the fact that most cultural remains may occur below surface and low archaeological visibility, the possibility exists that some features or artefacts may not have been discovered/ recorded during the survey and the possible occurrence of unmarked graves and other cultural material cannot be excluded. HCAC cannot be held accountable for any such oversights. Only the surface infrastructure footprint area and open cast extension areas were assessed as indicated in the location map, and not the entire farms. This study was a high level scan only as the survey was hindered by access restriction as well as poor visibility due to dense vegetation in the impact area. It is assumed that the results of the de Jong study are accurate and applicable to this study.

The surface impact areas in the dispatch area were not available at the time of the study. It is possible that new information, which could change the recommendations, could come to light through the following:

Exposure of archaeological and historical sites and objects that are hidden or are buried during site clearance activities;

- Exposure of hidden archaeological and historical sites and objects (obscured by tall grass etc.).

Although Prism EMS and HCAC 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 graves, stone tool scatters, artefacts, bones or fossils, be exposed during the process of development.

### 3 Nature of the development

#### 3.1 LoA mining expansion

The proposed areas where opencast mining will extend beyond the current mining areas in the approved EMPR are indicated in red in **Figure 2**. Opencast mining will be by means of dragline.

#### 3.2 Dispatch Rider project

The Dispatch Rider project covers an area of approximately 915 ha and is indicated in purple in **Figure 2** and consists of the following:

- Change the mining method of an existing EMP approved opencast area (pit DW) to underground mining,
- Undermine the adjacent property to the east (the Dispatch Rider prospecting area is located to the east of the existing approved mining rights area – indicated in pink on **Figure 2**. CSA has submitted an application to renew the prospecting rights on the farm), and
- Development of infrastructure in support of Dispatch Rider.

No shafts will be sunk for the Dispatch Rider project. The adjacent high wall of an old opencast pit will be used to gain access to the underground. Mining is to commence with No. 2 seam, followed by No. 4 seam and lastly No. 1 seam coal.



Figure 2. Infrastructure layout

## 4 Historical and Archaeological background of the study area

### 4.1 Databases Consulted

On the 1:50 000 map sheet 2529 CD 5 sites are on record at the Wits Archaeological database. These sites consist of ESA and LSA open air sites and farm labourer ruins. None of these sites are located in close proximity to the study area. Numerous previous CRM surveys are on record for the greater study area. For this study the following studies were consulted: Huffman (1999), De Jong (2011 and 2006), Gaigher (2011), Van Wyk Rowe (2013), Pistorius (2013) and van der Walt (2015). The study by De Jong (2006) covered the area earmarked for the Middelburg Mine North and South Sections on the following portions: Goedehoop 315 JS, Sterkwater 317 JS, Bankfontein 340 JS, Harbeesfontein 339 JS, Boschmanskrans 22 IS and Driefontein 338 JS. He did not record any heritage sites in the areas currently under investigation, however in the greater study area a cemetery, village and rock engravings were recorded. Gaigher (2011) recorded a cemetery and structures. Van Wyk Rowe (2013) recorded no sites of significance and similarly Pistorius (2013) did not record any prehistorical sites. The study by van der Walt also on the farm Goedehoop recorded various ruins of no significance and the study by Huffman recorded Stone Age sites and historical home steads.

#### **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

#### **Archaeological Background**

The Stone Age is divided in Early; Middle and Late Stone Age and refers to the earliest people of South Africa who mainly relied on stone for their tools.

Very few Early Stone Age (ESA) sites are on record for Mpumalanga and no sites dating to this period are expected for the study area. An example in Mpumalanga is Maleoskop on the farm Rietkloof where ESA tools have been found. This is one of only a handful of such sites in Mpumalanga.

The Middle Stone Age (MSA) has not been extensively studied in Mpumalanga but evidence of this period has been excavated at Bushman Rock Shelter, a well-known site on the farm Klipfonteinhoek in the Ohrigstad district. This cave was excavated twice in the 1960's by Louw and later by Eloff. The MSA layers show that the cave was repeatedly visited over a long period. Lower layers have been dated to over 40 000 BP (Before Present) while the top layers date to approximately 27 000 BP (Esterhuizen & Smith in Delius, 2007; Bergh, 1998).

Some isolated finds were recorded to the north east of the study area close to Witbank as well by Huffman (1999) on the farm Rietfontein directly west of the study area.

The Later phases of the Stone Age or Late Stone Age (LSA) began at around 20 000 years BP. This period was marked by numerous technological innovations and social transformations within these early hunter-gatherer societies. These people may be regarded as the first modern inhabitants of Mpumalanga, known as the San or Bushmen. They were a nomadic people who lived together in small family groups and relied on hunting and gathering of food for survival. Evidence of their existence is to be found in numerous rock shelters throughout the Eastern Mpumalanga where some of their rock paintings are still visible. A number of these shelters have been documented throughout

the Province (Bornman, 1995; Schoonraad in Barnard, 1975; Delius, 2007). These include areas such as Witbank, Ermelo, Barberton, Nelspruit, White River, Lydenburg and Ohrigstad.

The Iron Age (IA) as a whole represents the spread of Bantu speaking people and includes both the pre-Historic and Historic periods. It can be divided into three distinct periods:

- The Early Iron Age (EIA): Most of the first millennium AD.
- The Middle Iron Age (MIA): 10th to 13th centuries AD
- The Late Iron Age (LIA): 14th century to colonial period.

The Iron Age is characterised by the ability of these early people to manipulate and work Iron ore into implements that assisted them in creating a favourable environment to make a better living. No Sites dating to the Early or Middle Iron Age have been recorded or is expected for the study area. The same goes for the Later Iron Age period where the study area is situated outside the known distribution of Late Iron Age settlements in Mpumalanga. This phase of the Iron Age (AD 1600-1800's) is represented by various tribes including Ndebele, Swazi, BaKoni, Pedi marked by extensive stonewalled settlements found throughout the Mpumalanga escarpment

## Historical background

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 during the rainy season, up until the 1930's. Tsetse flies were however, not present in the area at that time. (Bergh 1999: 2)

Though the rarity of such pests may have facilitated early settlement in the area, there are no signs of Stone Age or Early Iron Age remains in the immediate vicinity. (Bergh 1999: 4-6) There are however signs that a large Late Iron Age (1000-1800) site was located approximately 50 km to the east and northeast of where the farm is located today (Bergh 1999: 7) By the beginning of the 19<sup>th</sup> century, the major black communities in the area of the farm would have been the Ndzundza Ndebele to the north, and the Kôpa even further to the north. (Bergh 1999: 11)

The Ndzundza Ndebele had moved away from the Pretoria District, and from the upper parts of the Steelpoort River, to the area where the Stoffberg is located today. This group of people were attacked and defeated by Mzilikazi's Khumalo-Ndebeles in 1821. Mzilikazi apparently settled in the area for a while, after he had attained his victory. (Bergh 1999: 110-111) Mzilikazi's attack on the Ndzundza Ndebele was however not isolated. The Difaqane (Sotho), or Mfekane ("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 (Bergh 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 (Bergh 1999: 14; 116-119).

During the time of the Difaqane, a northwards migration of white settlers from the Cape was also taking place. Some travellers, missionaries and adventurers had gone on expeditions to the northern areas in South Africa, some already as early as the 1720's. In 1934, the "Association for the Exploration of Central Africa" was established in Cape Town, with Andrew Smith as its Director. As a member of this party, one Robert Scoon also undertook a journey that led him through, or at least very close to the study area. His journey led him from the Strydpoortberge in the north, close to Potgietersrus, through Middelburg and to Chrissiesmeer in the east, and back to Pretoria (Bergh 1999: 13; 120).

It was however only 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). The Tregardt and Van Rensburg "trek" advanced past the Middelburg district, to the west thereof, in 1844. This migration ended in the area of the Soutpansberg (Bergh 1999: 14).

On 25 July 1846, the Volksraad (Council) at Ohrigstad bought a very large portion of land, stretching from the Olifants River in the north, the Crocodile River, the Elandspruit (Elands River) and to the Portuguese area in the east. This land was bought from the Swazi, who claimed to have a right to the area, for an amount of a 100 heads of cattle. The Middelburg District formed part of this area (Bergh 1999: 16; 131).

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 Mpumalanga, the then Eastern Transvaal area. 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 (Bergh 1999: 170).

Long after white settlers had moved into the Transvaal, they avoided the Eastern Transvaal Highveld area. This was due to the cold winters, which at first kept farmers at bay. Farmers from the Free State and Cape colony however gradually started moving into the area, due to the sufficient grazing that it offered to their cattle (Green 1986: 2).

Since the mid 1800's up until the present, South Africa had been subdivided into various districts. Since 1945, the area where the modern-day Middelburg area is located formed part of the Lydenburg district. As of 1872, the farm area was located in the Middelburg district. By 1994, the property under investigation still formed part of the Middelburg district (Bergh 1999: 17, 20-27).

The decision to establish the town of Middelburg was based on the fact that Pretoria was situated very far from towns like Lydenburg and Ohrigstad, which had been established before 1850. In order to facilitate a link between Lydenburg and Pretoria, the establishment of a town between these two centres was considered. (Green 1986: 3) In October 1859, it was decided that the town of Middelburg would be established. (Green 1986: 5) It is interesting that the town was at first known by two names; Nazareth by the Dutch Reformed Church and Middelburg by the ZAR Government. The name Middelburg was eventually accepted, and since the town was situated in the middle, between Pretoria and Lydenburg, it was considered to be the most appropriate title (Green 1986: 14-16).

Much can be said about the systematic oppression of black people in South Africa. In 1904 about a half of the black population in the Transvaal was living on private land, owned by whites or companies. According to the Squatters' Law of 1895, no more than five families of "natives" could live on any farm or divided portion of a farm, without special permission of the Government in the Transvaal (Massie 1905: 97). In Bergh's source, one can see a map indicating the areas where blacks had settled by 1904. It is interesting that there were a number of non-delimited reserves for blacks on private farms in the Middelburg district by 1904. There was also one private farm in the ownership of black people, seemingly in close proximity to the study area (Bergh 1999: 41). The 1913 and 1936 acts concerning the establishment of black "homelands" however delimited areas of land that were located far to the north of Middelburg (Bergh 1999: 42-43).

Black and white relations were however at times also interdependent in nature. After the Great Trek, when white farmers had settled at various areas in the northern provinces, wealthier farmers were often willing to lodge needy white families on their property in exchange for odd jobs and commando service. This bywoner often arrived with a family and a few cows. He would till the soil and pay a

minimal rent to the farmer from the crops he grew. The farmer did not consider him a labourer, but mostly kept black workers for hard labour on the farm. After the Anglo-Boer War, many families were left destitute. Post war years of severe droughts and locust plagues did not ameliorate this state of affairs. All of these factors resulted in what became known as the 'poor white problem'. On the advent of commercial farming in South Africa, white landowners soon found bywoners as a financial burden, and many were evicted from farms. In many cases, wealthier landlords found it far more profitable to rent their land to blacks than to bywoners. This enabled them to create reservoirs of black labour (for which mine recruiting agencies were prepared to pay handsome commissions), while it also enabled them to draw more rent from their black tenants. This practice was outlawed in the 1913 Natives Land Act, which forbade that more than five black families could live on white farms as peasant squatters. Some farmers however found ways to evade the law, as in the case of one rich landowner south of Middelburg, who still had 70 black families living on his land in 1920 (Readers Digest 1992: 329-332).

### **THE ANGLO-BOER WAR (1899-1902)**

The Anglo-Boer War, which took place between 1899 and 1902 in South Africa, was one of the most turbulent times in South Africa's history. Even before the outbreak of war in October 1899 British politicians, including Sir Alfred Milner and Mr. Chamberlain, had declared that should Britain's differences with the Z.A.R. result in violence, it would mean the end of republican independence. This decision was not immediately publicized, and as a consequence republican leaders based their assessment of British intentions on the more moderate public utterances of British leaders. Consequently, in March 1900, they asked Lord Salisbury to agree to peace on the basis of the status quo ante bellum. Salisbury's reply was, however, a clear statement of British war aims (Du Preez 1977).

Three individual battalions of British troops moved through Middelburg between February and September 1900. These included the regiments of Lieutenant General F. Roberts, Lieutenant General R. Pole-Carew and Lieutenant General French. During this period, a fleeing Boer commando had also gone through Middelburg. This town was perhaps a strategic point, since there was a railway line running through it (Bergh 1999: 51). During the latter phase of the war, the British followed a scorched earth policy. This entailed that whole towns and thousands of farm dwellings were set alight, that all sources of sustenance that were provided to the Boer Commandos would be destroyed and that women and children who had remained on the farms would be moved into concentration camps. (Bergh 1999: 250) Both a white and a black concentration camp were established at Middelburg (Bergh 1999: 54).

The early defeats suffered by the British Army and the subsequent rebellion of many colonial subjects ensured a general endorsement by the British public of government policy. The republics were soon afterwards annexed. The meeting between Kitchener and Botha at Middelburg on 27 February 1901, made it clear that diplomacy could not bring the war to an end. Both sides were now made aware of the political objectives of the other. The terms that Kitchener presented to Botha were that the republics surrender their independence in exchange for a promise of a form of self-government 'as soon as possible'. (Readers Digest 1992: 257) Since the Boers were unwilling to surrender their independence, it became evident that the only possible conclusion was a military decision, and that only total defeat would force either party to relinquish its political views (Du Preez 1977).

### **4.3 History of the Farms Under investigation**

The focus of this section will specifically be the history of land ownership and developments on the properties under investigation. This study should be viewed as an introduction to the history of the farms under investigation.

#### **4.3.1. Maps Of The Area Under Investigation**

Since the mid 1800's up until the present, South Africa had been subdivided into various districts. Since 1945, the area where the modern-day Middelburg is located formed part of the Lydenburg district. As of 1872, the farm area was located in the Middelburg district. By 1994, the property under investigation still formed part of the Middelburg district (Bergh 1999: 17, 20-27).

Note that, by 1905 the farm Goedehoop 315 JS was known as Good Hope 378. By 1954, the property had been renamed Goedehoop 378. By 1974, the farm was known as Goedehoop 315 JS, as it is today. In 1905, Hartbeestfontein 339 JS was known as Hartebeestfontein 127. By 1974, the property was known as Hartbeestfontein 339 JS.

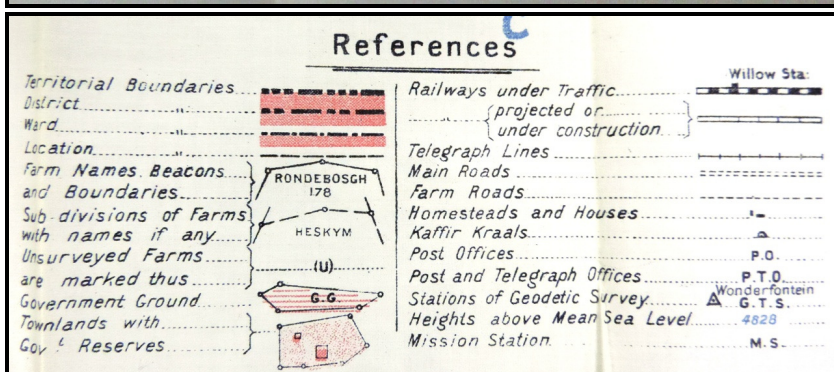


Figure 3. 1905 Map of the Middelburg district. The farms under investigation were known as Good Hope 378 and Hartebeestfontein 127 at the time. Roughly, eight homesteads were visible on Good Hope, most situated along a farm road. No other developments are visible on the farms, except for a few farm roads (Surveyor-General 1905).

