PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT

For

The Proposed Klei Minerale (Pty) Ltd Prospecting on Several Portions of the Farm Boekenhoutkloof 315 JR, Pretoria, Gauteng

Author ©:

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January 2022

A Phase 1 Archaeological Impact Assessment for the Proposed Klei Minerale (Pty) Ltd Prospecting on several portions of the Farm Boekenhoutkloof 315 JR, Pretoria, Gauteng

For: Environmental Assurance (Pty) Ltd

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Version: 4

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I, Tobias Coetzee, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Klei Minerale (Pty) Ltd Project in an objective manner, even if this results in views and findings that are not favourable to the client;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have the required expertise in conducting the specialist report and I will comply with legislation, regulations and any guidelines that have relevance to the proposed activity;
- I have not, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this declaration are true and correct.

Date: 28 January 2022

List of Abbreviations

AIA – Archaeological Impact Assessment

CRM – Cultural Resource Management

EIA – Environmental Impact Assessment

ESA – Early Stone Age

GPS – Global Positioning System

ha – Hectare

HIA – Heritage Impact Assessment

km – Kilometre

LIA – Late Iron Age

LSA – Later Stone Age

m – Metre

MASL – Metres Above Sea Level

MEC – Member of the Executive Council

MSA – Middle Stone Age

NHRA – National Heritage Resources Act

PWP – Prospecting Work Programme

SAHRA – South African Heritage Resources Agency

Executive Summary

The author was appointed by Environmental Assurance (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment (AIA) for the proposed Klei Minerale (Pty) Ltd prospecting on Portions 32, 34, 35, a portion of Portion 33 and a portion of the Remaining Extent of the Farm Boekenhoutkloof 315 JR near Pretoria, Gauteng. The aim of the study is to determine the scope of archaeological resources that could be impacted by the proposed prospecting activities.

A total of 10 sites were recorded on historical aerial images and topographical maps and were inspected during the site visit. Nine sites were identified as buildings and one site as a disturbance in the vegetation/soil that might indicate historical surface infrastructure. One of the sites associated with buildings, as well as the site that appears as a vegetation/soil disturbance, have been demolished (B05, B06). A further four sites associated with intact buildings were identified (B03, B07, B08, B10), as well as four sites associated with building ruins (B01, B02, B04, B09).

The identified intact building sites and ruins, or parts thereof, might exceed 60 years of age and should therefore be avoided by the proposed prospecting activities. Alternatively, a destruction permit from the provincial heritage authority will be required. The demolished sites might be associated with subsurface culturally significant material and care should therefore be exercised when prospecting in the vicinity of these sites.

Subject to adherence to the recommendations and approval by SAHRA (South African Heritage Resources Agency), the Klei Minerale (Pty) Ltd prospecting project may continue. Should skeletal remains be exposed during prospecting, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage and Resources Act, 25 of 1999 section 36 (6)). Also, should culturally significant material be discovered during the course of the said prospecting, all activities must be suspended pending further investigation by a qualified archaeologist.

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1. Project Background

1.1 Introduction

The author was appointed by Environmental Assurance (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for the proposed Klei Minerale (Pty) Ltd prospecting project. The proposed study area is located on Portions 32, 34, 35, a portion of Portion 33 and a portion of the Remaining Extent of the Farm Boekenhoutkloof 315 JR, approximately 14 km northwest of the Pretoria CBD in the Gauteng Province (**Figures 1 – 4, Table 1**). Surrounding suburbs include Rosslyn 6 km to the north-northeast and Atteridgeville 8 km to the south. The purpose of this study is to examine the demarcated portion in order to determine if any archaeological resources of heritage value will be impacted by the proposed prospecting activities, as well as to archaeologically contextualise the general study area. The aim of this report is to provide the developer with information regarding the location of heritage resources on the demarcated portion.

The following report discusses the implication for the prospecting of clay on Portions 32, 34, 35, a portion of Portion 33 and a portion of the Remaining Extent of the Farm Boekenhoutkloof 315 JR with regard to heritage resources. The demarcated portion is irregularly shaped and is located towards the north-eastern corner of the parent farm. The legislation section included serves as a guide towards the effective identification and protection of heritage resources and will apply to any such material unearthed during the project within the demarcated study area.

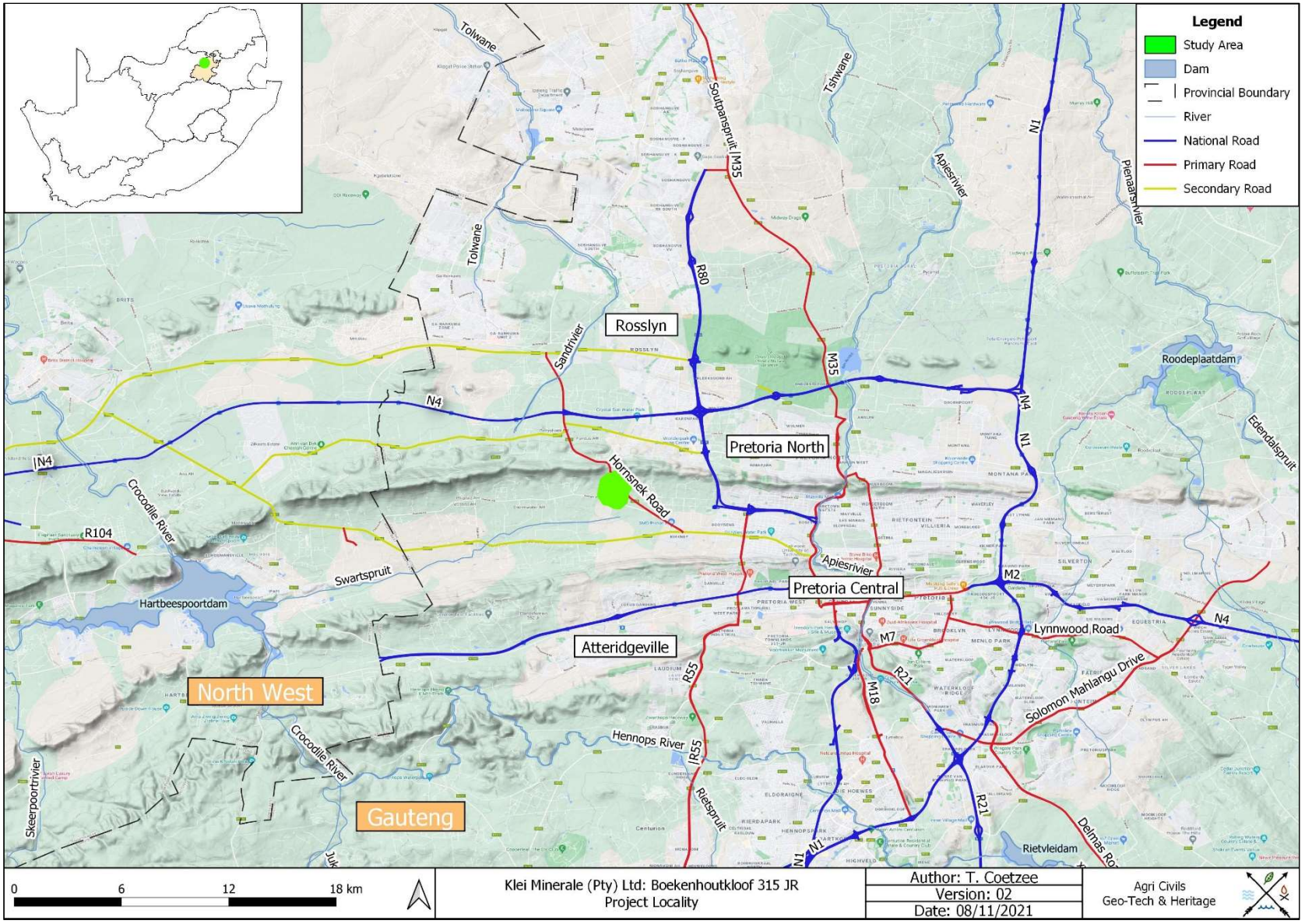


Figure 1: Regional and Provincial location of the study area.

1.2 Legislation

The South African Heritage Resources Agency aims to conserve and control the management, research, alteration and destruction of cultural resources of South Africa and to prosecute if necessary. It is therefore crucially important to adhere to heritage resource legislation contained in the Government Gazette of the Republic of South Africa (Act No.25 of 1999), as many heritage sites are threatened daily by development. Conservation legislation requires an impact assessment report to be submitted for development authorisation that must include an AIA if triggered.

AIAs should be done by qualified professionals with adequate knowledge to (a) identify all heritage resources that might occur in areas of development and (b) make recommendations for protection or mitigation of the impact of the sites.

1.2.1 The EIA (Environmental Impact Assessment) and AIA processes

Phase 1 Archaeological Impact Assessments generally involve the identification of sites during a field survey with assessment of their significance, the possible impact that the development might have, and relevant recommendations.