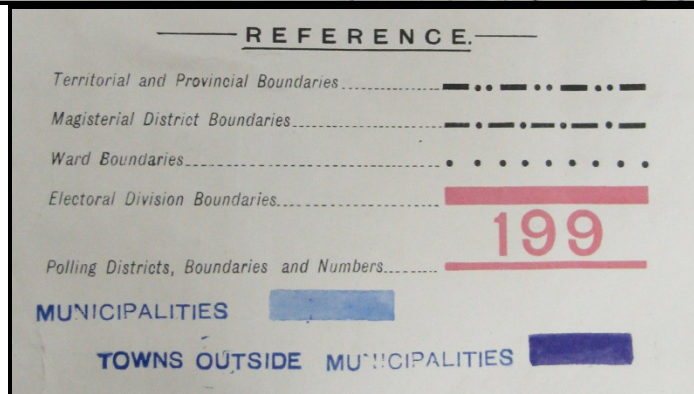
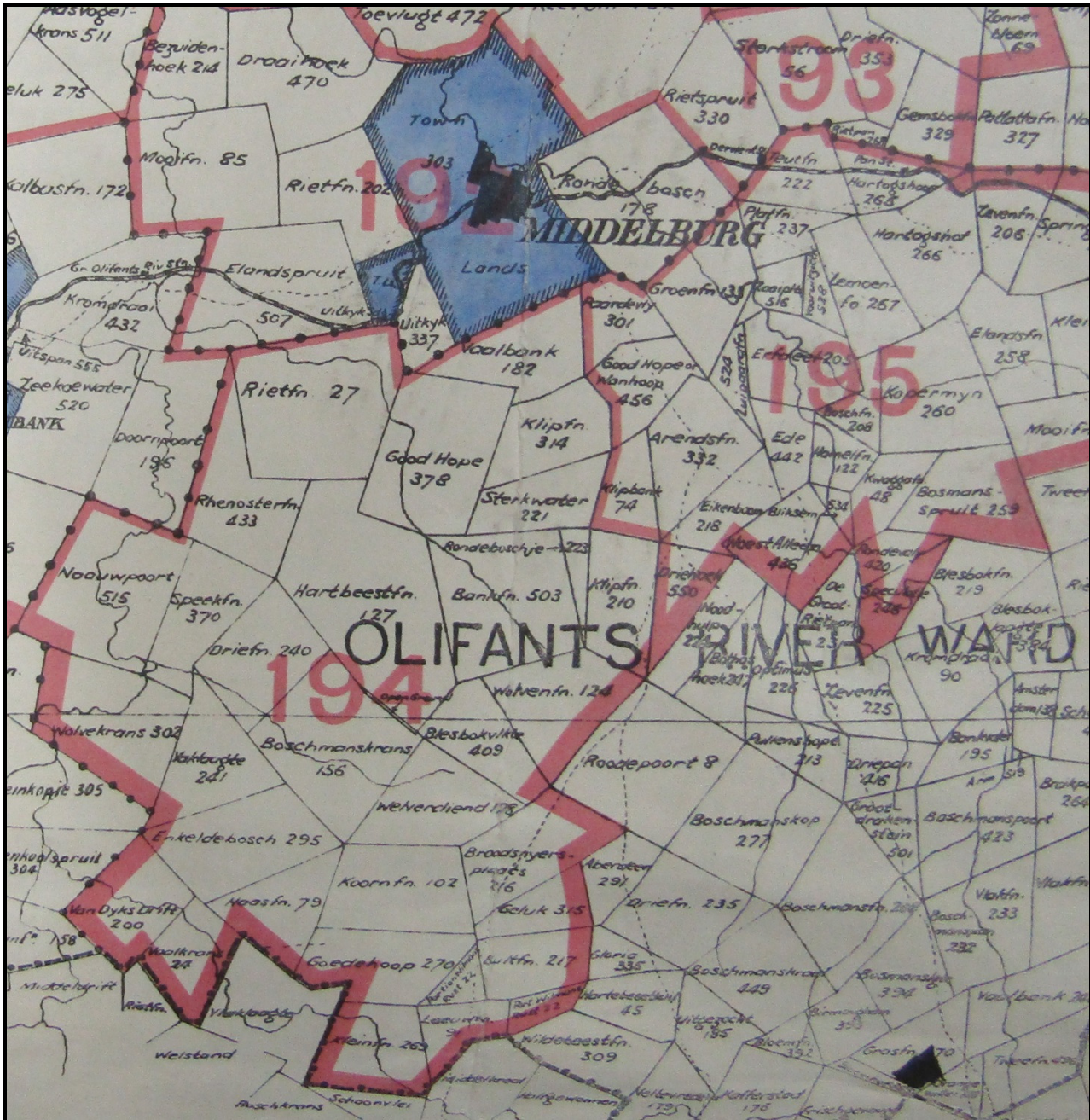


Figure 4. 1913 Map of the Middelburg Electoral Division. Good Hope 378 and Hartbeestfontein 127 were located in the Olifants River Ward. (NASA Maps: 3/485)

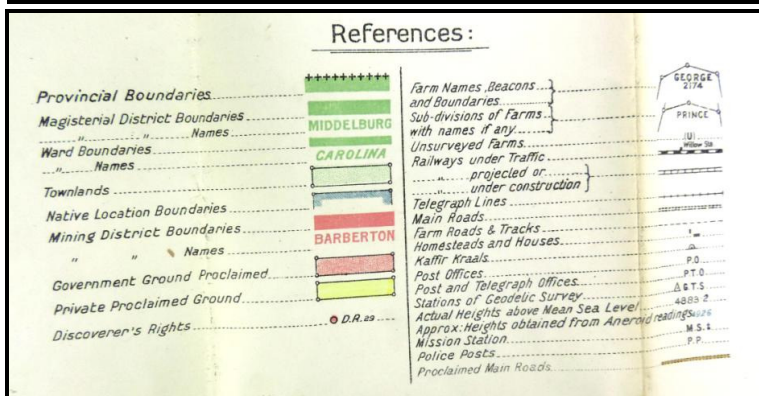
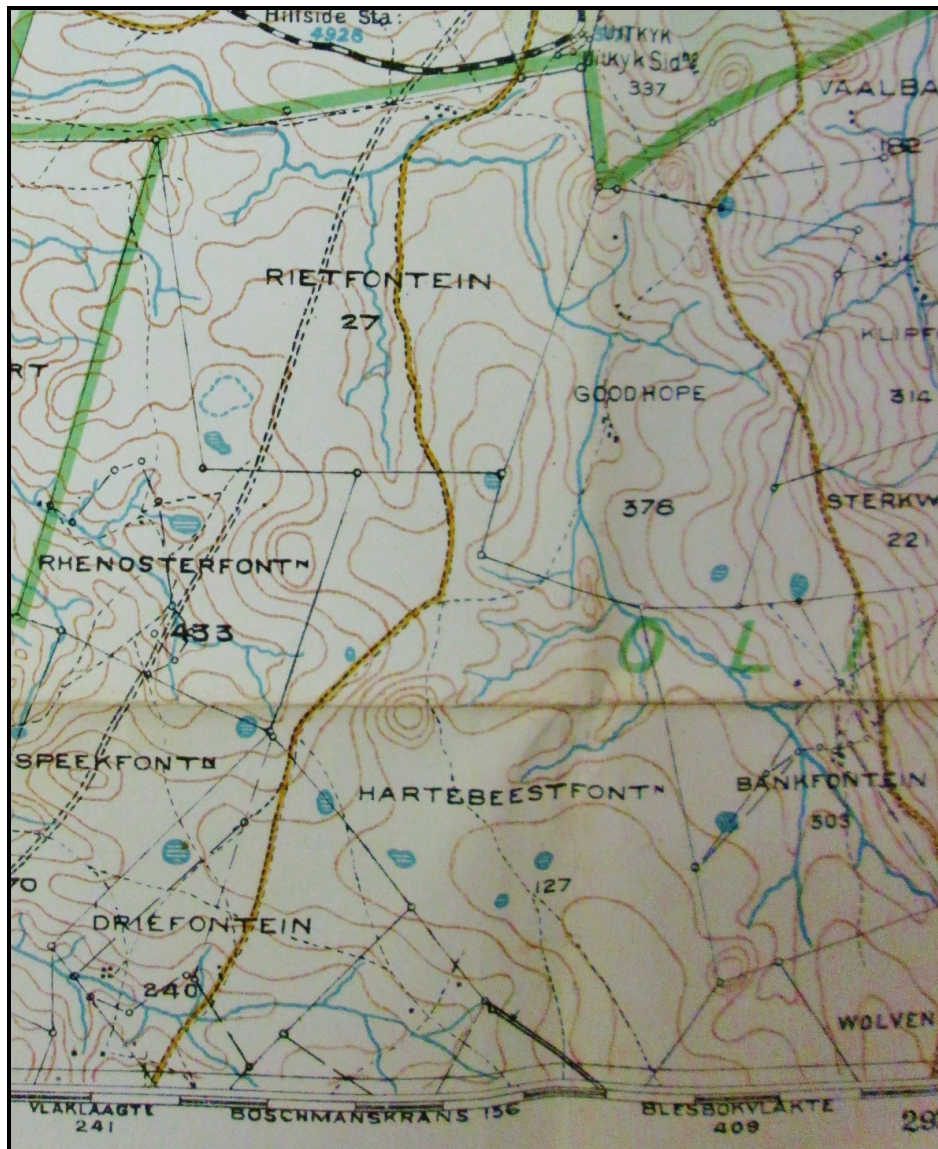
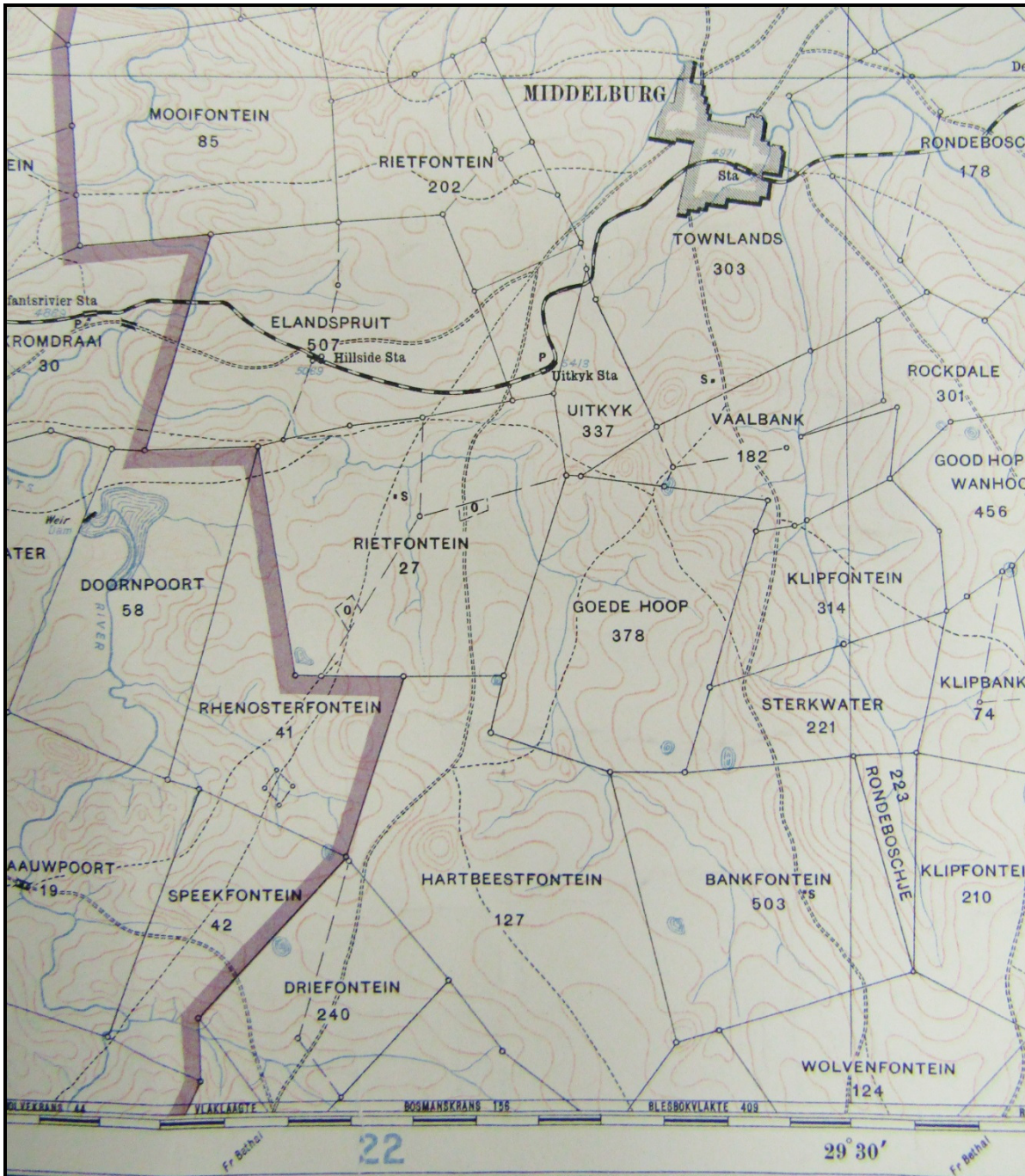


Figure 5. 1920 Map of the Middelburg district. The farms under investigation were still known as Good Hope 378 and Hartebeestfontein 127. As in 1905, a number of homesteads are visible alongside a farm road on Good Hope. (Surveyor-General 1920)



REFERENCE.—VERWYSING.			
Provincial Boundaries.....	+++++ Prowinsiale Grense.....	Railways.....	Wikkop Sta. _____
District Boundaries and Names.....	MIDDELBURG Distrik-Grense en Name.....	Mission Stations.....	MS # _____
Native Location Boundaries.....	RIETVLEI 24 Kafferlokasie-Grense.....	Outspans.....	O _____
Farm Boundaries, Beacons and Names.....	RIETVLEI 24 Plaas-Grense, Bakens en Name.....	Schools.....	S _____
Main Roads and Bridges.....	----- Hoofweë en Brugge.....	Police Posts.....	PP _____
Farm Roads.....	----- Plaaspaai.....	Post Offices.....	P _____
		Primary Triangulation Stations.....	Δ GTS _____
		Secondary Triangulation Stations.....	Δ _____
		Heights above Mean Sea-Level.....	5347.5 _____
			Spoorweë _____
			Sending-Stasies.....
			Uitspannings.....
			Skole.....
			Polisie-Poste.....
			Poskantore.....
			Primêre Driehoeksmetings-Stasies.....
			Sekondêre Driehoeksmetings-Stasies.....
			Hoogtes bo Gemiddelde See-Spieël.....