All Archaeological Impact Assessment reports should include:

a. Location of the sites that are found;

b. Short descriptions of the characteristics of each site;

c. Short assessments of how important each site is, indicating which should be conserved and which mitigated;

d. Assessments of the potential impact of the development on the site(s);

e. In some cases a shovel test, to establish the extent of a site, or collection of material, to identify the associations of the site, may be necessary (a pre-arranged SAHRA permit is required); and

f. Recommendations for conservation or mitigation.

This AIA report is intended to inform the client about the legislative protection of heritage resources and their significance and make appropriate recommendations. It is essential to also provide the heritage authority with sufficient information about the sites to enable the authority to assess with confidence:

a. Whether or not it has objections to a development;

b. What the conditions are upon which such development might proceed;

c. Which sites require permits for mitigation or destruction;

d. Which sites require mitigation and what this should comprise;

e. Whether sites must be conserved and what alternatives can be proposed to relocate the development in such a way as to conserve other sites; and

f. What measures should or could be put in place to protect the sites which should be conserved.

When a Phase 1 AIA is part of an EIA, wider issues such as public consultation and assessment of the spatial and visual impacts of the development may be undertaken as part of the general study and may not be required from the archaeologist. If, however, the Phase 1 project forms a major component of an AIA it will be necessary to ensure that the study addresses such issues and complies with Section 38 of the National Heritage Resources Act (NHRA).

1.2.2 Legislation regarding archaeology and heritage sites

National Heritage Resource Act No.25 of April 1999

Buildings are among the most enduring features of human occupation, and this definition therefore includes all buildings older than 60 years, modern architecture as well as ruins, fortifications and Farming Community settlements. The Act identifies heritage objects as:

- objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects, meteorites and rare geological specimens;
- visual art objects;
- military objects;
- numismatic objects;
- objects of cultural and historical significance;
- objects to which oral traditions are attached and which are associated with living heritage;
- objects of scientific or technological interest;
- books, records, documents, photographic positives and negatives, graphic material, film or video or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996), or in a provincial law pertaining to records or archives;
- any other prescribed category.

With regards to activities and work on archaeological and heritage sites this Act states that:

"No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority." (34. [1] 1999:58)

and

"No person may, without a permit issued by the responsible heritage resources authority:

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites."(35. [4] 1999:58)

and

"No person may, without a permit issued by SAHRA or a provincial heritage resources authority:

(a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

(b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;

(c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals." (36. [3] 1999:60)

On the development of any area the gazette states that:

"…any person who intends to undertake a development categorised as:

(a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site-

i. exceeding 5000m² in extent; or

ii. involving three or more existing erven or subdivisions thereof; or

iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or

iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10000m² in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development." (38. [1] 1999:62-64)

and

"The responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a): Provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development." (38. [3] 1999:64)

Human Tissue Act and Ordinance 7 of 1925

The Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925) protects graves younger than 60 years. These fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and re-burial must be obtained from the relevant Provincial Member of Executive Council MEC as well as the relevant Local Authorities. Graves 60 years or older fall under the jurisdiction of the National Heritage Resources Act as well as the Human Tissues Act, 1983.

2. Study Area and Project Description

2.1 Location & Physical Environment

The proposed prospecting is situated on the following land parcels (**Table 1 & Figure 2**):

Table 1: Property name & coordinates

Property	Portion	Map Reference (1:50 000)	Lat	Lon	Extent (ha)
Boekenhoutkloof 315 JR	RE (portion of)	2528 CA	-25.696455	28.071089	29.3993
Boekenhoutkloof 315 JR	32	2528 CA	-25.691341	28.067881	9.1013
Boekenhoutkloof 315 JR	33 (portion of)	2528 CA	-25.691765	28.069757	7.8965
Boekenhoutkloof 315 JR	34	2528 CA	-25.695396	28.067034	8.5653
Boekenhoutkloof 315 JR	35	2528 CA	-25.695941	28.068547	8.5653
Total					**63.5277**

The Pretoria CBD is located about 14 km southeast of the Klei Minerale (Pty) Ltd prospecting project, while Rosslyn is located 6 km to the north-northeast and Atteridgeville 8 km to the south. The study area falls on the southern slopes of the Magaliesberg within the Tshwane Metropolitan Municipality in the Gauteng Province. The Hornsnek primary road runs in a northwest – southeast direction approximately 260 m east of the study area, while a local road runs along the southern boundary (**Figures 1 & 3**). Access to the study area is via the local road to the south.

In terms of vegetation, the study area falls within the Savanna Biome and Central Bushveld Bioregion. On a local scale, the proposed prospecting area is classified as Moot Plains Bushveld. This vegetation unit is associated with the Gauteng and North West Provinces. The main belt occurs immediately south of the Magaliesberg from the Selons River Valley in the west through Maanhaarrand, filling the valley bottom of the Magalies River, proceeding east of the Hartebeestpoort Dam between the Magaliesberg and Daspoort mountain ranges to Pretoria. A narrow belt also occurs immediately north of the Magaliesberg from Rustenburg in the West to just east of the Crocodile River in the east. Moot Plains Bushveld is considered vulnerable with a conservation target of 19%. Some 13% is statutorily conserved mainly in the Magaliesberg Nature Reserve Area, while about 28%

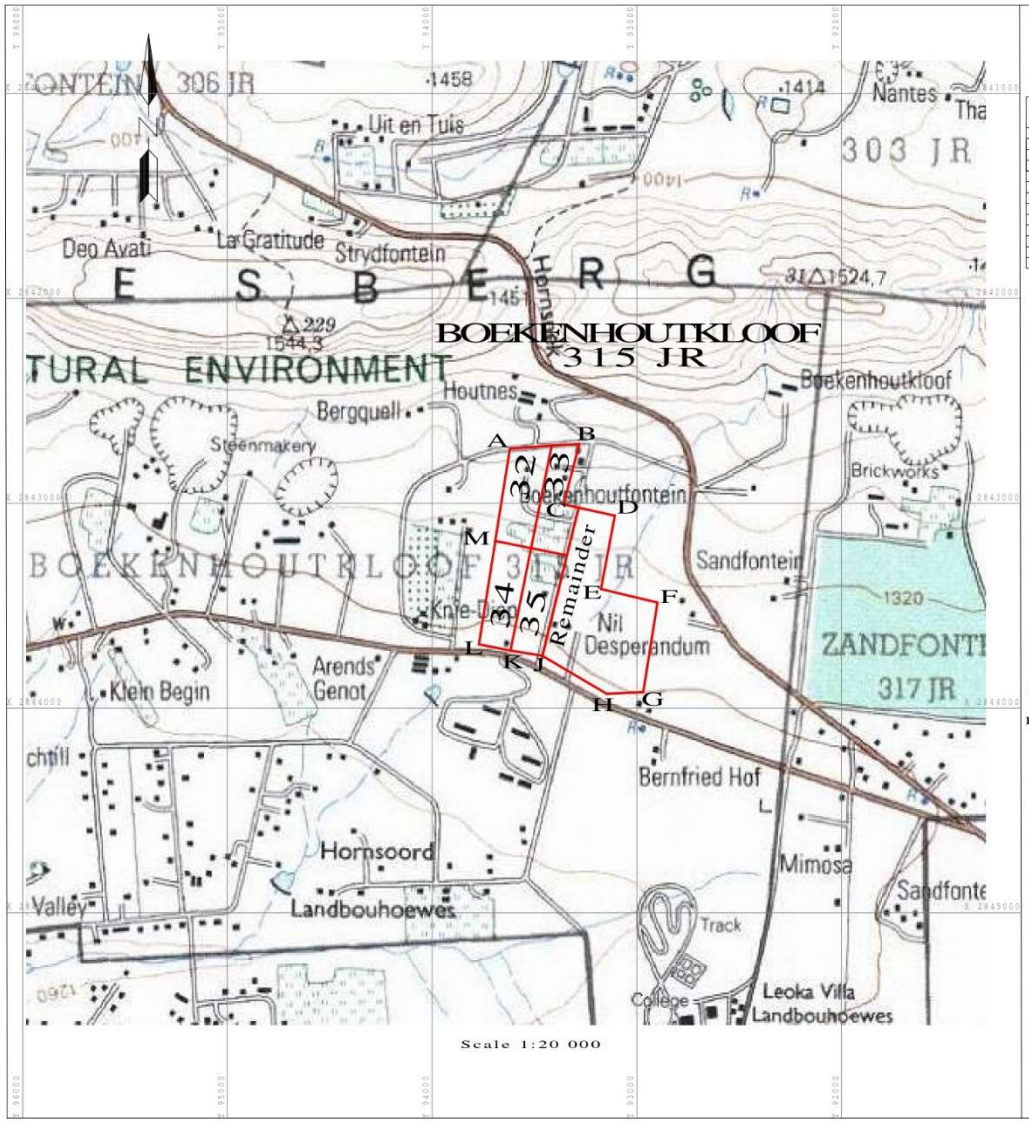
is transformed mainly by cultivation and urban and built-up areas. Very scattered occurrences of alien vegetation are found while erosion varies between very low and low (Mucina & Rutherfords 2006)

The average elevation for Moot Plains Bushveld varies between 1050 and 1450 MASL (Metres Above Sea Level) while the average elevation of the study area is 1320 MASL and slopes from the more elevated northern section to the lower southern area.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 661 mm. The average maximum temperature for the study area is recorded during January when an average of 22.3 ºC is reached. The average minimum temperature is recorded during July when an average of 12 ºC is reached (Climate-data.org 30/07/2021).