Figure 6. 1930 Map of the Middelburg district. The farms under investigation were known as Goede Hoop 378 and Hartbeestfontein 127 at the time. (NASA Maps: 2/194)

### 4.3.1.1 Historical topographical maps:

a) Goedehoop 315 JS:

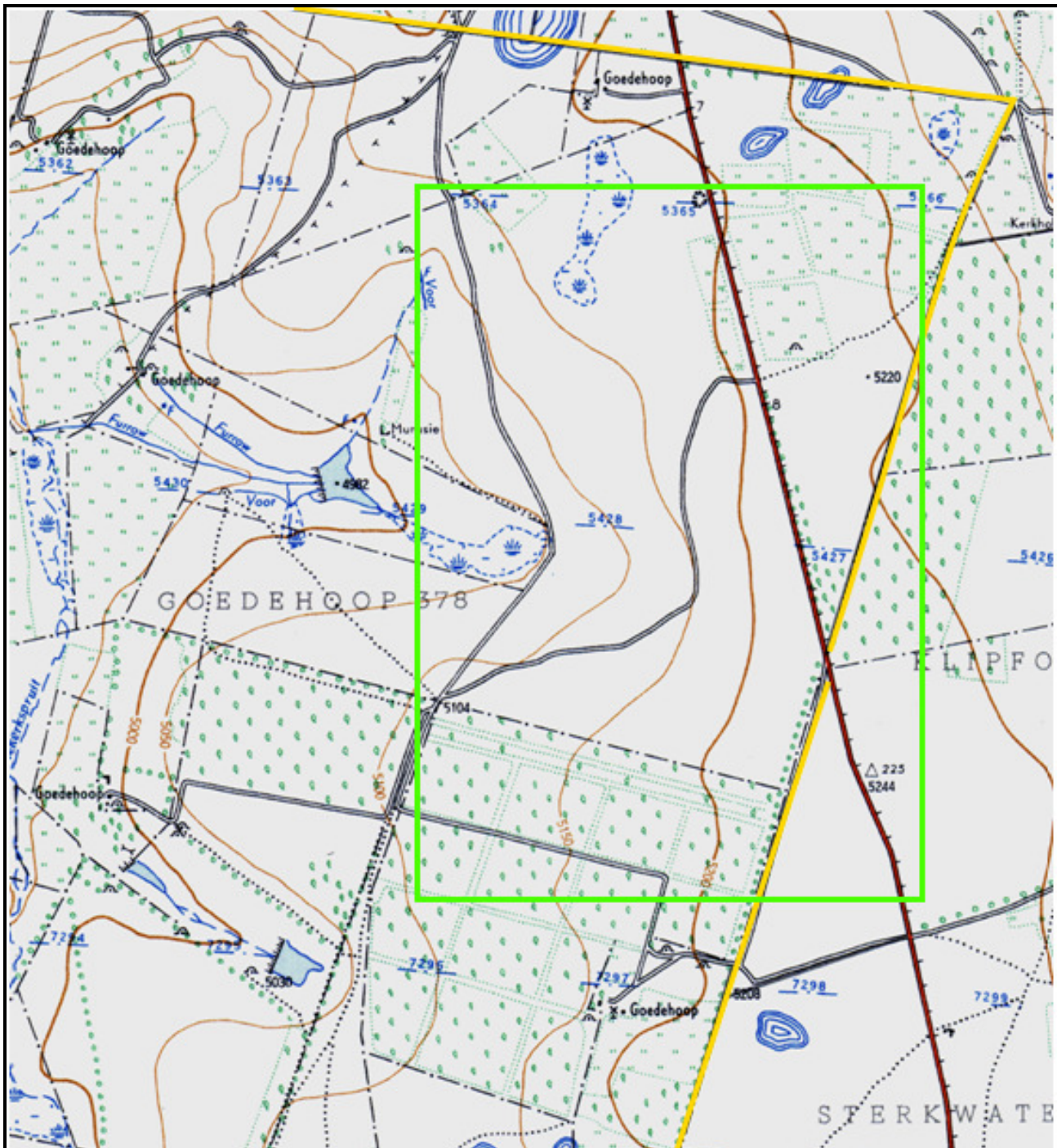


Figure 7. 1954 Topographical map of Goedehoop 378. Yellow lines show the border of this large farm and the specific area of interest (currently owned by CSA) lies within the green border. One can see that parts of this land, including sections in the northeastern and southern part of the area under investigation, were cultivated. A main road intersected the property. Some smaller roads and footpaths are also visible. Within the area of cultivated land in the northeastern part of the property, a hut is visible. No European houses are present (Topographical Map 1954).



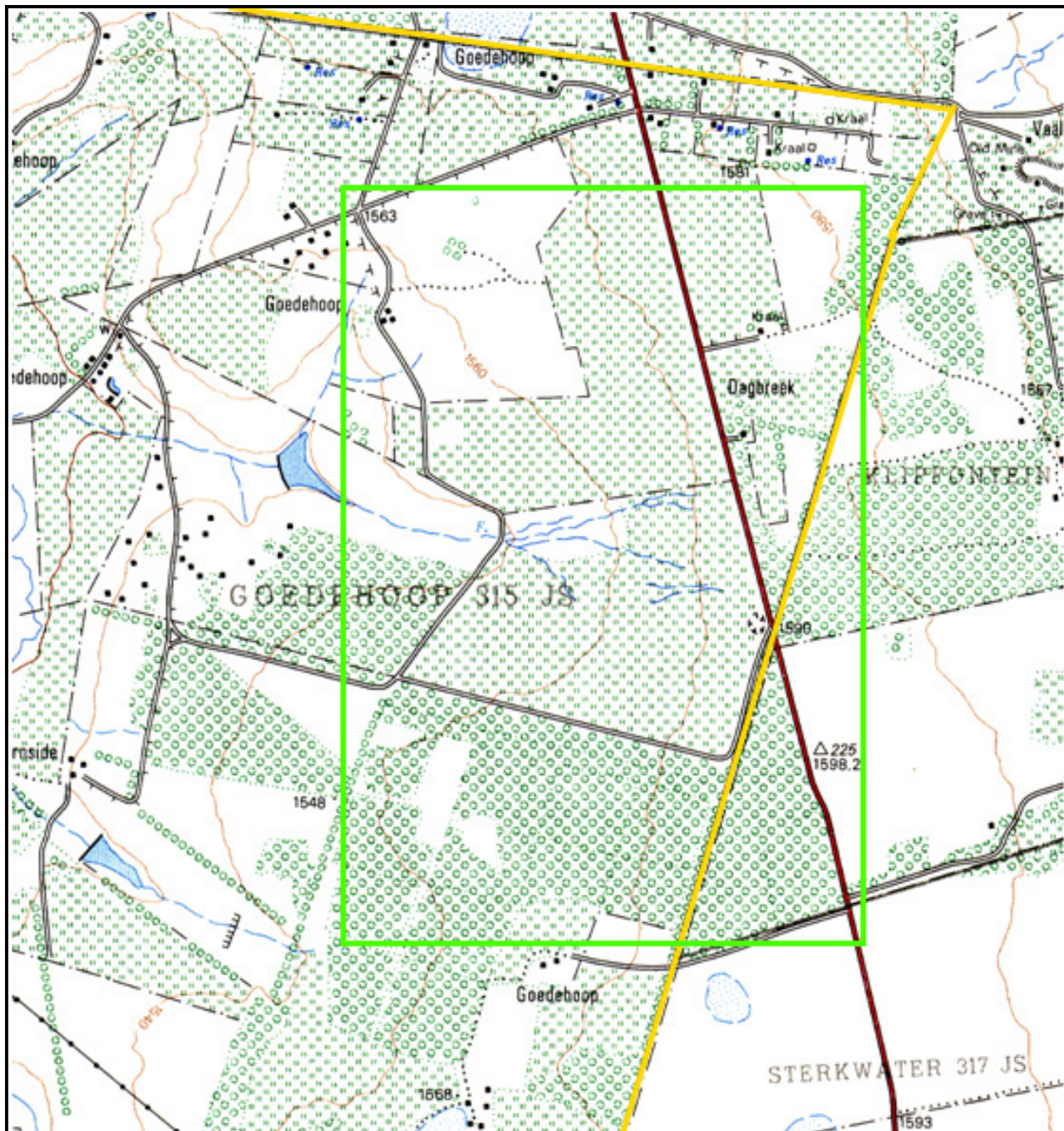


Figure 8. 1974 Topographical map of Goedehoop 315 JS. A large part of the area under investigation was cultivated as agricultural land, and it seems that the southern section was mostly used for forestry. The main road and a number of smaller roads are still visible. The hut (or *kraal*) of the 1954 map is still located in the northeastern part of the property, east of the main road and within agricultural land. Another structure can be seen a small distance to the south, but it is hard to make out if it is a hut or a European structure. Other developments include three houses to the east, near a secondary road, as well as telephone lines that served these structures (Topographical Map 1974).

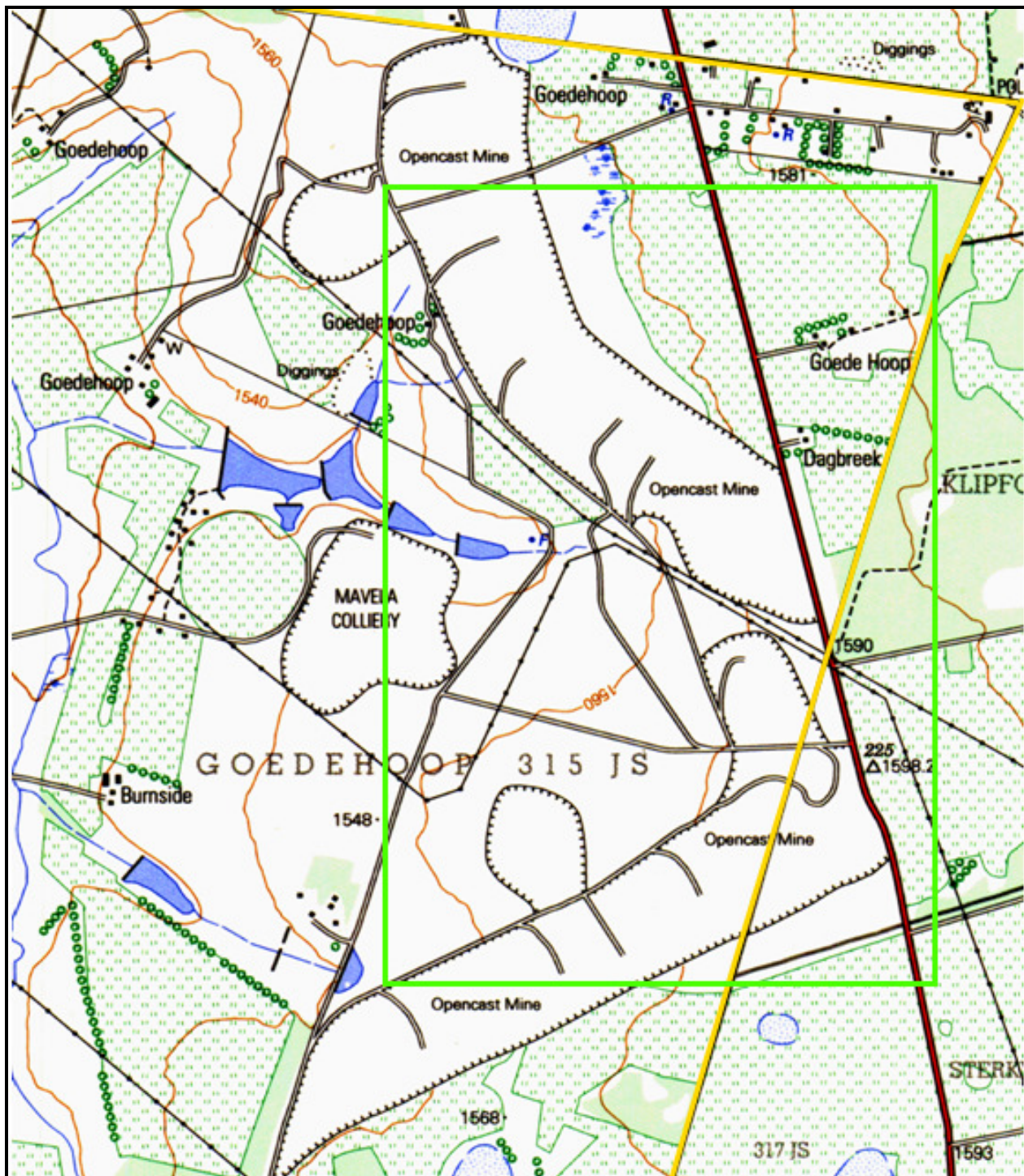


Figure 9. 1996 Topographical map of Goede Hoop 315 JS. Only the northeastern part of the area under investigation was still agricultural land. Mine related developments take up most of the southern and eastern parts of the land. One can see two opencast mines and the secondary roads, dams and power lines that serve the mines. A building is still visible where a hut was located in 1954, and four more houses had been constructed near it. Two houses can be seen a small distance to the south. Since these buildings are all located within and near the remaining agricultural land on the property, it is possible that they were owned by farmers (Topographical Map 1996).

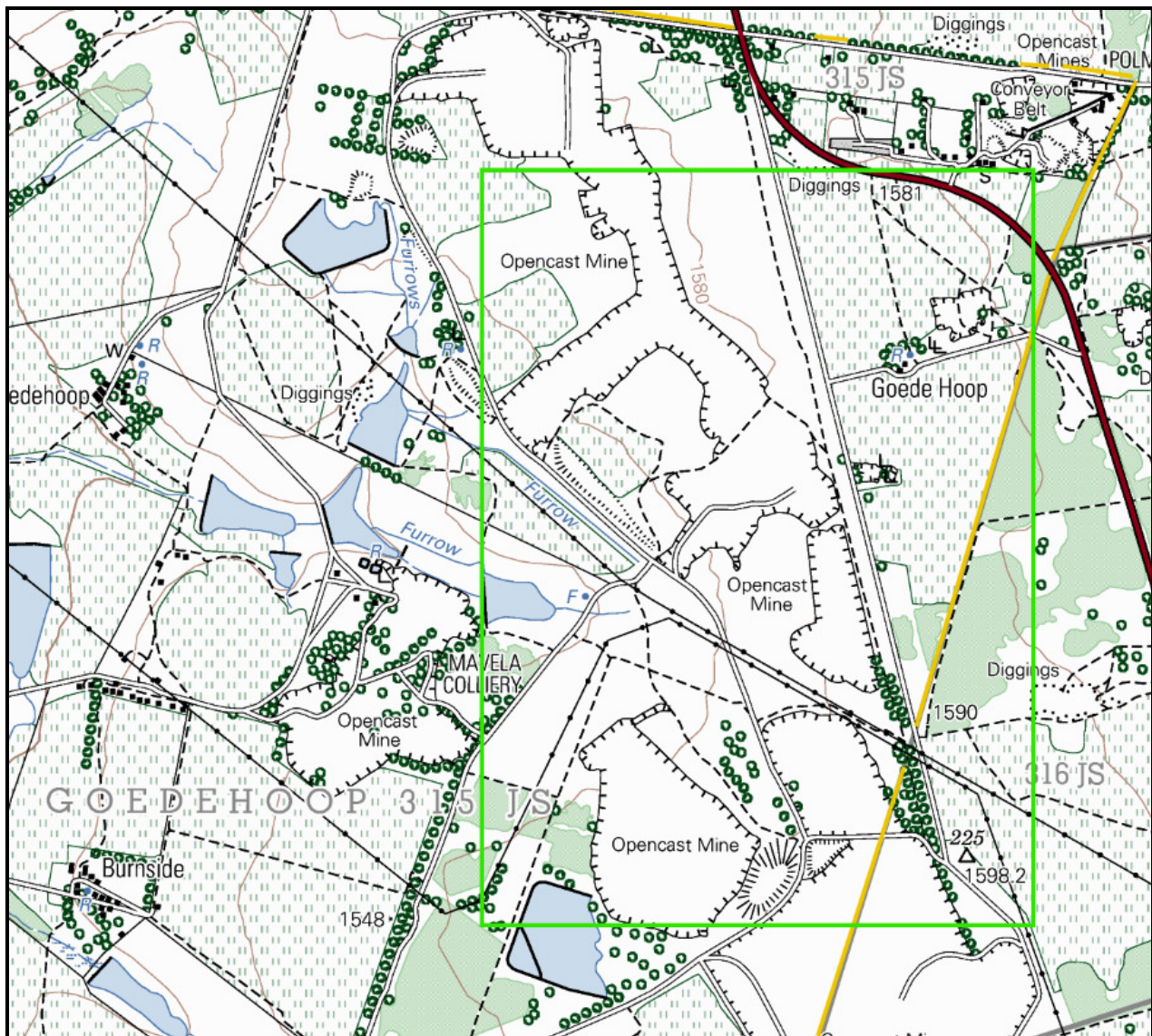


Figure 10. 2003 Topographical map of Goedehoop 315 JS. The landscape had not changed much since 1996. An arterial route known as the R35 had however been constructed and intersects the area under investigation in the northeast. The northeastern part of the property is still cultivated as agricultural lands, but there are signs of mine excavations even in this area. The rest of the area under investigation, apart from some small sections of agricultural land, is dedicated to mining. Three of the buildings that were visible on the 1996 map are now indicated as ruins, but two buildings are still visible. Where two buildings could be seen to the south of this, only ruins are left near a mine excavation site (Topographical Map 2003).