The study area falls within the A21H Quaternary Catchment within the Limpopo Water Management Area. The closest perennial rivers to the study area are Swartspruit approximately 1.2 km to the south and the Sand River 6 km to the northwest. A non-perennial offshoot is also associated with the demarcated Remaining Extent of the Farm Boekenhoutkloof 315 JR.

On a local scale, the study area is fenced-off on the western side and a brick wall runs along a section of the northern and eastern boundaries. Several slashed roads, residences, outbuildings, offices and workshops are found within the study area. The majority of the open areas are associated with cultivated fields. The greater area is generally associated with farming related activities and mining development. Historical aerial images (**Appendix A**) show large sections of the study area to be cultivated since at least 1939 with a gravel road intersecting the northern section.



Compiled in accordance with Regulation 2(2) to the Mineral and Petroleum Resources Development Act, No 28 of 2002 and Regulation 42 to the Mining Titles Registration Act, No 16 of 1967

	Latitude	Longitude	Survey System - WGS84 (WG29)		
				Y	X
A	-25.689207	28.067367	A	93620.040	2842733.540
B	-25.689030	28.070739	B	93281.678	2842711.474
C	-25.691680	28.069950	C	93358.779	2843005.603
D	-25.692193	28.072446	D	93107.802	2843060.763
E	-25.695423	28.071747	E	93175.455	2843419.075
F	-25.696037	28.074493	F	92899.376	2843485.178
G	-25.699976	28.073770	G	92968.890	2843922.050
H	-25.700041	28.071985	H	93148.000	2843930.600
J	-25.698349	28.068874	J	93461.615	2843745.333
K	-25.698110	28.067321	K	93617.630	2843719.890
L	-25.697819	28.065789	L	93771.660	2843688.810
M	-25.693271	28.066616	M	93692.180	2843184.340
A	-25.689207	28.067367	A	93620.040	2842733.540

Side	Distance (metres)	Direction (DD:mm:ss)
AB	339.081	266:16:07
BC	304.067	14:41:19
CD	256.968	282:23:43
DE	364.643	10:41:31
EF	283.882	283:27:54
FG	442.368	9:02:27
GH	179.314	87:16:01
HJ	364.250	120:34:20
JK	193.158	99:15:44
KL	157.134	101:24:28
LM	610.820	189:01:03
MA	456.536	189:05:30

Details of Portions of the farm BOEKENHOUTKLOOF 315 JR included in Prospecting Area

PORTION	EXTENT HA
32	9.1013
Ptn of 33	7.8965
34	8.5653
35	8.5653
Ptn of Rem	29.3993
Total	63.5277

The figure A,B,C,D,E,F,G,H,J,K,L,M,A represents an area measuring 63.5277 hectares comprising of Portions 32, 34, 35, a portion of Portion 33 and a portion of the Remainder of the farm BOEKENHOUTKLOOF 315, Registration division JR, District of Tshwane North, Gauteng Province, in respect of which KLEI MINERALE (PTY) LTD, Registration number1997/005698/07 has applied for a Prospecting Right for Clay, Sand, Shale/Brick Clay, Silica Sand and Aggregate in terms of Section 16 of the Mineral and Petroleum Resources Development Act, No 28 of 2002.

Applicant: KLEI MINERALE (PTY) LTD
Reg No. 1997/005698/07

. . . . . Signature on behalf of Applicant

. . . . . Signature Regional Manager

. . . . . Date

. . . . . Date

RICHARD PETER LAW
Cert mine Surveyor (1960)

10/11/2021
. . . . . Date

Figure 2: Reg 2 (2) map (supplied by Envass 2022).

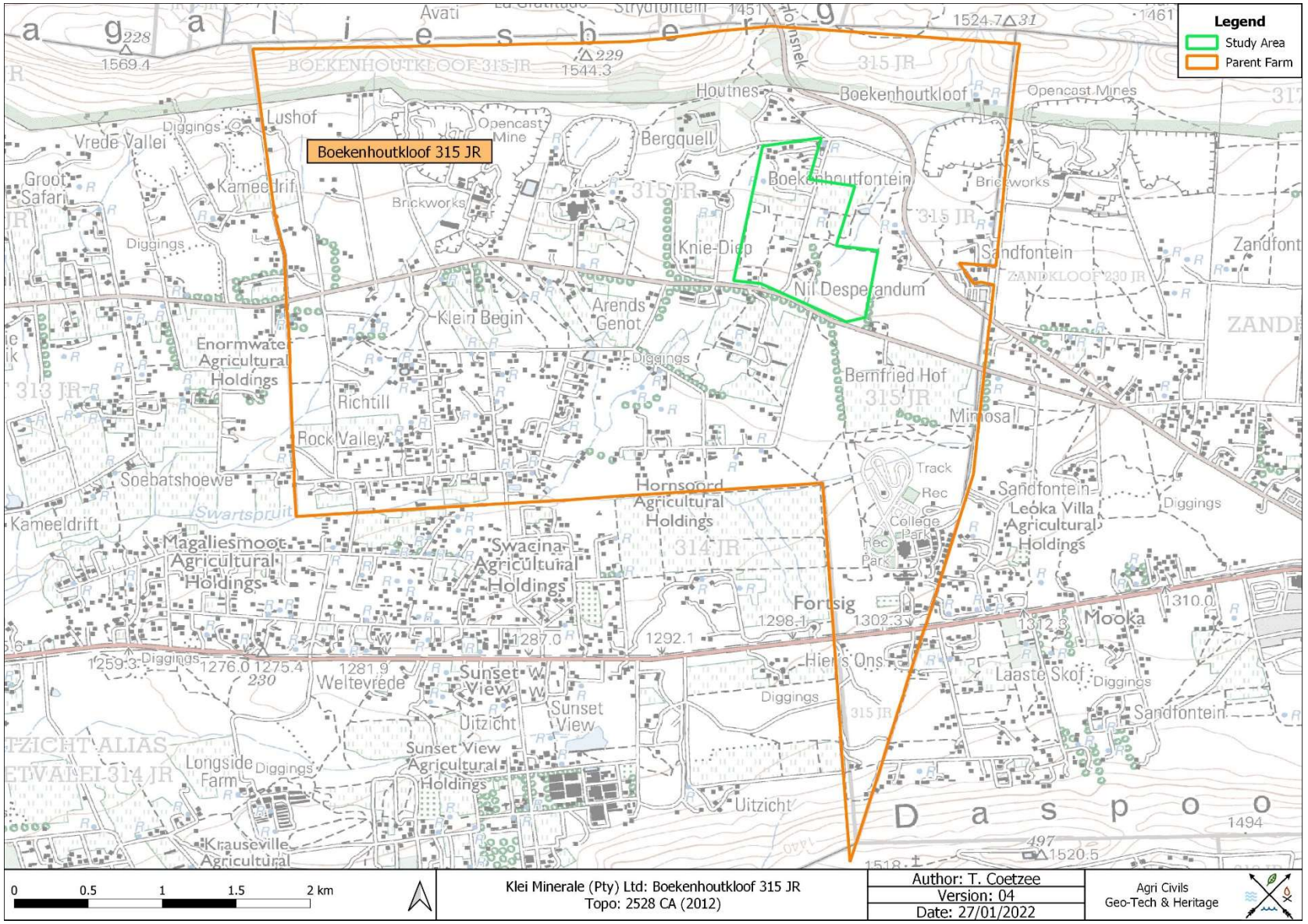


Figure 3: Segments of SA 1: 50 000 2528 CA indicating the study area.

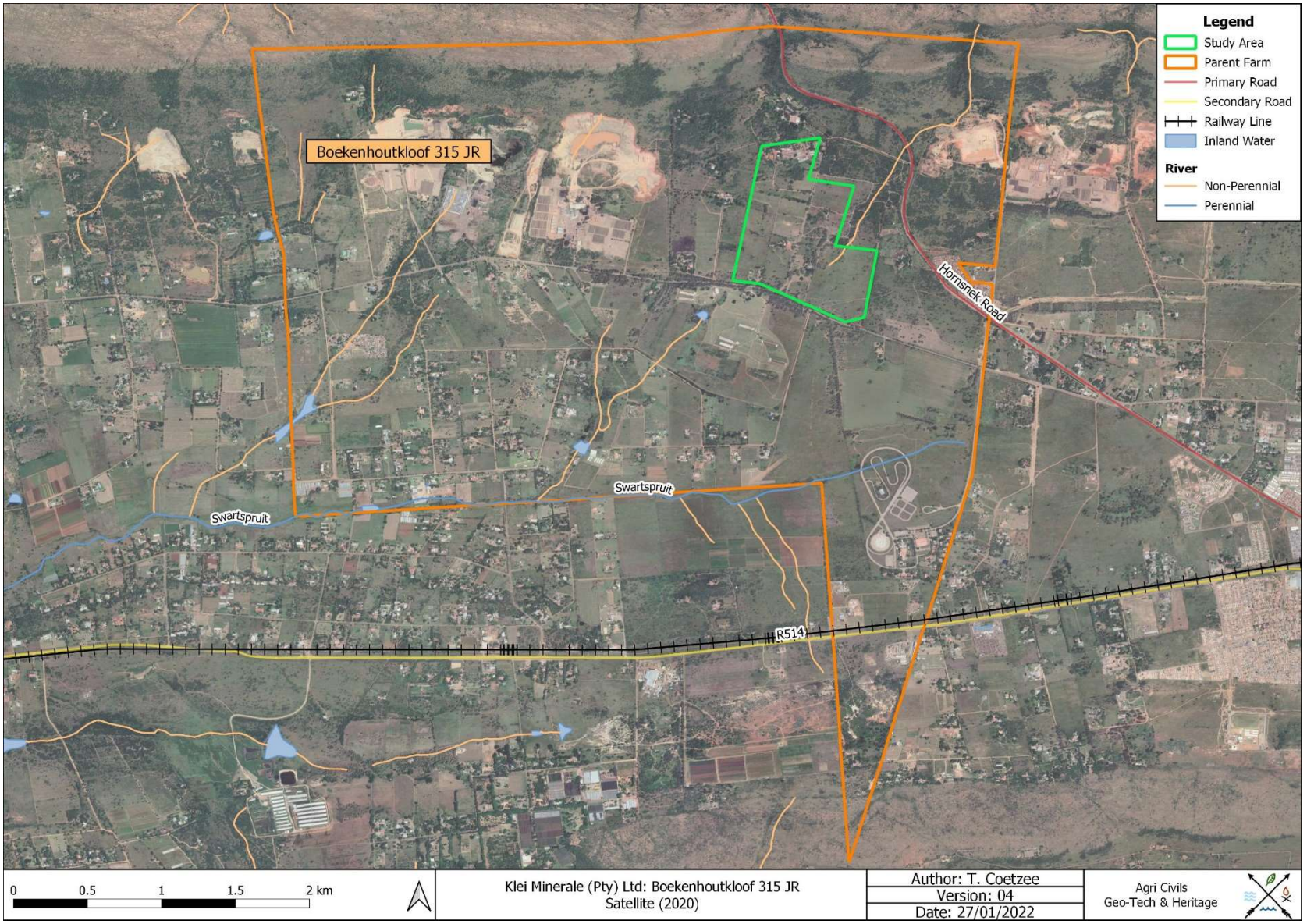


Figure 4: Study area indicated on a 2020 satellite image.

2.2 Project description

Klei Minerale (Pty) Ltd wishes to expand their mining development to the demarcated portion. The area demarcated for the prospecting of clay covers 63.5277 ha (**Table 1 & Figures 2 – 4**). According to the Prospecting Work Programme (PWP), prospecting will consist of a high-level desktop study, the studying of historical data and existing maps, as well as trenching. The trenches will be approximately 750mm wide, 3 metres long and 3 metres deep and will be dug using graders and excavators. The trench walls will then be mapped. **Table 2** indicates the planned activities and timeframe. It should also be noted that the existing SABRIX office complex located on the premises, will be utilised for the site office, ablutions, fuel and machine storage etc. No new infrasteucure will therefore be constructed, existing roads will be used and no one will stay on site.

The location of the actual prospecting activities has not been determined/mapped yet since it will be based on the recommendations/mitigations indicated by the specialist assessments and geologist as part of phase 1 of the PWP.

Table 2: Proposed activities and timeframe (adapted from the PWP).

Phase	Activity (what are the activities that are planned to achieve optimal prospecting)	Skill(s) required (refers to the competent personnel that will be employed to achieve the required results)	Timeframe (in months) for the activity)	Outcome (What is the expected deliverable, e.g. Geological report, analytical results, feasibility study, etc.)	Timeframe for outcome (deadline for the expected outcome to be delivered)	What technical expert will sign off on the outcome? (e.g. geologist, mining engineer, surveyor, economist, etc)
Year 1	**Non-Invasive Prospecting**					
	Search and collect all relevant existing and historical data	Geologist	3 months	Historical data and reports collection	Month 3	Geologist
	Review relevant existing and historical data gathered	Geologist	3 months	Review gathered relevant existing and historical data for compilation of a desktop study	Month 6	Geologist
	Compile high-level desktop study and potential desktop resource evaluation using sourced data	Geologist	6 months	High-Level Desktop Report including detail mapping of the prospecting area	Month 12	Geologist
Year 1	**Invasive Prospecting**					
	None					
Year 2	**Invasive Prospecting**					
	Trenching	Geologist	6 months	Trenching Results	Month 24	Geologist
Year 2	**Non-Invasive Prospecting**					
	Prospecting Results Report	Geologist	3 months	Update of geological report with prospecting results	Month 24	Geologist

Phase	Activity (what are the activities that are planned to achieve optimal prospecting)	Skill(s) required (refers to the competent personnel that will be employed to achieve the required results)	Timeframe (in months) for the activity)	Outcome (What is the expected deliverable, e.g. Geological report, analytical results, feasibility study, etc.)	Timeframe for outcome (deadline for the expected outcome to be delivered)	What technical expert will sign off on the outcome? (e.g. geologist, mining engineer, surveyor, economist, etc)
Year 3	**Invasive Prospecting**					
	Trenching (1-3 trenches)	Geologist	6 months	Trenching results and resource extents	Month 36	Geologist
	Non-Invasive Prospecting					
Year 3	Prospecting Results Report and geological modelling	Geologist 3 months Geological Resource Report Month 36 Geologist	3 months	Update of geological report with prospecting results and geological modelling	Month 36	Geologist
	Invasive Prospecting					
Year 4	None					
	Non-Invasive Prospecting					
Year 4	Compile geological model and perform resource estimation	Geologist	3 months	Geological Model and Resource Report	Month 48	Geologist
	Non-Invasive Prospecting					
Year 5	Perform high level mine planning and mine scheduling	Geologist/Mining Engineer	3 months	Resource and Reserve report.	Month 60	Geologist/Mining Engineer

3. Archaeological Background

Southern African archaeology is broadly divided into the Early, Middle and Later Stone Ages; Early, Middle and Later Iron Ages; and Historical or Colonial Periods. This section of the report provides a general background to archaeology in South Africa and focuses on more site-specific elements where relevant.

3.1 The Stone Ages

The earliest stone tool industry, the Oldowan, was developed by early human ancestors which were the earliest members of the genus *Homo,* such as *Homo habilis*, around 2.6 million years ago. It comprises tools such as cobble cores and pebble choppers (Toth & Schick 2007). Archaeologists suggest these stone tools are the earliest direct evidence for culture in southern Africa (Clarke & Kuman 2000). The advent of culture indicates the advent of more cognitively modern hominins (Mitchell 2002: 56, 57).

The Acheulean industry completely replaced the Oldowan industry. The Acheulian industry was first developed by *Homo ergaster* between 1.8 to 1.65 million years ago and lasted until around 300 000 years ago. Archaeological evidence from this period is also found at Swartkrans, Kromdraai and Sterkfontein. The most typical tools of the ESA (Early Stone Age) are handaxes, cleavers, choppers and spheroids. Although hominins seemingly used handaxes often, scholars disagree about their use. There are no indications of hafting, and some artefacts are far too large for it. Hominins likely used choppers and scrapers for skinning and butchering scavenged animals and often obtained sharp ended sticks for digging up edible roots. Presumably, early humans used wooden spears as early as 5 million years ago to hunt small animals.

Middle Stone Age (MSA) artefacts started appearing about 250 000 years ago and replaced the larger Early Stone Age bifaces, handaxes and cleavers with smaller flake industries consisting of scrapers, points and blades. These artefacts roughly fall in the 40-100 mm size range and were, in some cases, attached to handles, indicating a significant technical advance. The first *Homo sapiens* species also emerged during this period. Associated sites are Klasies River Mouth, Blombos Cave and Border Cave (Deacon & Deacon 1999).

Although the transition from the Middle Stone Age to the Later Stone Age (LSA) did not occur simultaneously across the whole of southern Africa, the Later Stone Age ranges from about 20 000 to 2000 years ago. Stone tools from this period are generally smaller, but were used to do the same job as those from previous periods; only in a different, more efficient way. The Later Stone Age is associated with: rock art, smaller stone tools (microliths), bows and arrows, bored stones, grooved stones, polished bone tools, earthenware pottery and beads. Examples of Later Stone Age sites are Nelson Bay Cave, Rose Cottage Cave and Boomplaas Cave (Deacon & Deacon 1999). These artefacts are often associated with rocky outcrops or water sources.