b) Hartebeestfontein 339 JS:

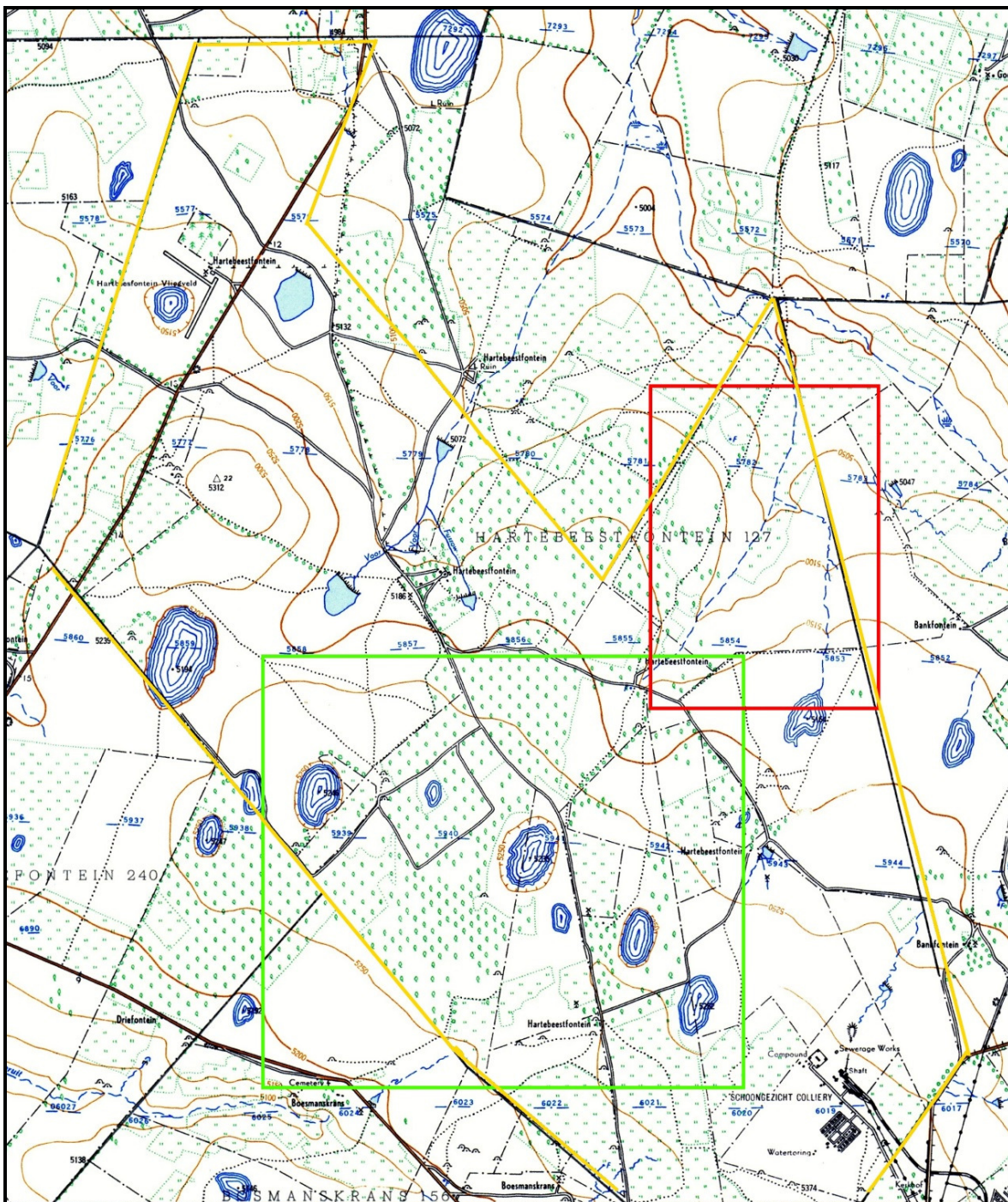


Figure 11. 1954 Topographical map of Hartebeestfontein 127. Yellow lines show the border of the farm and the specific areas of interest lie within the green and red borders. Generally, the area within the green border was used for forestry, though some sections were used for agriculture. A secondary road intersects the northeastern part of the area within the green border. Some smaller roads are also visible. Four large and two smaller bodies of non-perennial water can be seen. About 13 traditional huts can be seen scattered across this section, with the greatest concentration in the south (five huts near a windmill). No European buildings are visible. In the section within the red border segments of cultivated and forestry, land can be seen, but no buildings are visible (Topographical Map 1954).

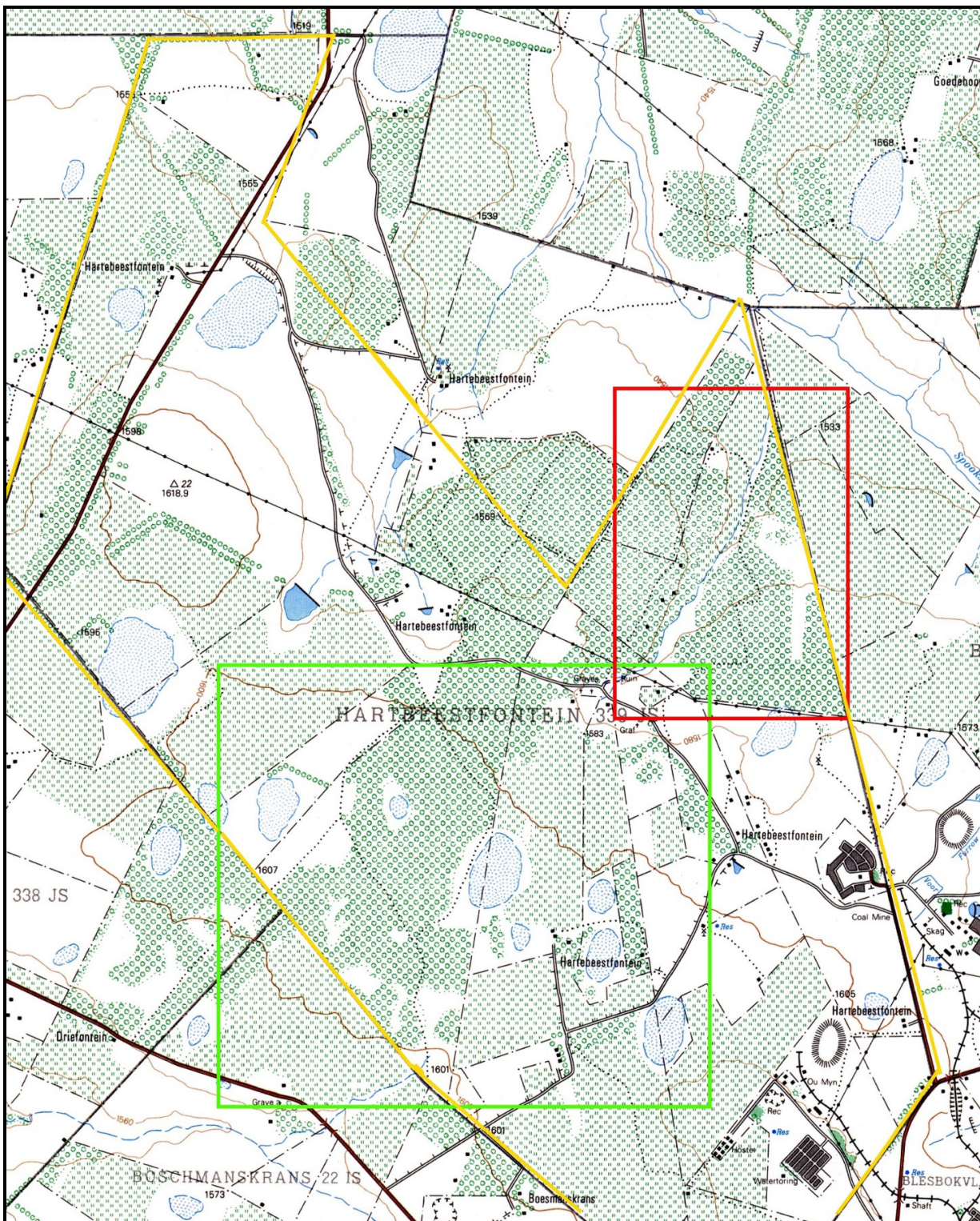


Figure 12. 1974 Topographical map of Hartebeestfontein 339 JS. Large sections of land within the green border were still used for forestry, and more land had also been brought under cultivation. A number of dams are still visible. In the northwestern area within the green border, one can see three grave sites, a ruin, and three buildings. The traditional huts of 1954 are no longer visible. Further to the south, one can see a few buildings (about 9) near a secondary road intersecting the property. More buildings are visible between the eastern green border and a coal mine. The area within the red border had been afforested, with a strip of agricultural land in the middle. Four buildings can be seen in this sector (Topographical Map 1974).

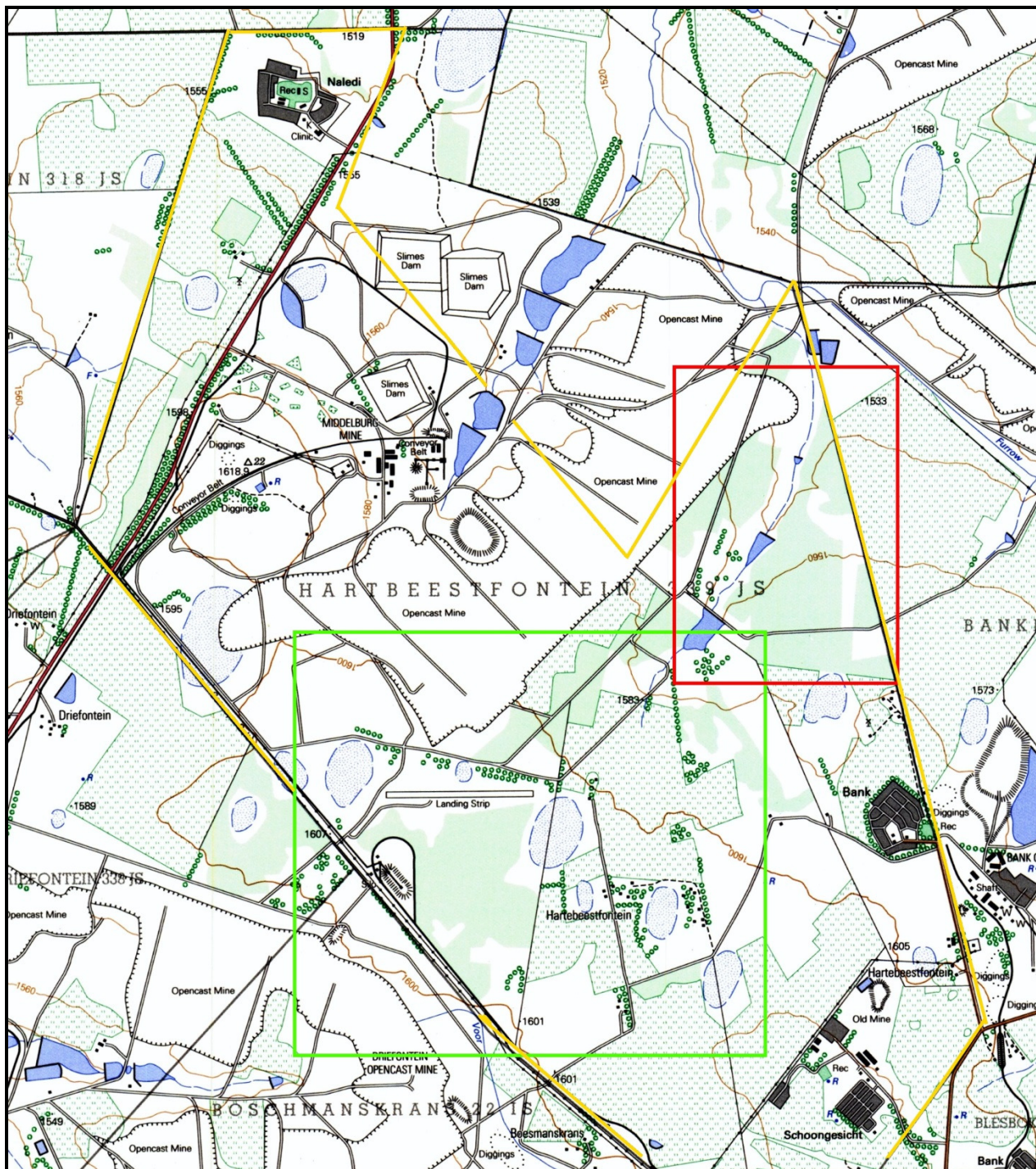


Figure 13. 1996 Topographical map of Hartebeestfontein 339 JS. Within the green border, one can see forestry areas (solid green) and sections of cultivated land. A number of dams are visible. More roads have been constructed in this area and there is now also a landing strip. An embankment and three buildings can be seen near the western border of the farm. To the east, near a road, one can see about 14 buildings in one area, with two more buildings further up the road, and three more to the south. To the south, a large opencast mine is visible. The area within the red border was mostly afforested, and no buildings are visible. Three bodies of perennial water can be seen in this sector. To the west, one can see a large opencast mine (Topographical Map 1996).