3.2 The Iron Age & Later History

The Early Iron Age marks the movement of farming communities into South Africa in the first millennium AD, or around 2500 years ago (Mitchell 2002:259, 260). These groups were agro-pastoralist communities that settled in the vicinity of water in order to provide subsistence for their cattle and crops. Archaeological evidence from Early Iron Age sites is mostly artefacts in the form of ceramic assemblages. The origins and archaeological identities of this period are largely based upon ceramic typologies. Some scholars classify Early Iron Age ceramic traditions into different "streams" or "trends" in pot types and decoration, which emerged over time in southern Africa. These "streams" are identified as the Kwale Branch (east), the Nkope Branch (central) and the Kalundu Branch (west). Early Iron Age ceramics typically display features such as large and prominent inverted rims, large neck areas and fine elaborate decorations. This period continued until the end of the first millennium AD (Mitchell 2002; Huffman 2007). Some well-known Early Iron Age sites include the Lydenburg Heads in Mpumalanga, Happy Rest in the Limpopo Province and Mzonjani in Kwa-Zulu Natal.

The Middle Iron Age roughly stretches from AD 900 to 1300 and marks the origins of the Zimbabwe culture. During this period cattle herding appeared to play an increasingly important role in society. However, it was proved that cattle remained an important source of wealth throughout the Iron Age. An important shift in the Iron Age of southern Africa took place in the Shashe-Limpopo basin during this period, namely the development of class distinction and sacred leadership. The Zimbabwe culture can be divided into three periods based on certain capitals. Mapungubwe, the first period, dates from AD 1220 to 1300, Great Zimbabwe from AD 1300 to 1450, and Khami from AD 1450 to 1820 (Huffman 2007: 361, 362).

The Late Iron Age (LIA) roughly dates from AD 1300 to 1840. It is generally accepted that Great Zimbabwe replaced Mapungubwe. Some characteristics include a greater focus on economic growth and the increased importance of trade. Specialisation in terms of natural resources also started to play a role, as can be seen from the distribution of iron slag which tend to occur only in certain localities compared to a wide distribution during earlier times. It was also during the Late Iron Age that different areas of South Africa were populated, such as the interior of KwaZulu Natal, the Free State, the Gauteng Highveld and the Transkei. Another characteristic is the increased use of stone as building material. Some artefacts associated with this period are knife-blades, hoes, adzes, awls, other metal objects as well as bone tools and grinding stones.

In terms of the general project area, the region is well known for LIA sites. The area west of Wonderboompoort is associated with one of the earliest LIA sites. Further to the west a high concentration of sites is also found that stretches to Olifantspoort in the Magaliesberg. These sites date to the Moloko period that roughly stretched from AD 1100 – 1500 (Van Vollenhoven 2006).

Oral traditions of Nguni-speaking Ndebele groups indicate their sites in the area to the east of Pretoria, while heritage reports conducted on the stone-walled sites of this area suggest that Ndebele-speaking people inhabited this area between the late 1600s and mid-1800s (Antonites 2020).

According to Van Vuuren (2006), Ndebele oral traditions state that they first settled at Emhlangeni, translating to "At the reeds", near Randfontein in the Gauteng Province. Accordingly, they entered the Pretoria region during the early to mid- 1600s and settled at KwaMnyamana, which translates to "Place of the Black Hills". KwaMnyamana is located close to the Hippo Quarries crusher site on the farms De Onderstepoort (300JR) and Doornpoort (295JR). The first chief to settle at this site was called Musi. A split between his sons caused the Ndebele to divide into several tribal entities. The descendants of the youngest son, Ndzundza, moved further to the east, while the descendants of the eldest son, Manala, stayed behind.

A later Ndebele invasion that was led by Mzilikaze in 1827, settled at Kungwini, present day Wonderboom in Pretoria North. In 1832, the Zulu king Dingane attacked Mzilikaze at Kungwini. According to Van Vollenhoven (2006), the Sotho-Tswana groups are the largest Bantu language speaking people who are formed by the Northern and Southern Sotho, as well as the Tswana. These groups are responsible for large stone-walled towns and according to oral histories, these groups re-established themselves after the 1827 arrival of Mzilikaze during the Mfecane/Difaquane.

According to Huffman (2007), the following pottery is associated with the general area surrounding Pretoria:

- Mzonjani facies of the Kwale Branch of the Urewe Tradition (AD 450 to 750).
- Uikomst facies of the Blackburn Branch of the Urewe Tradition (AD 1650 to 1820)
- Olifantspoort facies of the Moloko branch of the Urewe Tradition (AD 1500 to 1700)
- Buispoort facies of the Moloko branch of the Urewe Tradition AD (1700 – 1840)

4. Methodology

Archaeological reconnaissance of the study area was conducted during July 2021 (Winter) through a combination of unsystematic pedestrian and vehicular surveys that lasted one day (**Figure 5**). Slashed roads provided good access to all parts of the study area. It should also be noted that majority of the study area is associated with slashed grass that used to be cultivated fields. Visibility was therefore considered to be good. General site conditions were recorded via photographic record (**Figures 6 – 10**). Also, the site was inspected beforehand on Google Earth, historical aerial imagery and topographical maps in order to identify potential heritage remains (**Appendix A**). Ten potential sites (B01 – B10) were identified on historical topographical maps or aerial images and were visited during the survey (**Table 3 & Figure 5**). No additional sites were identified during the survey. It should be noted that the prefix '2528CA' is not used as a site reference due to the length of the name, but is recorded as such in **Tables 3 & 6**. The topographical datasets dating to 1939, 1965, 1975, 1995 and 2001, as

well as the historical aerial photographs dating to 1939, 1948, 1958 and 1964 proved useful in terms of providing an indication of the location and age of some of the structures and features associated with the study area, as well as to determine past land uses associated with the area. The total area surveyed was 63.5277 ha.

The reconnaissance of the area under investigation served a twofold purpose:

- To obtain an indication of heritage material found in the general area as well as to identify or locate archaeological sites on the area demarcated for development. This was done in order to establish a heritage context and to supplement background information that would benefit developers through identifying areas that are sensitive from a heritage perspective.

- All archaeological and historical events have spatial definitions in addition to their cultural and chronological context. Where applicable, spatial recording of these definitions were done by means of a handheld GPS (Global Positioning System) during the site visit.

Table 3: Site coordinates & description

Name	Off. Name	Latitude	Longitude	Description	Age	Current Status	ID Source
B01	2528CA-B01	-25.693293	28.071458	Building	Historic	Ruin	Aerial 1939
B02	2528CA-B02	-25.694579	28.071366	Building	Historic	Ruin	Aerial 1939
B03	2528CA-B03	-25.696839	28.069958	Building	Historic	Intact	Aerial 1939
B04	2528CA-B04	-25.690938	28.069763	Building	Historic	Ruin	Aerial 1948
B05	2528CA-B05	-25.695101	28.068776	Disturbance	Unknown	Demolished	Aerial 1939
B06	2528CA-B06	-25.689625	28.068329	Building	Historic	Demolished	Aerial 1958
B07	2528CA-B07	-25.689371	28.070923	Building	Historic	Intact	Aerial 1948
B08	2528CA-B08	-25.689791	28.069786	Building	Historic	Intact	Aerial 1948
B09	2528CA-B09	-25.694898	28.070414	Building	Historic	Ruin	Aerial 1948
B10	2528CA-B10	-25.697135	28.067358	Building	Historic	Intact	Aerial 1964

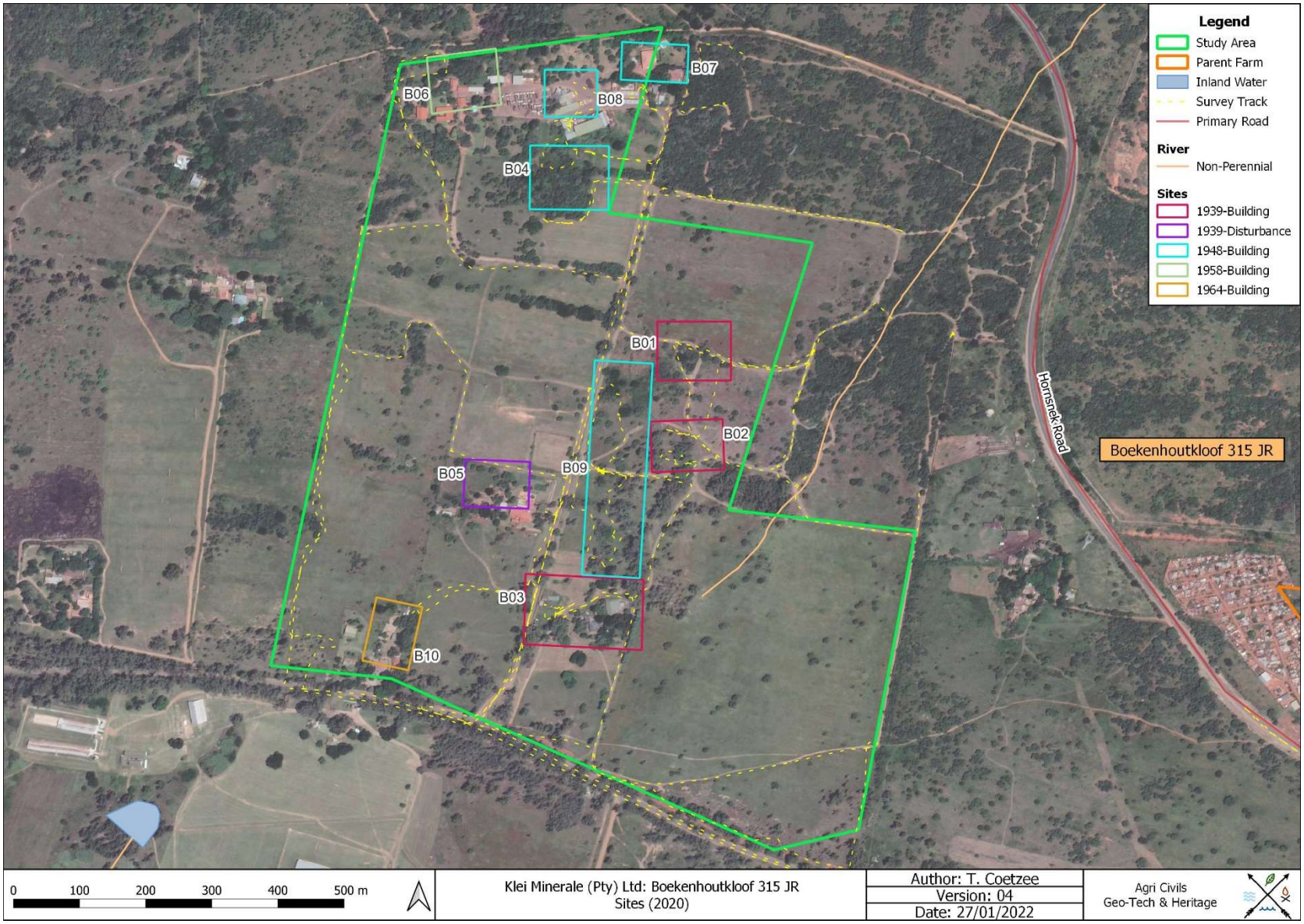


Figure 5: Study area with survey track indicated on a 2020 satellite image.

Figure 6: Slashed grass associated with the south-western section of the study area.

Figure 7: Slashed grass associated with the south-eastern section of the study area.

Figure 8: Slashed grass associated with the north-western section of the study area.

Figure 9: Brick wall along the northern and eastern boundary.

Figure 10: Previously cultivated fields.

4.1 Limitations

A small section of dense vegetation found in the north-western quadrant of the study area hampered access to some extent (**Figure 11**). This section also used to be associated with buildings in 1948 . The remaining areas, however, generally consisted of slashed grass that promoted visibility. No other access constraints were encountered.

It should be noted that the available farm portion boundaries differ from the registered farm portions as indicated by the Reg 2 (2) map (**Figure 2**). Since the spatial dataset for the registered boundaries are not available, the farm portions are omitted from the maps produced in this study.

Figure 11: Small section of dense vegetation in the north-western quadrant of the study area.

4.2 Sources of information

At all times during the survey, standard archaeological procedures for the observation of heritage resources were followed. As most archaeological material occur in single or multiple stratified layers beneath the soil surface, special attention was paid to disturbances; both man-made such as roads and clearings, and those made by natural agents such as burrowing animals and erosion. Locations of archaeological material remains were recorded by means of a Garmin Oregon 750 GPS. These sites, as well as the general conditions of the terrain, were photographed with a Sony Cyber-shot digital camera.

A literature study, which incorporated previous work done in the region, was conducted in order to place the study area into context from a heritage perspective.

4.2.1 Historical aerial and topographical maps

The historical aerial image dating to 1939 (**Appendix A: Figure 41**) shows a footpath interesting the northern section of the study area, as well as three areas associated with buildings and one area associated with a soil/vegetation disturbance. The majority of the area to the south of the footpath appears to be associated with cultivated fields. The 1939 topographical map (**Appendix A: Figure 42**) portrays the same buildings observed on the 1939 aerial image.

The 1948 aerial image (**Appendix A: Figure 43**) shows the presence of four additional areas associated with buildings, while the cultivated section expanded to the northwest. By 1958 (**Appendix A: Figure 44**), the extent of agricultural activities appears to have remained the same, while one additional area associated with buildings is noted in the north-western corner of the study area. The 1958 aerial image also shows the presence of the existing Hornsnek road and another gravel road at the same location as the existing northern boundary wall. The footpath appears to have no longer existed by 1958. Except for one additional building in the south-western

corner of the study area, the same features and land uses are indicated on the 1964 aerial image (**Appendix A: Figure 45**).

Between 1965 and 1975 (**Appendix A: Figures 46 & 47**), several additional buildings were constructed and the hut symbol was replaced by the symbol for a building. Diggings are also shown in the north-western corner of the study area. The majority of the cultivated fields are not indicated on the 1995 topographical map (**Appendix A: Figure 48**), while several new roads and buildings are shown. The 2001 topographical map (**Appendix A: Figure 49**) shows an increase in agricultural activity and the number of buildings.

4.2.2 Previous Heritage Studies

Fort West Phase 1 Development

An archaeological survey was done for the development of a mixed-use township on Portion 1 of the Farm Fort 646 JR within the Tshwane Metropolitan Municipality. The site is located south of the Daspoortrand, north of the suburb of Lotus Gardens and approximately 4.5 km south of the proposed prospecting concerned in this report. J. van Schalkwyk (2012) surveyed the study area and located seven stone-walled Late Iron Age sites consisting of settlement structures, cattle enclosures and several other smaller enclosures. According to Van Schalkwyk (2012), these sites can probably be linked to Tswana- or Ndebele speakers who settled in the area within the past 300 years. Other sites of heritage importance located in close vicinity are Fort Daspoort, built by the ZAR out of fear for British domination (Van Vollenhoven 1999), and Westfort Hospital, which was erected in 1898.

HIA on the Farm Hartbeeshoek 301 JR

The National Cultural History Museum (2002) conducted a Heritage Impact Assessment to identify graves on the Farm Hartbeeshoek 301 JR within the Akasia municipal area, Pretoria. The aim of the study was to identify graves within the road reserve of the Platinum Toll Highway. The study identified approximately 20 graves marked with stone cairns and a recommendation was made to relocate the graves. The identified graveyard was located about 6 km northeast of the area demarcated for the Klei Minerale (Pty) Ltd prospecting concerned in this study.

Extension of SABRIX Quarry

Dr R. C. de Jong (2002) conducted a Heritage Scoping Study as part of an EMP for the expansion of the SABrix quarry on Portion 19 of the Farm Boekenhoutkloof 315 JR, Pretoria. Portion 19 is located approximately 550 m west of the Klei Minerale (Pty) Ltd project area. According to De Jong (2002), the Farm Boekenhoutkloof originally belonged to the Zuid-Afrikaansche Republiek and was subsequently leased to Willem Hendrik Boshoff Jr. from 26 July 1859. During the 1860s, the farm was transferred to G. P. J. Horn. The original farmhouse was built by Horn to the northwest of the SABrix quarry and a farm school was later erected approximately in the middle of the property. In June 1892, Arthur H. Walker surveyed the entire farm for G. P. J. Horn and in March 1912, the farm was subdivided. During the survey, two heritage sites were identified: one ruin consisting of stone-walls and clay mortar dating to between 1930 and 1960, and one graveyard consisting of several graves (De Jong 2002).

5. Archaeological and Historical Remains

5.1 Stone Age Remains

No Stone Age archaeological remains were observed within the demarcated study area.

Stone Age artefacts are often associated with rocky outcrops or water sources. **Figures 12 – 14** are examples of stone tools often associated with the Early, Middle and Later Stone Age of southern Africa.

Archaeological studies done on the surrounding areas also did not locate material pertaining to the Stone Age.

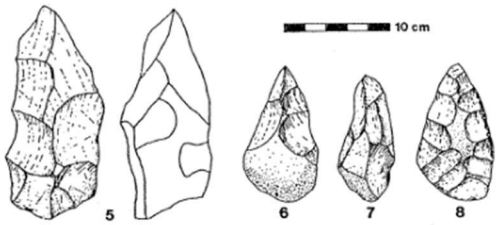


Figure 12: ESA artefacts from Sterkfontein (Volman 1984).

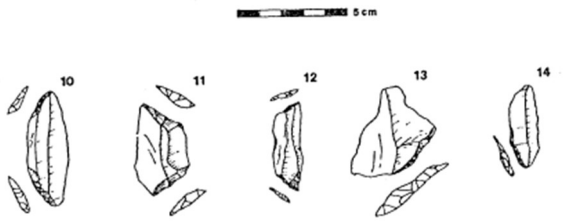


Figure 13: MSA artefacts from Howiesons Poort (Volman 1984).

Figure 14: LSA scrapers (Klein 1984).

5.2 Iron Age Farmer Remains

No Iron Age archaeological remains were observed within the demarcated study area.

The heritage study conducted by van Schalkwyk (2012) recorded several stone-walled enclosures belonging to the LIA in the vicinity of the Daspoortrand.