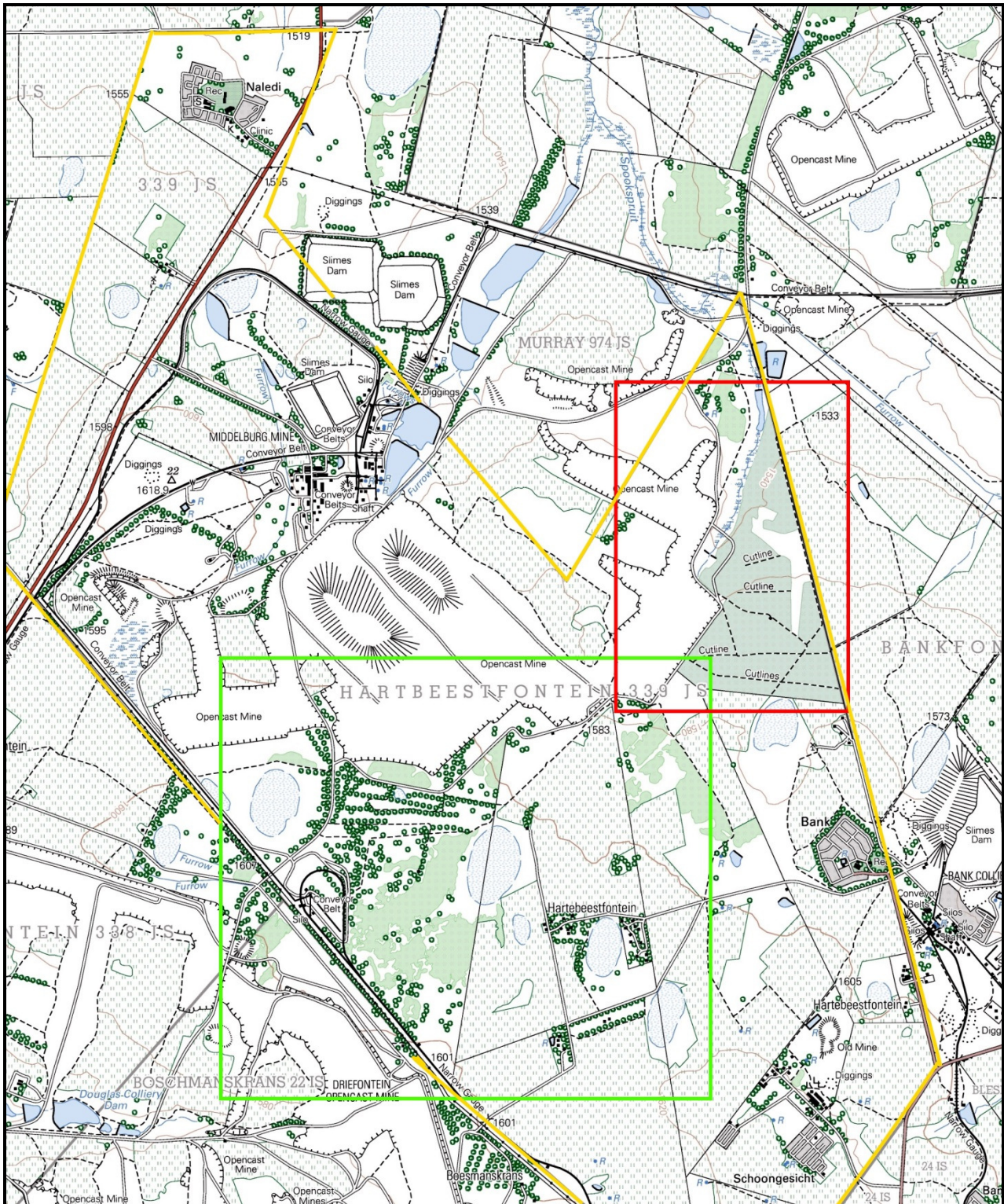


Figure 14: 2003 Topographical map of Hartbeestfontein 339 JS. The situation on the land within the green border remained much the same as in 1996, though the landing strip is no longer visible and there is now a conveyor belt where there used to be an embankment (western border). A few more buildings have also been constructed. Likewise, a large part of the land within the red border had remained afforested, but the western part of this section formed part of the open-cast mine area by 2003. No buildings are visible (Topographical Map 2003).

c) Vaalbank 289 JS

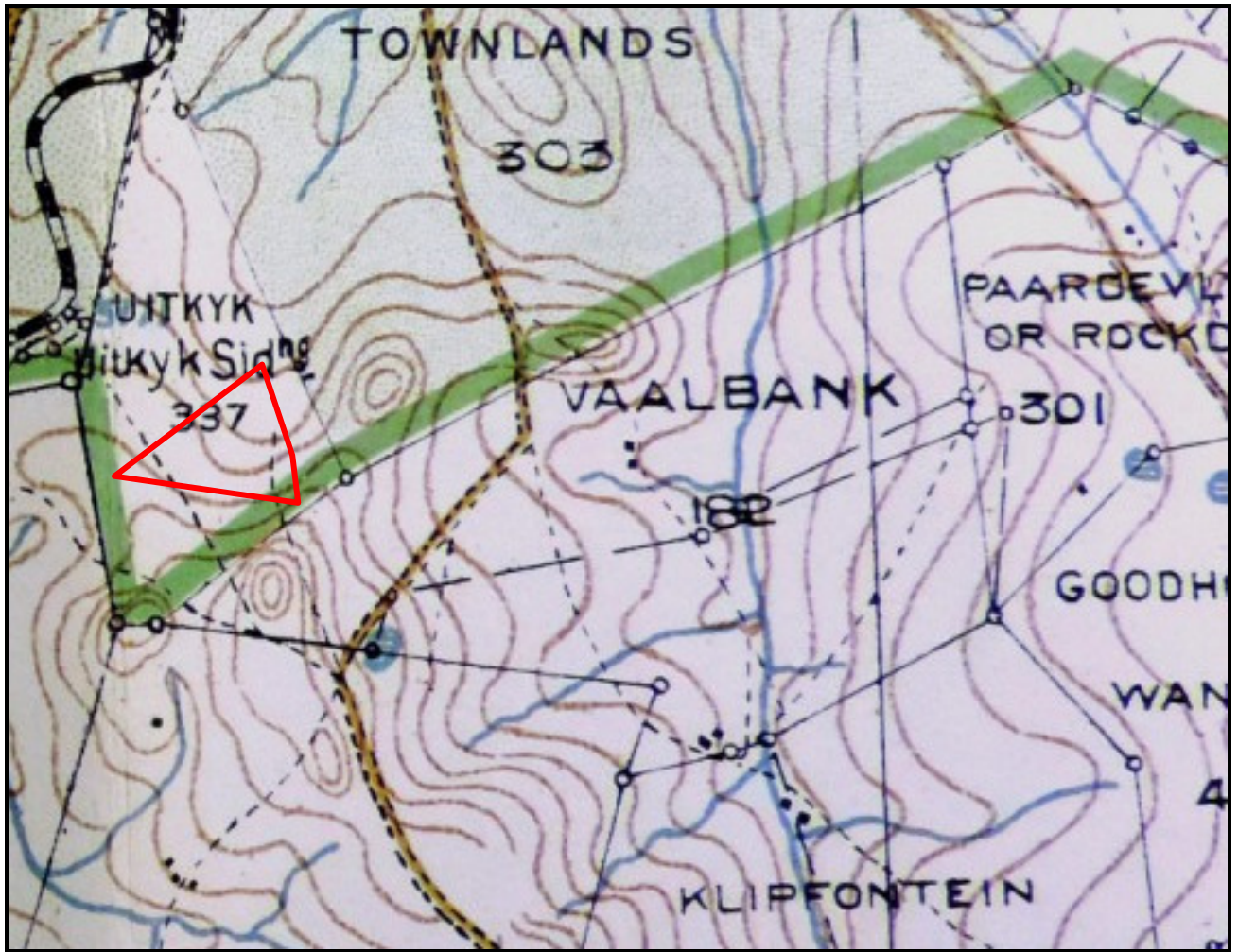


Figure 15: 1920 Map of the Middelburg district. The farm under investigation was still known as Vaalbank 182. (Surveyor-General 1920)



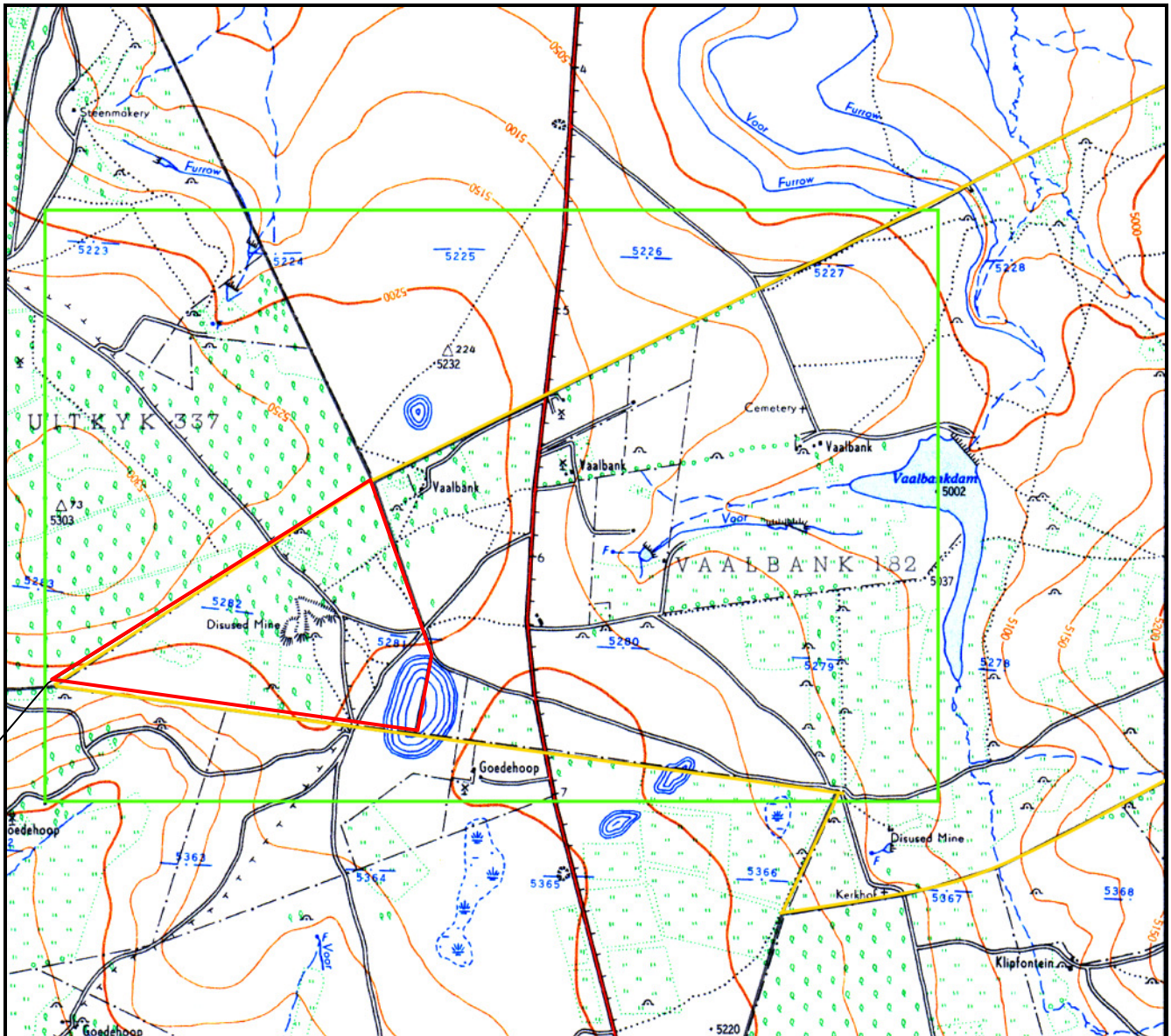


Figure 16: 1954 Topographical map of Vaalbank 182. The part of Vaalbank 182 within the red border forms part of the portion under investigation. (Topographical Map 1954)

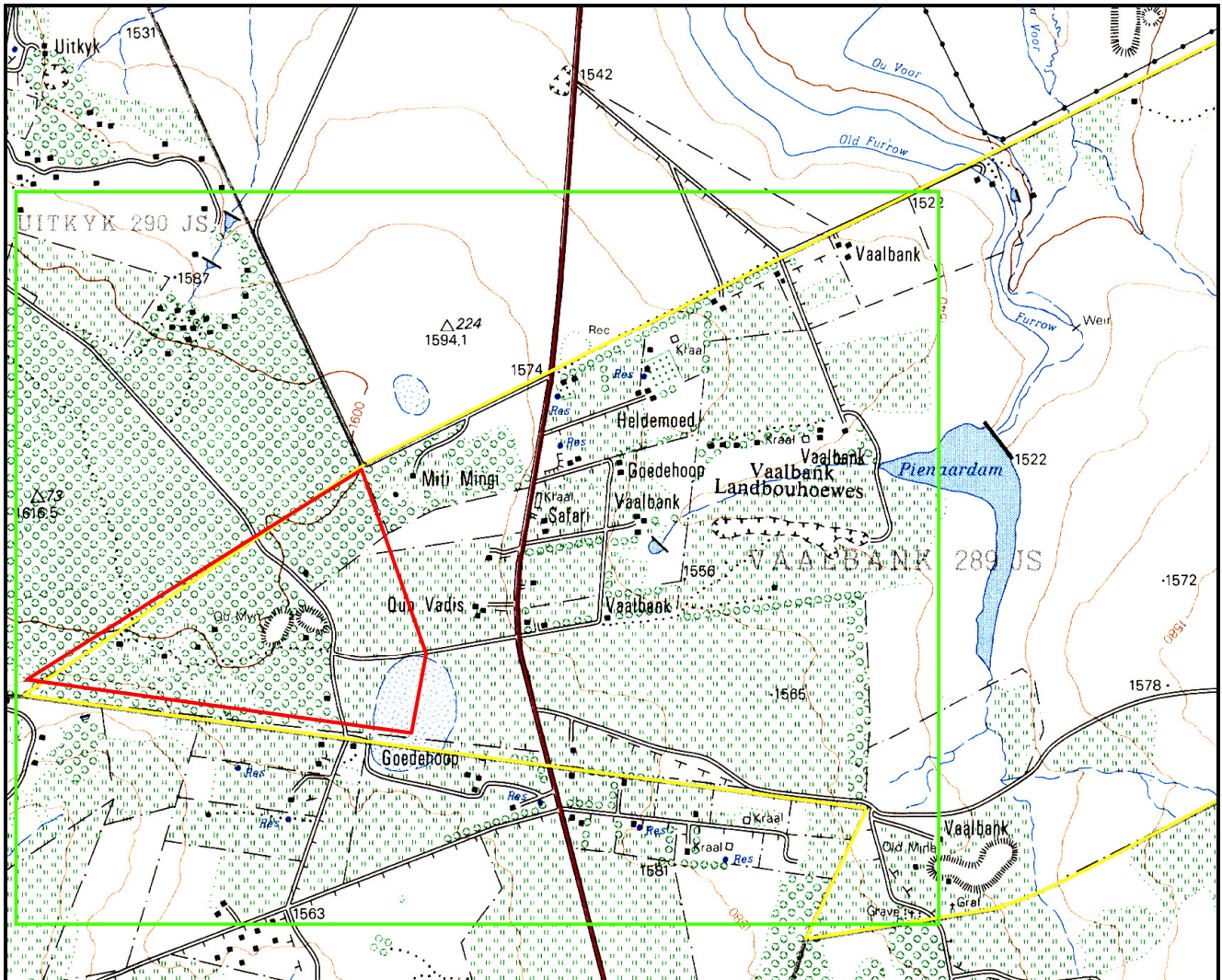


Figure 17:1974 Topographical map of Vaalbank 289 JS. The part of Vaalbank within the red border forms part of the portion under investigation. (Topographical Map 1974)

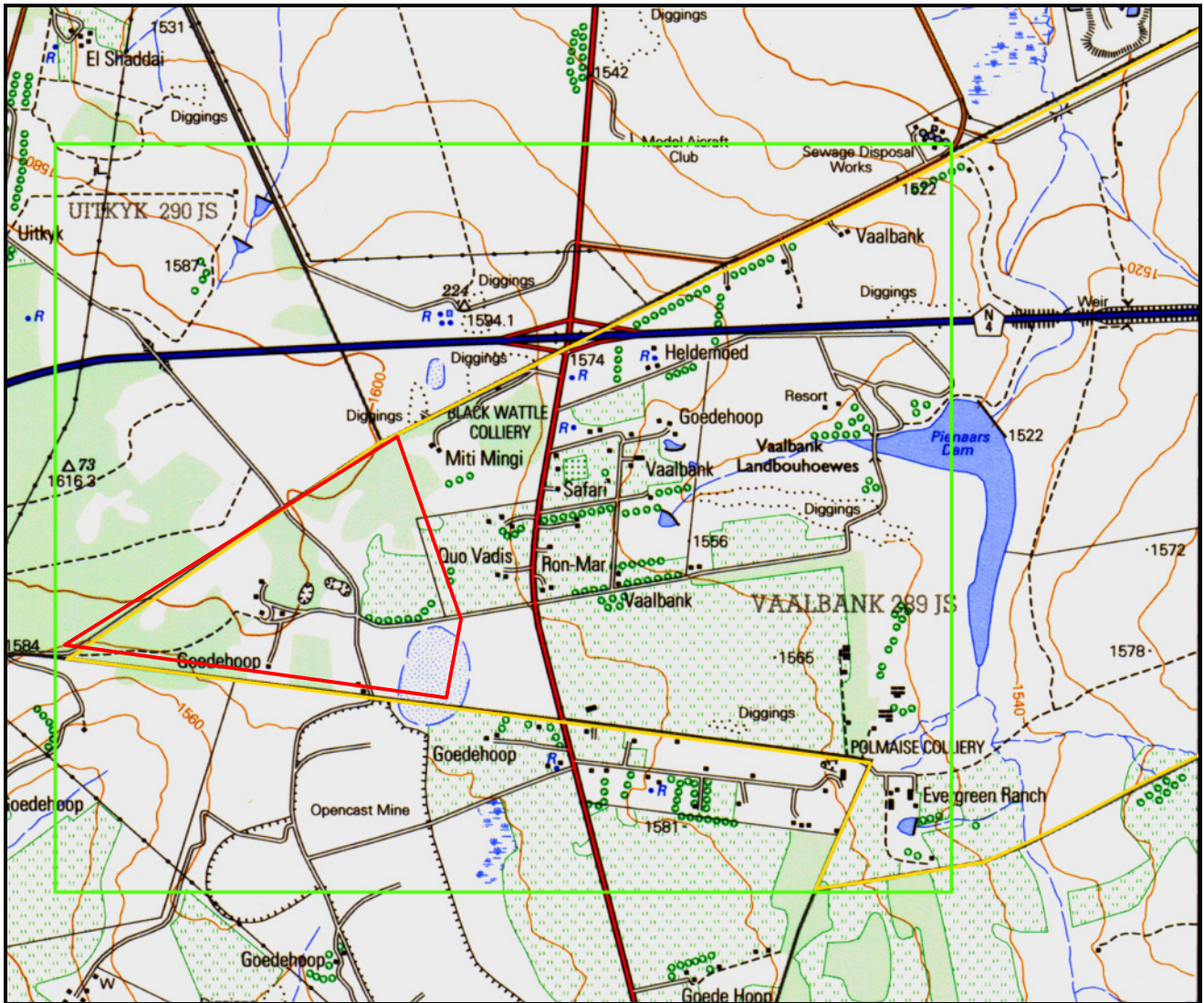


Figure 18: 1996 Topographical map of Vaalbank 289 JS. The part of Vaalbank within the red border forms part of the portion under investigation. (Topographical Map 1996)

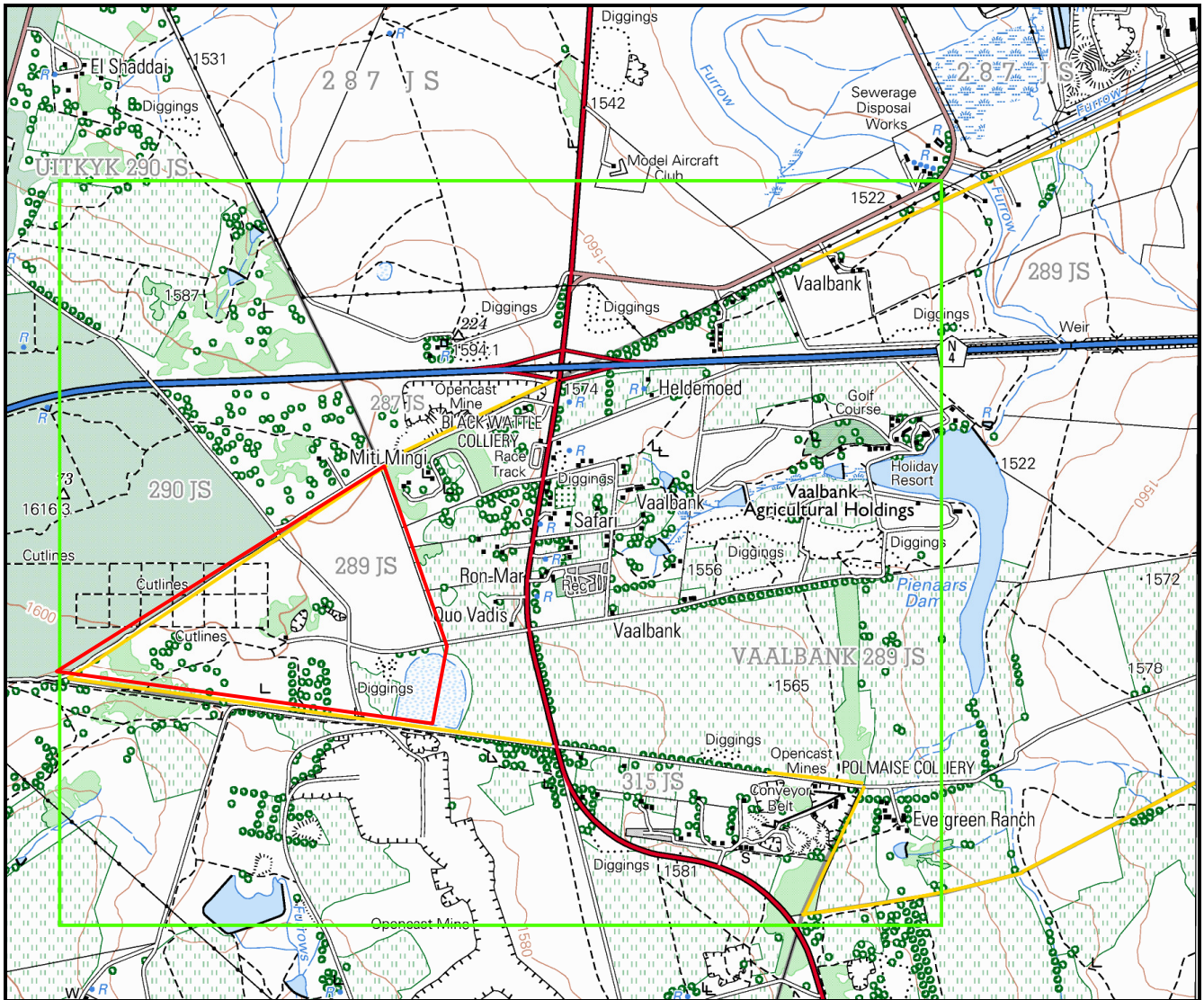


Figure 19: 2003 Topographical map of Vaalbank 289 JS. The part of Vaalbank within the red border forms part of the portion under investigation. (Topographical Map 2003)

## 4.4 Historical Overview Of The Ownership And Development Of The Properties Under Investigation

Documents and maps found in the National Archives of South Africa were used to write this section. Though it should be noted that it is very difficult to pinpoint specific farm portions in the historical record, it was possible to provide some insight into the history of these properties.

### 4.4.1. Historical landowners:

a) Goedehoop 315 JS:

The purchase of a certain portion measuring approximately 308 morgen of the RE of a certain Northern Half Portion of the farm Goedehoop No. 378, district Middelburg, Province Transvaal, was approved on 8 June 1929. The name of the buyer was not given. (NASA SAB, URU: 1065 1920)

On 17 August 1943 approval was provided by the Executive Council to issue a Crown Grant in favour of Hendrik Stephanus Becker, for Portion C of the Northern Half of the farm Goedehoop No. 378, district Middelburg, Transvaal. This portion measured 308 morgen, and would be granted together with its mineral rights. This property had been sold for the sum of £1,677.14.3. (NASA SAB, URU: 2115 2019)

Date	Portion	Transferor	Transferee	Purchase amount
18 March 1944	Ptn 6 of N. half	T. J. Barnard	Cornelis Albertus van Niekerk	£2400
27 January 1949	Ptn 8 of N. half	C. A. van Niekerk	James Douglas Kent	£621-43
26 July 1949	Ptn 8 of N. half	J. D. Kent	Roy Patrick Nelson	-
2 March 1950	RE of Ptn C of N. half	C. A. van Niekerk	Eva Maria Malan	-
20 November 1951	Ptn 9	Certificate of Joint Title	Johannus Paulus Steyn	-
20 November 1951	Ptn 10 Dagbreek (Ptn of Ptn 10)	J. P. Steyn	Johannes Hendrik Schoeman	-
20 November 1951	Ptn 11 (Ptn of Ptn 9)	J. P. Steyn	Daniel Cornelius Malan	-
14 April 1955	Ptn 12 (Ptn of Ptn 10 named Dagbreek)	J. H. Schoeman	Johannes Matthys Erasmus	-
14 April 1955	Ptn 13 (Ptn of Ptn 10 named Dagbreek)	J. H. Schoeman	Philippus Petrus Grobbelaar	-
14 April 1955	RE of Ptn 10 named Dagbreek	J. H. Schoeman	Jan Roeland Otto	-
30 September 1955	4/7 <sup>th</sup> of Ptn 14 (Ptn of Ptn A named Burnside, S. half)	J. P. Steyn	Petrus Johannes van Papendorp Uys	-
30 September 1955	3/7 <sup>th</sup> of Ptn 14 (Ptn of Ptn A named Burnside, S. half)	J. P. Steyn	Cornelius Janse Uys (minor)	-
28 August 1956	Ptn 1 of Ptn A of N. half	Est. late W. Nelson	Frances Mabel Nelson (Born Parker), widow	-
6 September 1956	RE of Ptn 10 named Dagbreek	J. R. Otto	Ferdinand Petrus Erasmus	-
9 October 1956	Ptn 20 (Ptn of Ptn 12)	J. M. Erasmus	Joyce Dorothy Wheeler	-
12 February 1957	Portion 12 (Ptn of Ptn 12)	J. M. Erasmus	Johannes Hendrik Botha	-

(NASA TAB, RAK: 2929)

b) Hartbeestfontein 339 JS:

Date	Portion	Transferor	Transferee	Purchase amount
18 August 2013	RE of Ptn B (Ebenezer), ptn of Ptn 19	L. P. Oosthuyzen	Esrael Lazarus	£3102
18 August 2013	15/16 share in RE of Ptn	L. P. Oosthuyzen	Esrael Lazarus	£3102
16 October 1915	1/16 share in RE of Ptn	B. C. Groenewald	Esrael Lazarus	£94
5 August 1920	Ptn 1 of Despatch Rider	J. N. Oosthuizen	Rachmael Lazarus & Louis Brozin, known as "Lazarus & Brozin"	£1300
25 February 1922	Ptn C of Ptn	E. Lazarus	James Warburton Begbie	£2700
26 May 1923	Ptn 1 of Ptn B Ebenezer	Joint owners	Petrus Johannes Dirkse Steenkamp	Partition
24 January 1928	RE of Ptn A Despatch Rider	J. N. Oosthuizen	Isaac Pieter Minnaar Johannes Hamman Minnaar Pieter Edward Minnaar, trading as "Minnaar Bros"	£1669
3 August 1928	RE of Ptn A Despatch Rider	Minnaar Bros	Government of the Union of SA	£2000
30 October 1935	Ptn 1 of Ptn A of Despatch Rider	Est. late R. Lazarus & L. Brozin, known as "Lazarus & Brozin"	Lazarus & Brozin (Pty) Ltd	£800
16 May 1949	Ptn 7 of Ptn 1 of Ebenzer	P. J. D. Steenkamp	Witbank Coal Holdings Ltd.	£6000
14 November 1941	Ptn C	J. W. Begbie	Esrael Lazarus	£1740
29 April 1943	RE	J. D. Heyns	Andrias Hercules Heyns	£10907
29 June 1949	RE of Ptn 1 of Ebenezer	P. J. D. Steenkamp	Johannes Reyneke Steenkamp	-
10 January 1953	Ptn 1 of Ptn A named Despatch Rider	Lazarus & Brozin (Pty) Ltd.	Wessel Jacobus Maree	-
9 November 1956	Ptn of Despatch Rider	-	Nicolaas Johannes Davel	£1185.0.0

(NASA TAB, RAK: 2932; NASA SAB, URU: 3583 2443)

#### 4.4.2. Developments on the properties:

a) Goedehoop 315 JS:

In 1988, AMCOAL Goedehoop Colliery applied for permission to house married couples on the mining premises in existing apartments. By March 1988, 1630 black workers were employed on the mine, excluding those on leave. A 100 of these employees were housed in official married villages by that time, as well as four to 10 families in the visiting wives flats. There were 26 of the latter flats, but since strict rules and standards abounded for the occupation thereof, rural families were reluctant to utilise them. It is for this reason that the mine applied to house young married couples in these flats. The flats were built on a site separate from the other accommodations and were enclosed by concrete walls. (NASA SAB, CDB: 16118 PB13/2/M26/27)

The mine also applied for permission to house female visitors in the "old Springbok Hostel". In April 1988 the South African Police granted permission for this, on condition that woman visiting the mine from neighbouring countries would have the relevant passports and visitors permits and that the visits would be closely monitored. It was believed that the women residing on farms at the time were mostly squatters, living as illegal immigrants in the country. The police were of the opinion that the hostel could be used to house illegal squatters, and that this had to be avoided. (NASA SAB, CDB: 16118 PB13/2/M26/27)

c) Hartbeestfontein 339 JS:

On 8 April 1931, it was recommended by the government that a notice would be served to Johannes Jacobus Grobler and Willem Andries Stefanus Grobler, the joint lessees of the holding comprising a certain remaining portion of a portion marked A named Despatch Rider of a portion of the farm Hartebeestfontein 127, district Middelburg, that the lease would be cancelled unless the lessees complied with the condition of lease relative to the insurance of the buildings on the holding within 30 days from the date of notification. (NASA SAB, URU: 1195 1031)

The lease was consequently cancelled on 3 September 1931, due to the fact that one of the lessees, Willem Andries Stefanus Grobler, had not complied with the conditions of the said lease in so far as personal occupation of the holding was concerned. (NASA SAB, URU: 1230 2669)

By 1972 a saw mill was being operated by P. en B. Boerdery on the farm Hartebeestfontein, Middelburg. No indication is provided regarding where this mill was operated on Hartbeestfontein. The government made an enquiry at the time regarding the housing of black workers on the property. By September 1973 this matter has however not yet been cleared up. (NASA SAB, BAO: 2768 C31/3/4153)



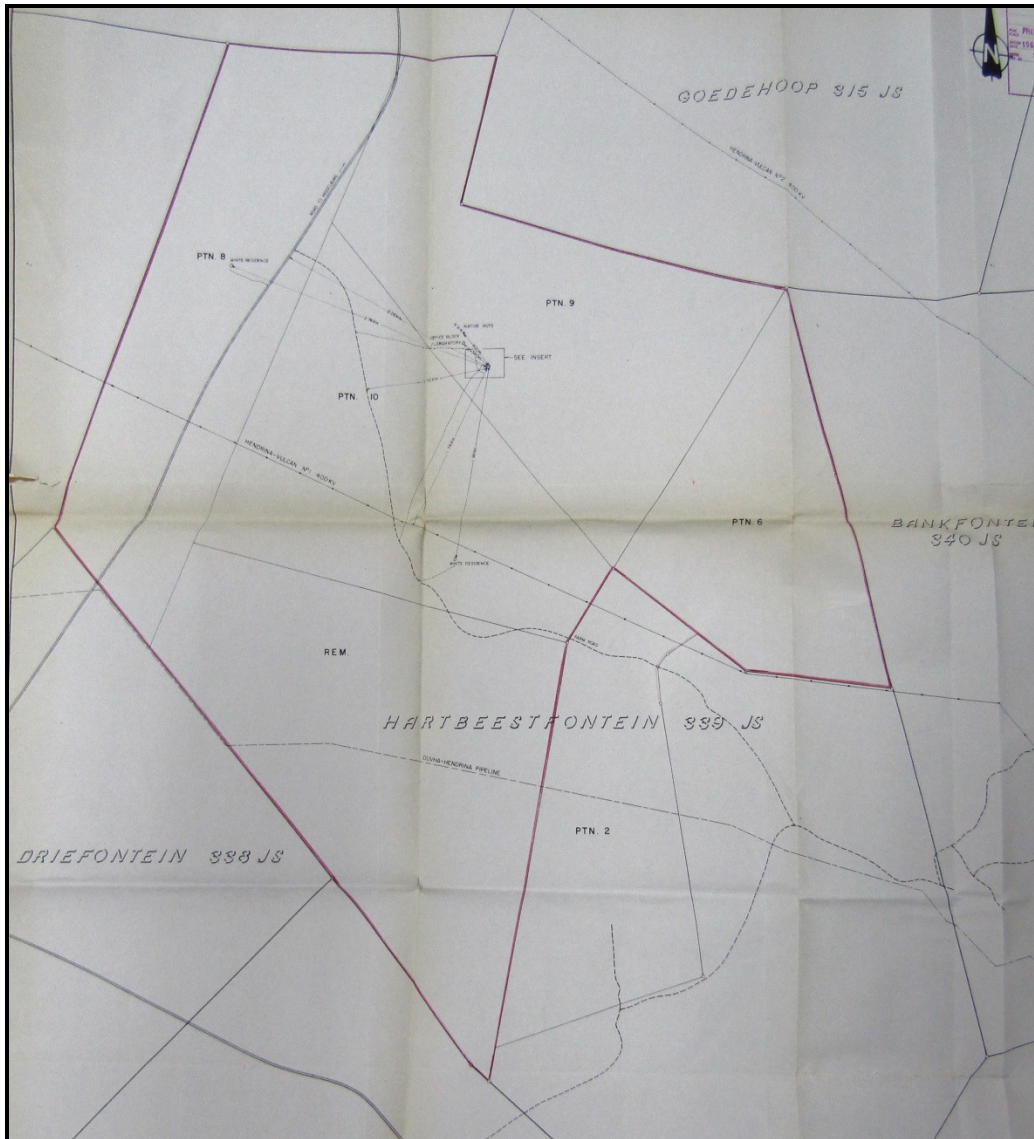


Figure 20. 1980 Sketch, showing how Hartbeestfontein 339 JS was divided at the time. It seems that the sections of land of interest in this report would have formed part of Portions 2, 6 and the Remaining Extent of the farm. One can see that the Duvha water pipe line intersected the RE of the property. (NASA SAB, BAO: 3/4230 A12/2/6/M52/90)

By 1980, Rand Mines Limited owned mines on Portion 8 of Hartbeestfontein, north of where the portions under investigation are located. The company was developing black and white housing on their portion at the time. (NASA SAB, BAO: 3/4230 A12/2/6/M52/90)

## 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 quarry extension 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 acknowledged by ASAPA for the SADC region (Table 2), were used for the purpose of this report. The recommendations for each site should be read in conjunction with section 7 of this report.