5.3 Historical

Ten sites (**Table 4**) potentially dating to the historic period were identified using a combination of historical topographical maps and aerial imagery.

Sites B01, B02 and B03 were identified as buildings on the 1939 aerial image and topographical map (**Appendix A: Figures 41 & 42**). Sites B01 and B02 are also visible on the remaining aerial datasets. However, Site B01 is indicated as a wind pump on the 1965 topographical map (**Appendix A: Figure 46**). By 1975 (**Appendix A: Figure 47**), both sites appear to have been demolished. No structures are visible on contemporary satellite imagery, but the site visit confirmed the presence of material culture. No building remains were observed at Site B01, but a circular cement water reservoir and water tank structure were noted (**Figure 15**). This suggests that the building as observed on the 1939 aerial image and topographical maps was demolished between 1939 and 1965, while the wind pump was constructed during the same period. The building remains at Site B02 consist of a building ruin constructed from brick, stone and mortar measuring 9 m X 4 m (**Figures 16 & 17**), as well as the foundation of a second building measuring 7 m X 4 m (**Figure 18**). Site B03 is still associated with several intact buildings including a residence, outbuildings, and a building ruin. Building material used in the construction of the buildings include stone, bricks and mortar (**Figures 19 – 22**).

Two sites consisting of building ruins, Site B04 and Site B09, were observed on the aerial image dating to 1948 (**Appendix A: Figure 43**). Site B04 is only visible on the 1948 aerial image and is not indicated on any of the topographical maps. The possibility, therefore, exists that the building was constructed between 1939 and 1948, but was demolished before 1958 (**Appendix A: Figure 44**). During the site visit, two structures were observed: an older building ruin constructed from a combination of stone and bricks (**Figure 23**), and a more recent building ruin constructed from bricks only (**Figure 24**). Site B09 appears as several buildings on the 1948 aerial image (**Appendix A: Figure 43**) and the 1965 topographical map (**Appendix A: Figure 46**), but is not indicated on the 1975 topographical (**Appendix A: Figure 47**). However, two buildings are shown on the 2001 topographical map (**Appendix A: Figure 49**). This suggests that the initial buildings were constructed between 1939 and 1948 and were demolished between 1965 and 1975. Two buildings were then constructed between 1995 and 2001 (**Appendix A: Figures 48 & 49**). **Figures 25 & 26** possibly indicate the ruins of the initial buildings, while **Figures 27 & 28** might indicate the more recent building ruins.

Site B05 was identified on the 1939 aerial image as a disturbance in the vegetation or soil (**Appendix A: Figure 41**). This may indicate the presence of historical infrastructure. However, the area associated with Site B05 has completely been disturbed by modern construction and no evidence of historical features or structures were observed during the survey (**Figure 29**).

Site B06, appearing on the 1958 aerial image as a building in the north-western corner of the study area (**Appendix A: Figure 44**), is also indicated as a hut on the 1965 topographical map (**Appendix A: Figure 46**) and as a building on the 1975 topographical map (**Appendix A: Figure 47**). The 1995 topographical map (**Appendix A: Figure 48**) no longer indicates the building, but another building is shown slightly to the south of the original building. By 2001 (**Appendix A: Figure 49**), several additional buildings are shown in the area. The original building, therefore, appears to have been demolished between 1958 and 1995. No building remains indicating the presence of historical structures were noted during the survey (**Figure 30**).

Sites B07 and B08 are associated with intact buildings near the northern boundary of the study area. Both sites were identified on the 1948 aerial image (**Appendix A: Figure 43**). Between 1948 and 2001, additional buildings also appear at these localities. Site B07 appears to consist of two residences (**Figures 31 & 32**), while Site B08 appears to be associated with two buildings, one of which is a store constructed from stone (**Figures 33 – 35**).

The intact building associated with Site B10 was first observed on the 1964 aerial image (**Appendix A: Figure 45**). The site, located near the south-western corner of the study area, is also shown on the 1965 topographical map as two buildings (**Appendix A: Figure 46**). Two buildings are also shown on the 1975 topographical map (**Appendix A: Figure 47**), while only one is shown on the 1995 topographical map (**Appendix A: Figure 48**). Several buildings, however, are shown on the 2001 topographical map (**Appendix A: Figure 49**). During the site visit, a building ruin and several intact buildings were observed (**Figures 36 & 37**). Some of the buildings associated with this site were therefore constructed between 1958 and 1964 and might therefore exceed 60 years of age.

Table 4: Historic Sites.

Name	Type	Status	Heritage	Extent (ha)
B01	Building	Ruin	Avoid	0.9
B02	Building	Ruin	Avoid	0.8
B03	Building	Intact	Avoid	1.7
B04	Building	Ruin	Avoid	1.0
B05	Disturbance	Demolished	Less sensitive	0.6
B06	Building	Demolished	Less sensitive	0.8
B07	Building	Intact	Avoid	0.5
B08	Building	Intact	Avoid	0.5
B09	Building	Ruin	Avoid	2.6
B10	Building	Intact	Avoid	0.6

The Heritage studies conducted by Van Vollenhoven (1999) and De Jong (2002) recorded heritage sites that date to the Historic Period.

Figure 15: Ruin at Site B01.

Figure 16: Building ruin associated with Site B02.

Figure 17: Interior of building ruin at Site B02.

Figure 18: Building foundation at Site B02.

Figure 19: Building at Site B03.

Figure 20: Partially restored building at Site B03.

Figure 21: Building ruin at Site B03.

Figure 22: Residence at Site B03.

Figure 23: Building ruin at Site B04.

Figure 24: Potentially modern building ruin at Site B04.

Figure 25: Building ruin at Site B09.

Figure 26: Building remains associated with Site B09.

Figure 27: Potentially historical ruin at Site B09.

Figure 28: Potentially modern building ruin at the southern boundary of Site B09.

Figure 29: Disturbance at Site B05.

Figure 30: Demolished building at Site B06.

Figure 31: Eastern building associated with Site B07.

Figure 32: Northern building associated with Site B07.

Figure 33: Northern building at Site B08 as seen from the northeast.

Figure 34: Northern building at Site B08 as seen from the southeast.

Figure 35: Southern building at Site B08 as seen from the southwest.

Figure 36: Building ruin associated with Site B10.

Figure 37: Intact building associated with Site B10.

5.4 Contemporary Remains

The study area is associated with several contemporary buildings, structures and residences (**Figures 38 & 39**).

The heritage studies conducted by the National Cultural History Museum (2002), De Jong (2002) and Van Schalkwyk (2012) do not mention contemporary sites.

Figure 38: Modern residence.

Figure 39: Existing modern SABRIX infrastructure.

5.5 Graves

No graves, cemeteries or burial sites were observed during the study.

The heritage studies conducted by the National Cultural History Museum (2002) and De Jong (2002) recorded cemeteries in the general study area.

6. Evaluation

The significance of an archaeological site is based on the amount of deposit, the integrity of the context, the kind of deposit and the potential to help answer present research questions. Historical structures are defined by Section 34 of the National Heritage Resources Act, 1999, while other historical and cultural significant sites, places and features, are generally determined by community preferences.

A fundamental aspect in the conservation of a heritage resource relates to whether the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. There are many aspects that must be taken into consideration when determining significance, such as rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and if appropriate mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed.

6.1 Field Ratings

All sites should include a field rating in order to comply with section 38 of the National Heritage Resources Act (Act No. 25 of 1999). The field rating and classification in this report are prescribed by SAHRA.

Table 5: Field Ratings.

Rating	Field Rating/Grade	Significance	Recommendation
National	Grade 1		National site
Provincial	Grade 2		Provincial site
Local	Grade 3 A	High	Mitigation not advised
Local	Grade 3 B	High	Part of site should be retained
General protection A	4 A	High/Medium	Mitigate site
General Protection B	4 B	Medium	Record site
General Protection C	4 C	Low	No recording necessary

Table 6: Individual site ratings.

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2528CA-B01	Building Ruin	General Protection B	4 B	Medium	Record site
2528CA-B02	Building Ruin	General Protection B	4 B	Medium	Record site
2528CA-B03	Intact Building	General Protection B	4 B	Medium	Record site
2528CA-B04	Building Ruin	General Protection B	4 B	Medium	Record site
2528CA-B05	Demolished Disturbance	General Protection C	4 C	Low	No recording necessary
2528CA-B06	Demolished Building	General Protection C	4 C	Low	No recording necessary
2528CA-B07	Intact Building	General Protection B	4 B	Medium	Record site
2528CA-B08	Intact Building	General Protection B	4 B	Medium	Record site
2528CA-B09	Building Ruin	General Protection B	4 B	Medium	Record site
2528CA-B10	Intact Building	General Protection B	4 B	Medium	Record site

7. Statement of Significance & Recommendations

7.1 Statement of significance

The study area: Several portions of the Farm Boekenhoutkloof 315 JR

As can be seen form heritage studies done in the surrounding areas, as well as the findings made in this study, the greater study area is considered to be significant from a heritage perspective. Locally, only historical buildings and structures were observed.