**Table 2: The site significance classification standards prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC region**

<b>FIELD RATING</b>	<b>GRADE</b>	<b>SIGNIFICANCE</b>	<b>RECOMMENDED MITIGATION</b>
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

## 6 Description of sites

It is important to note that the entire farms Hartbeesfontein 339 JS, Goedehoop 315 JS and Vaalbank 289 JS were not surveyed. These farms forming part of Middelburg mine was previously surveyed (De Jong 2006) and the current study was only a high level scan of the impact areas since access to the currently mined areas are restricted and highly disturbed. De Jong recorded an engraving of a game board, a large cemetery (referenced in this report as cemetery 4) and a mining village that is located outside of the current area of impact. The study area consists of extensively ploughed fields, old agricultural fields, plantations (Figure 24) and rehabilitated and actively mining areas (Figure 23) and due to the disturbed nature of the study areas the chances of recovering surface archaeological material *in situ* is limited.

During the survey no Iron Age sites were identified inside the development footprint. However some heritage features were recorded consisting of the demolished remains of 5 ruins, 4 cemeteries, isolated Stone Age artefacts (1 location) and the game board engraving recorded by de Jong (2006). Two more ruins were recorded during the HIA conducted in support of the Basic Assessment process for the infrastructure development at the Goedehoop North mini-pit (vd Walt 2015) but fall outside of the impact area (Figure 26) and is not discussed further in this report. Within the current area of impact **ruin 1 and 2** and a cemetery (**cemetery 1**) located on the farm Vaalbank will be impacted on. This area was not assessed by De Jong in 2006.

In the dispatch rider area on the farm Hartbeesfontein two cemeteries and a couple of LSA miscellaneous flakes were recorded next to a pan. These artefacts made from crypto crystalline silica (CCS) are scattered too sparsely to be of any significance apart from noting their presence, which has been done so in this report. The study area is void of raw material suitable for the manufacture of stone tools or rocks for the construction of Stone Walled settlements. This scenario changes to the west as various EAS and MSA artefacts were recorded here on a ridge consisting of metamorphic rocks.

For the purposes of this report only the recorded features that might be impacted on will be briefly discussed.



Figure 21. General site conditions in the study area.



Figure 22. General site conditions in the study area.



Figure 23. General site conditions in the study area.



Figure 24. General site conditions in the study area.



Figure 25: Surface infrastructure with track logs of the areas covered in black

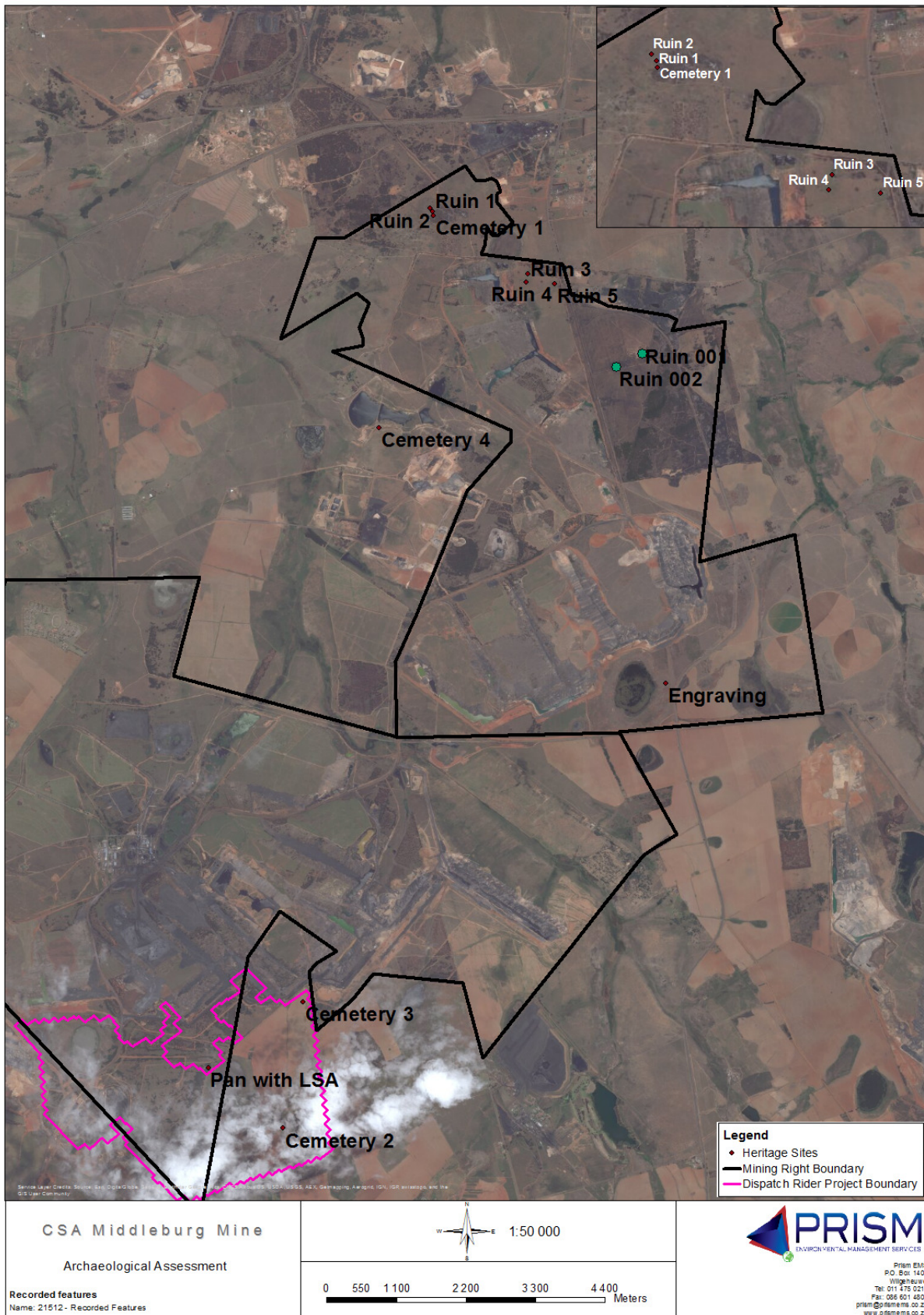


Figure 26: Recorded features in the study area. Ruin 001 & 002 marked by green dots are discussed in separate BA report (*Prism EMS – Archaeological Impact Assessment Report 21512\_HIA\_F1; 2015*).

**Table 3: Recorded features with Co-ordinates. GPS accuracy 4 meters**

Feature	Type Site	Markers	Co ordinate
Ruin 1	Modern	Cement and brick foundations	25° 50' 45.8773" S, 29° 26' 29.2957" E
Ruin 2	Modern	Cement and brick foundations	25° 50' 44.0735" S, 29° 26' 27.8808" E
Ruin 3	Historical	Cement and brick foundations	25° 51' 17.8597" S, 29° 27' 18.2197" E
Ruin 4	Modern	Cement and brick foundations	25° 51' 22.1149" S, 29° 27' 17.4384" E
Ruin 5	Modern	Cement and brick foundations	25° 51' 22.9933" S, 29° 27' 31.9103" E
Cemetery 1		Stone packed grave dressings	25° 50' 47.6987" S, 29° 26' 29.6089" E
Cemetery 2		Headstones with stone packed grave dressings	25° 58' 37.7797" S, 29° 25' 12.5399" E
Cemetery 3		Headstones and stone packed grave dressing	25° 57' 32.7852" S, 29° 25' 22.7281" E
Cemetery 4		Headstones and stone packed grave dressing	25° 52' 37.0000" S, 29° 26' 02.0000" E
Engraving	Colonial/ historic	Game board engraving on sandstone ridge	25° 54' 49.0000" S, 29° 28' 29.0000" E
Pan with LSA	Archaeological	Very low density of microliths	25° 58' 06.6972" S, 29° 24' 34.1460" E

**Ruin 1 and 2** consist of the total demolished remains of several structures consisting only of cement slabs etc. The site is entirely overgrown and no walls etc. remain. This is presumably the remains of a farm labourer dwelling. Sites like these might contain the unmarked graves of still born babies. Nothing is left of the structures apart from cement and brick foundations and the site is of no heritage significance (Figure 22). From the archival maps it seems as if these structures were constructed before 1974.

**Heritage significance:** Generally Protected C (GP.C)

**Cemetery 1** is located in the planned open cast area on the farm Vaalbank and a direct impact is foreseen on the site. The cemetery is very overgrown and consists of approximately 25 graves that are aligned east to west with stone and brick grave dressings (Figure 29).

**Heritage significance:** Graves are of high social significance -Generally Protected A (GP.A)

**Cemetery 3** is located in the northern periphery of the dispatch rider area and approximately 100 meters from a planned opencast area. Therefore no direct impact is foreseen on the site. The cemetery is highly overgrown (Figure 30) and it is impossible to determine how many graves are here.

**Heritage significance:** Graves are of high social significance -Generally Protected A (GP.A)

**Engraving:** "Rough engraving of *moruba* game board on sandstone outcrop, presumably made by cattle herdsman whilst looking after his master's cattle. The game is derived from the European game *mill* that was introduced by colonial settlers. Hence, the site "*dates back to colonial periods*" de Jong (2006). The site is located approximately 50 meters from a planned opencast area and a secondary impact is possible on the site.

**Heritage significance:** Generally Protected B (GP.B)





Figure 27. Ruin 2 viewed from the south.



Figure 28. Grass cover at Ruin 1.



Figure 29. Grave at Cemetery 1.



Figure 30. General site conditions at cemetery 3.

## 7 Environmental impact assessment

### 7.1 Impact assessment for the construction phase

The following activities will be associated with the construction phase of the project:

- Ground works;
- Civil construction activities;
- Construction of internal haul roads;
- Building activities;
- Hauling of material to and from the specific areas.

The impact rating of the construction phase at the proposed Goedehoop and Hartbeesfontein sections of the project is given in Table 4 and 5.

**Table 4: Impact rating during the construction phase - Unmitigated**

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	IMPACT RATING	IMPACT DESCRIPTION
<b>Construction phase</b>						
	MODERATE	<i>Local</i>	<u>Permanent</u>	<i>Very Likely</i>		
Ground works	3	3	5	4	3	Moderate
	MODERATE	<i>Local</i>	<u>Permanent</u>	<i>Very Likely</i>		
Civil construction activities	3	3	5	4	3	Moderate
	MODERATE	<i>Local</i>	<u>Permanent</u>	<i>Very Likely</i>		
Construction of internal haul roads	3	3	5	4	3	Moderate
	MODERATE	<i>Local</i>	<u>Permanent</u>	<i>Very Likely</i>		
Building activities	3	3	5	4	3	Moderate
	MODERATE	<i>Local</i>	<u>Permanent</u>	<i>Very Likely</i>		
Hauling of material to and from the specific area	3	3	5	4	3	Moderate

\*Impact assessment methodology attached as Appendix C

**Table 5: Impact rating during the construction phase - Mitigated**

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	IMPACT RATING	IMPACT DESCRIPTION
<b>Construction phase</b>						
	LOW	<i>Local</i>	<u>Permanent</u>	<i>Unlikely</i>		
Ground works	2	3	5	2	1.4	Low
	LOW	<i>Local</i>	<u>Permanent</u>	<i>Unlikely</i>		
Civil construction activities	2	3	5	2	1.4	Low
	LOW	<i>Local</i>	<u>Permanent</u>	<i>Unlikely</i>		

Construction of internal haul roads	2	3	5	2	1.4	Low
	LOW	Local	Permanent	Unlikely		
Building activities	2	3	5	2	1.4	Low
	LOW	Local	Permanent	Unlikely		
Hauling of material to and from the specific area	2	3	5	2	1.4	Low

\*Impact assessment methodology attached as Appendix C

## 7.2 Impact assessment for the operational phase

The following activities are associated with the operational phase of the project:

- Additional traffic to and from the different sites;
- Blast hole drilling (opencast);
- Open cast blasting (opencast);
- Crushing activities;
- Hauling of material to and from the mining area;

The impact rating during the operational phases of the proposed project at the Goedehoop and Hartbeesfontein sections are illustrated in Table 6 and 7.

**Table 6: Impact rating during the operational phase - Unmitigated**

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	IMPACT RATING	IMPACT DESCRIPTION
<b>Operational phase</b>						
	MODERATE	Local	Permanent	Very Likely		
Additional traffic to and from the different sites	3	3	5	4	3	Moderate
	MODERATE	Local	Permanent	Very Likely		
Blast hole drilling	3	3	5	4	3	Moderate
	MODERATE	Local	Permanent	Very Likely		
Open cast blasting (opencast)	3	3	5	4	3	Moderate
	MODERATE	Local	Permanent	Very Likely		
Crushing activities	3	3	5	4	3	Moderate
	MODERATE	Local	Permanent	Very Likely		
Hauling of material to and from the mining area	3	3	5	4	3	Moderate

\*Impact assessment methodology attached as Appendix C

**Table 7: Impact rating during the operational phase - Mitigated**

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	IMPACT RATING	IMPACT DESCRIPTION
<b>Operational phase</b>						
	LOW	<i>Local</i>	<u>Permanent</u>	<i>Could happen</i>		
Additional traffic to and from the different sites	2	3	5	3	2	Low
	LOW	<i>Local</i>	<u>Permanent</u>	<i>Could happen</i>		
Blast hole drilling	2	3	5	3	2	Low
	LOW	<i>Local</i>	<u>Permanent</u>	<i>Could happen</i>		
Open cast blasting (opencast)	2	3	5	3	2	Low
	LOW	<i>Local</i>	<u>Permanent</u>	<i>Could happen</i>		
Crushing activities	2	3	5	3	2	Low
	LOW	<i>Local</i>	<u>Permanent</u>	<i>Could happen</i>		
Hauling of material to and from the mining area	2	3	5	3	2	Low

\*Impact assessment methodology attached as Appendix C

### 7.3 Impact assessment for the rehabilitation phase

The following activities are associated with the rehabilitation phase:

- Back fill of mined areas;
- Planting of grass and vegetation at the rehabilitated areas;
- Removal of infra-structure.

The impact rating during the rehabilitation phases of the proposed project at the Goedehoop and Hartbeesfontein sections are illustrated in Table 13 and 14.

**Table 8: Impact rating during the rehabilitation phase - Unmitigated**

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	IMPACT RATING	IMPACT DESCRIPTION
<b>Rehabilitation phase</b>						
	MODERATE	<i>Study Area</i>	<u>Permanent</u>	<i>Could happen</i>		
Back fill of mined areas	3	2	5	3	2	Low
	MODERATE	<i>Study Area</i>	<u>Permanent</u>	<i>Could happen</i>		
Planting of grass and vegetation at the rehabilitated areas	3	2	5	3	2	Low
	MODERATE	<i>Study Area</i>	<u>Permanent</u>	<i>Could happen</i>		
Removal of infra-structure	3	2	5	3	2	Low

\*Impact assessment methodology attached as Appendix C

**Table 9: Impact rating during the rehabilitation phase - Mitigated**

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	IMPACT RATING	IMPACT DESCRIPTION
<b>Rehabilitation phase</b>						
	VERY LOW	<i>Study Area</i>	<u>Medium term</u>	<i>Unlikely</i>		
Back fill of mined areas	1	2	3	2	0.8	Very Low
	VERY LOW	<i>Study Area</i>	<u>Medium term</u>	<i>Unlikely</i>		
Planting of grass and vegetation at the rehabilitated areas	1	2	3	2	0.8	Very Low
	VERY LOW	<i>Study Area</i>	<u>Medium term</u>	<i>Unlikely</i>		
Removal of infra-structure	1	2	3	2	0.8	Very Low

\*Impact assessment methodology attached as Appendix C

## 8 Mitigation Measures

Archaeological mitigation of the heritage sites encountered would be destructive in nature. The end result is thus either avoidance in totality or destruction of the resource through mitigation. The status of the resource would determine the course of action and mitigation required. The following mitigation measures are proposed:

- Graves – It is preferable that cemeteries are fenced off with an access gate for family members with a 30 meter buffer zone around the grave site. If this is not feasible the cemeteries could be relocated adhering to existing legislation with extensive social consultation.
- Ruins – Prior to destruction it is recommended that the age of the ruins should be confirmed. If these sites are older than 60 years they will require demolition permits. These sites will then have to be assessed by a conservation architect and recorded. Sites like these are also known to contain unmarked graves that would be of high social significance. It is recommended that the sites are monitored during construction and that prior to destruction social consulting is done to determine the presence of unmarked graves.
- Game Board: The game board engraving must be fenced off to protect the site from accidental damage during the life of mine. If the site is threatened by future developments it must be documented after which a destruction permit must be obtained before mining activities can occur in this location.
- The community liaison officer at the mine should engage with the local community to determine if any graves sites are known in the study areas as well as investigating the possibility of unmarked graves at the ruins.
- A chance finds procedure should be implemented as part of the EMP.

## 9 Conclusions and recommendations

It is important to note that the entire farms Hartbeesfontein 339 JS, Goedehoop 315 JS and Vaalbank 289 JS were not surveyed. These farms form part of the Wolvekrans Colliery North and were previously surveyed (de Jong 2006) and the current study was only a high level scan of the impact areas since access to the currently mined areas are restricted and highly disturbed. The study area consists of extensively ploughed fields, old agricultural fields, plantations and rehabilitated and active mining areas. As the study area is very disturbed the chances of recovering surface archaeological material *in situ* is limited.

During the survey no Iron Age sites were identified inside the development footprint. However some heritage features were recorded consisting of the demolished remains of 5 ruins, 4 cemeteries, isolated Stone Age artefacts (1 location) and a game board engraving recorded by de Jong (2006). Two more ruins were recorded during the BA study (vd Walt 2015) but fall outside of the impact area and is not discussed further in this report. Within the current area of impact ruin 1 and 2 and a cemetery located on the farm Vaalbank will be impacted on. The portion on Vaalbank was not assessed by de Jong in 2006.

The demolished remains recorded are presumably farm labourer dwellings all of which date to post 1974 according to the maps that were consulted. Due to the extent of demolishment of these features and the fact that they are not older than 60 years, they are of no heritage significance. From the archival maps more structures are indicated on the farm Vaalbank but these could not be located during the survey as they are totally demolished. Sites like these might contain unmarked graves. Ruin 3 could have been a European farmstead and was constructed before 1954. The site is also totally demolished and is therefore of no heritage significance.

In the dispatch rider area on the farm Hartbeesfontein, two cemeteries and a few LSA miscellaneous flakes were recorded next to a pan. These artefacts made from Cristo cryptoline silica are scattered too sparsely to be of any significance apart from noting their presence, which has been done so in this report. The study area is void of raw material suitable for the manufacture of stone tools or rocks for the construction of Stone Walled settlements. This scenario does not repeat itself to the west as various EAS and MSA artefacts were recorded here on a ridge consisting of metamorphic rocks. The mining in the dispatch is underground with no shafts and no impact is foreseen on the recorded sites in this area.

The impacts to heritage resources by the proposed development are not considered to be highly significant and the impact on the recorded features can very easily be mitigated. Based on the results of the study there are no significant archaeological risks associated with the proposed project if the following recommendations are implemented:

- Cemetery 1 is located in the middle of an opencast area and will be directly impacted. It is preferable that the cemetery is fenced off with an access gate for family members with a 30 meter buffer zone around the grave site. If this is not feasible the cemetery could be relocated adhering to all legislation with extensive social consultation.
- All areas of impact should be monitored for grave sites as more are expected in the study areas. This should commence as soon as possible to avoid unnecessary delays when these are identified during mining.
- The dispatch rider area was not subjected to an archaeological assessment as the area is already impacted on by mining activities that would have destroyed any surface indicators of archaeological sites. The area was however subjected to a walkthrough to search for grave sites, but none was recorded. It is recommended that a "chance find" procedure should be

implemented for this area as discussed below. However if any graves are located in future they should ideally be preserved *in-situ* or alternatively relocated according to existing legislation. All the cemeteries should be marked on mine plans and fenced off to ensure these sites are not accidentally disturbed or destroyed.

- The community liaison officer at the mine should engage with the local community to determine if any graves sites are known in the study areas as well as investigating the possibility of unmarked graves at the ruins. Earth works at the ruins should be monitored by an archaeologist.
- The game board engraving must be fenced off to protect the site from accidental damage during the life of mine. If the site is threatened by future developments it must be documented after which a destruction permit must be obtained before mining activities can occur in this location.
- A chance finds procedure is included within the EMPr as detailed below.

### Chance find procedure

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any grave, artefact of cultural significance or rock engraving, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find, and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact HCAC for an assessment of the finds who will notify the SAHRA.

No cultural landscape elements were noted and visual impacts to scenic routes and sense of place are also considered to be low from a heritage perspective due to the extensive mining development in the area but are assessed by a separate study by a visual specialist. In terms of the built environment (Section 34 of the NHRA), no standing buildings of significance were recorded.

### 7.1 Reasoned Opinion

From a heritage perspective the project is considered to be viable as long as the above recommendations are adhered to, and based on approval from SAHRA. HCAC is of the opinion that the development can continue as the impact of the development on heritage will not impact negatively on the archaeological record of the Middelburg area. If during construction, any archaeological finds are made (e.g. graves, stone tools, and skeletal material), the operations must be stopped and the archaeologist must be contacted for an assessment of the finds

## 10 Project team

Jaco van der Walt.  
Liesl Bester

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



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## Appendix A - GNR 982: Specialist report information

Legal Requirement		Relevant Section in Specialist study
(1)	A specialist report prepared in terms of these Regulations must contain-	
(a)	details of-	
	(i) the specialist who prepared the report; and	First Page
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae	Appendix B
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page vi
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 1.2
(d)	the date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 2.2
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process	Section 2
(f)	the specific identified sensitivity of the site related to the activity and its associated structures and infrastructure;	Section 6
(g)	an identification of any areas to be avoided, including buffers;	Section 6 and 7
(h)	a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figure 26
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 2.3
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment;	Section 7
(k)	any mitigation measures for inclusion in the EMPr;	Section 7
(l)	any conditions/aspects for inclusion in the environmental authorisation;	Section 7
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 7
(n)	a reasoned opinion (Environmental Impact Statement)-	Section 7.1
	as to whether the proposed activity or portions thereof should be authorised;	Section 7.1
	and if the opinion is that the proposed activity or portions thereof should be	Section 7.1

	Legal Requirement	Relevant Section in Specialist study
	authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Section 2.1.3
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Section 2.1.3
(q)	any other information requested by the competent authority.	

## Appendix B - CV

## Appendix C - Impact Assessment Methodology

In order to ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared. The impact assessment methodology makes provision for the assessment of impacts against the following criteria:

- Significance;
- Spatial scale;
- Temporal scale;
- Probability; and
- Degree of certainty.

A combined quantitative and qualitative methodology will be used to describe the impacts for each of the aforementioned assessment criteria. A summary of each of the qualitative descriptors along with the equivalent quantitative rating scale for each of the aforementioned criteria is given in **Table 1 1**.

**Table 1 1: Quantitative rating and equivalent descriptors for the impact assessment criteria.**

RATING	SIGNIFICANCE	EXTENT SCALE	TEMPORAL SCALE
1	VERY LOW	<i>Isolated corridor / proposed corridor</i>	<u>Incidental</u>
2	LOW	<i>Study area</i>	<u>Short-term</u>
3	MODERATE	<i>Local</i>	<u>Medium-term</u>
4	HIGH	<i>Regional / Provincial</i>	<u>Long-term</u>
5	VERY HIGH	<i>Global / National</i>	<u>Permanent</u>

A more detailed description of each of the assessment criteria is given in the following sections.

### Significance Assessment

Significance rating (importance) of the associated impacts embraces the notion of extent and magnitude, but does not always clearly define these since their importance in the rating scale is very relative. For example, the magnitude (i.e. the size) of area affected by atmospheric pollution may be extremely large (1000km<sup>2</sup>) but the significance of this effect is dependent on the concentration or level of pollution. If the concentration is great, the significance of the impact would be HIGH or VERY HIGH, but if it is diluted it would be VERY LOW or LOW. Similarly, if 60 ha of a grassland type are destroyed the impact would be VERY HIGH if only 100 ha of that grassland type were known. The impact would be VERY LOW if the grassland type was common. A more detailed description of the impact significance rating scale is given in **Table 1 2** below.

**Table 1 2: Description of the significance rating scale.**

RATING		DESCRIPTION
5	VERY HIGH	Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity which could offset the impact. In the case of beneficial impacts, there is no real alternative to achieving this benefit.
4	HIGH	Impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these. In the case of beneficial impacts, other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
3	MODERATE	Impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
2	LOW	Impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts, alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.
1	VERY LOW	Impact is negligible within the bounds of impacts which could occur. In the case of adverse impacts, almost no mitigation and/or remedial activity is needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of beneficial impacts, alternative means are almost all likely to be better, in one or a number of ways, than this means of achieving the benefit. Three additional categories must also be used where relevant. They are in addition to the category represented on the scale and if used will replace the scale.
0	NO IMPACT	There is no impact at all - not even a very low impact on a party or system.

## Spatial Scale

The spatial scale refers to the extent of the impact i.e. will the impact be felt at the local, regional, or global scale. The spatial assessment scale is described in more detail in **Table 1 3**.

**Table 1 3: Description of the significance rating scale.**

RATING		DESCRIPTION
5	Global/National	The maximum extent of any impact.
4	Regional/Provincial	The spatial scale is moderate within the bounds of impacts possible, and will be felt at a regional scale (District Municipality to Provincial Level). The impact will affect an area up to 50km from the proposed site / corridor.
3	Local	The impact will affect an area up to 5km from the proposed route corridor / site.
2	Study Area	The impact will affect a route corridor not exceeding the boundary of the corridor / site.
1	Isolated Sites / proposed site	The impact will affect an area no bigger than the corridor / site.

## Duration Scale

In order to accurately describe the impact it is necessary to understand the duration and persistence of an impact in the environment. The temporal scale is rated according to criteria set out in **Table 1 4**.

**Table 1 4: Description of the temporal rating scale.**

RATING		DESCRIPTION
1	Incidental	The impact will be limited to isolated incidences that are expected to occur very sporadically.
2	Short-term	The environmental impact identified will operate for the duration of the construction phase or a period of less than 5 years, whichever is the greater.
3	Medium term	The environmental impact identified will operate for the duration of life of the project.
4	Long term	The environmental impact identified will operate beyond the life of operation.
5	Permanent	The environmental impact will be permanent.

## Degree of Probability

The probability or likelihood of an impact occurring will be described, as shown in **Table 1 5** below.

**Table 1 5: Description of the degree of probability of an impact occurring.**

RATING	DESCRIPTION
1	Practically impossible
2	Unlikely
3	Could happen
4	Very Likely
5	It's going to happen / has occurred

## Degree of Certainty

As with all studies it is not possible to be 100% certain of all facts, and for this reason a standard “degree of certainty” scale is used as discussed in **Table 1 6**. The level of detail for specialist studies is determined according to the degree of certainty required for decision-making. The impacts are discussed in terms of affected parties or environmental components.



**Table 1 6: Description of the degree of certainty rating scale.**

RATING	DESCRIPTION
Definite	More than 90% sure of a particular fact.
Probable	Between 70 and 90% sure of a particular fact, or of the likelihood of that impact occurring.
Possible	Between 40 and 70% sure of a particular fact, or of the likelihood of an impact occurring.
Unsure	Less than 40% sure of a particular fact or the likelihood of an impact occurring.
Can't know	The consultant believes an assessment is not possible even with additional research.

## Quantitative Description of Impacts

To allow for impacts to be described in a quantitative manner in addition to the qualitative description given above, a rating scale of between 1 and 5 was used for each of the assessment criteria. Thus the total value of the impact is described as the function of significance, spatial and temporal scale as described below.

<b>Impact Risk = (SIGNIFICANCE + Spatial + Temporal) X Probability</b>	
3	5

An example of how this rating scale is applied is shown in **Table 1 7**.

**Table 1 7: Example of Rating Scale.**

IMPACT	SIGNIFICANCE	SPATIAL SCALE	TEMPORAL SCALE	PROBABILITY	RATING
	LOW	<i>Local</i>	<u>Medium Term</u>	<u>Could Happen</u>	
Impact to air	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1.6</b>

*Note: The significance, spatial and temporal scales are added to give a total of 8, that is divided by 3 to give a criteria rating of 2,67. The probability (3) is divided by 5 to give a probability rating of 0,6. The criteria rating of 2,67 is then multiplied by the probability rating (0,6) to give the final rating of 1,6.*

The impact risk is classified according to 5 classes as described in **Table 1 8**.

**Table 1 8: Impact Risk Classes.**

RATING	IMPACT CLASS	DESCRIPTION
0.1 – 1.0	1	Very Low
1.1 – 2.0	2	Low
2.1 – 3.0	3	Moderate
3.1 – 4.0	4	High
4.1 – 5.0	5	Very High

Therefore with reference to the example used for air quality above, an impact rating of 1.6 will fall in the Impact Class 2, which will be considered to be a low impact.