Two of the sites (B05, B06) have been demolished and are not considered to be significant from a heritage perspective. However, culturally significant material might be located at a subsurface level.

The sites consisting of building ruins (Sites B01, B02, B04, B09) are considered to be significant from a heritage perspective since these sites appear to exceed 60 years of age and are therefore protected under the NHRA (25 of 1999).

The remaining sites, consisting of intact buildings (Sites B03, B07, B08, B10), are considered to be significant from a heritage perspective since these buildings appear to exceed 60 years of age. It is unclear whether these buildings are the original buildings or have been demolished and rebuilt. Should these buildings, or any parts thereof, consist of the original buildings, it would be protected under the NHRA (25 of 1999).

Since water sources are often associated with human settlement, the non-perennial streams associated with the study area were buffered by 500 m. This buffer zone should be considered potentially sensitive from a heritage perspective (**Figure 40**).

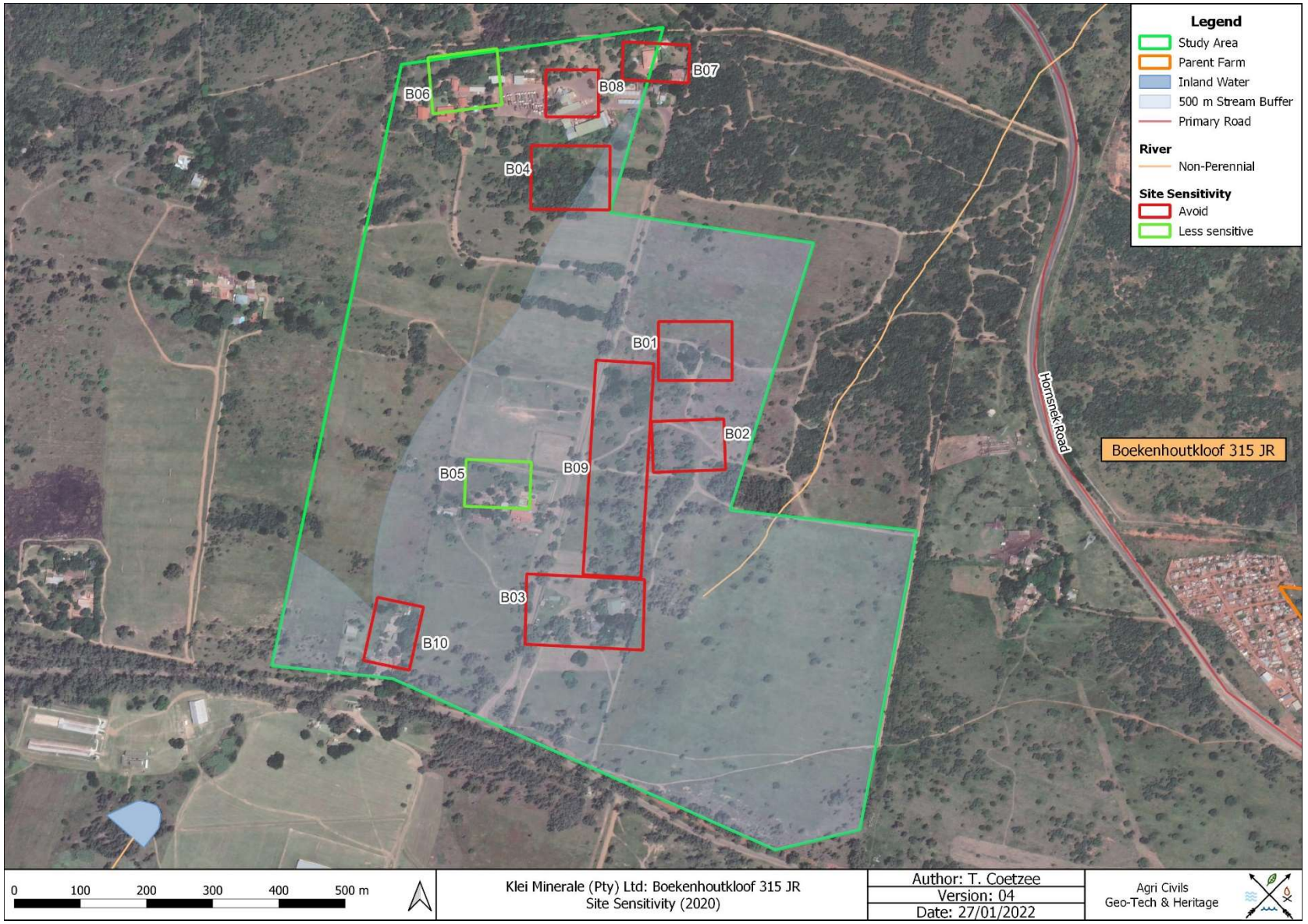


Figure 40: Heritage sites indicated on a 2020 satellite image.

7.2 Recommendations

The following recommendations are made in terms with the National Heritage Resources Act (25 of 1999) in order to avoid the destruction of heritage remains associated with the area demarcated for prospecting:

- Historical Site B05 used to be associated with a soil disturbance that might indicate the presence of historical infrastructure, while Site B06 used to be associated with buildings exceeding 60 years of age. Both sites, however, appear to have been demolished and are currently partially associated with modern infrastructure. Even though the original surface structures are no longer present, subsurface cultural material might exist at these sites and care should therefore be exercised during the proposed prospecting activities. Should culturally significant material be unearthed during the prospecting process, it is advised that a qualified archaeologist be contacted.

- Sites B01, B02, B03, B04, B07, B08, B09 and B10 consist of building ruins and intact buildings located on the same premises as historically identified buildings. The possibility therefore exists that these buildings/ruins, or parts thereof, might exceed 60 years age and should therefore be avoided by the proposed prospecting activities. Should this not be possible, a destruction permit from the provincial heritage authority will be required.

- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the prospecting phase, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during the course of the project, all activities must be suspended and the relevant heritage resources authority contacted (See National Heritage Resources Act, 25 of 1999 section 36 (6)).

- Should the need arise to expand the proposed project beyond the surveyed area outlined in this study, the following applies: A qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment on the sections beyond the demarcated area that will be affected by the development, in order to determine the occurrence and extent of any archaeological sites and the impact development might have on these sites.

- From a heritage point of view, the proposed prospecting may proceed, subject to the abovementioned conditions, recommendations and approval by the South African Heritage Resources Agency.

8. Addendum: Terminology

Archaeology:

The study of the human past through its material remains.

Artefact:

Any portable object used, modified, or made by humans; e.g. pottery and metal objects.

Assemblage:

A group of artefacts occurring together at a particular time and place, and representing the sum of human activities.

Context:

An artefact's context usually consist of its immediate *matrix* (the material surrounding it e.g. gravel, clay or sand), its *provenience* (horizontal and vertical position within the matrix), and its *association* with other artefacts (occurrence together with other archaeological remains, usually in the same matrix).

Cultural Resource Management (CRM):

The safeguarding of the archaeological heritage through the protection of sites and through selvage archaeology (rescue archaeology), generally within the framework of legislation designed to safeguard the past.

Excavation:

The principal method of data acquisition in archaeology, involving the systematic uncovering of archaeological remains through the removal of the deposits of soil and other material covering and accompanying it.

Feature:

An irremovable artefact; e.g. hearths or architectural elements.

Ground Reconnaissance:

A collective name for a wide variety of methods for identifying individual archaeological sites, including consultation of documentary sources, place-name evidence, local folklore, and legend, but primarily actual fieldwork.

Matrix:

The physical material within which artefacts is embedded or supported, i.e. the material surrounding it e.g. gravel, clay or sand.

Phase 1 Assessments:

Scoping surveys to establish the presence of and to evaluate heritage resources in a given area.

Phase 2 Assessments:

In-depth culture resources management studies which could include major archaeological excavations, detailed site surveys and mapping / plans of sites, including historical / architectural structures and features. Alternatively, the sampling of sites by collecting material, small test pit excavations or auger sampling is required.

Sensitive:

Often refers to graves and burial sites although not necessarily a heritage place, as well as ideologically significant sites such as ritual / religious places. *Sensitive* may also refer to an entire landscape / area known for its significant heritage remains.

Site:

A distinct spatial clustering of artefacts, features, structures, and organic and environmental remains, as the residue of human activity.

Surface survey:

There are two kinds: (1) unsystematic and (2) systematic. The former involves field walking, i.e. scanning the ground along one's path and recording the location of artefacts and surface features. Systematic survey by comparison is less subjective and involves a grid system, such that the survey area is divided into sectors and these are walked ally, thus making the recording of finds more accurate.

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Human Tissue Act No. 65 of 1983, Government Gazette, Cape Town

National Heritage Resource Act No.25 of 1999, Government Gazette, Cape Town

Removal of Graves and Dead Bodies Ordinance No. 7 of 1925, Government Gazette, Cape Town

Appendix A: Historical Aerial Photographs and Topographical Maps

Figure 41: The study area superimposed on a 1939 aerial image.

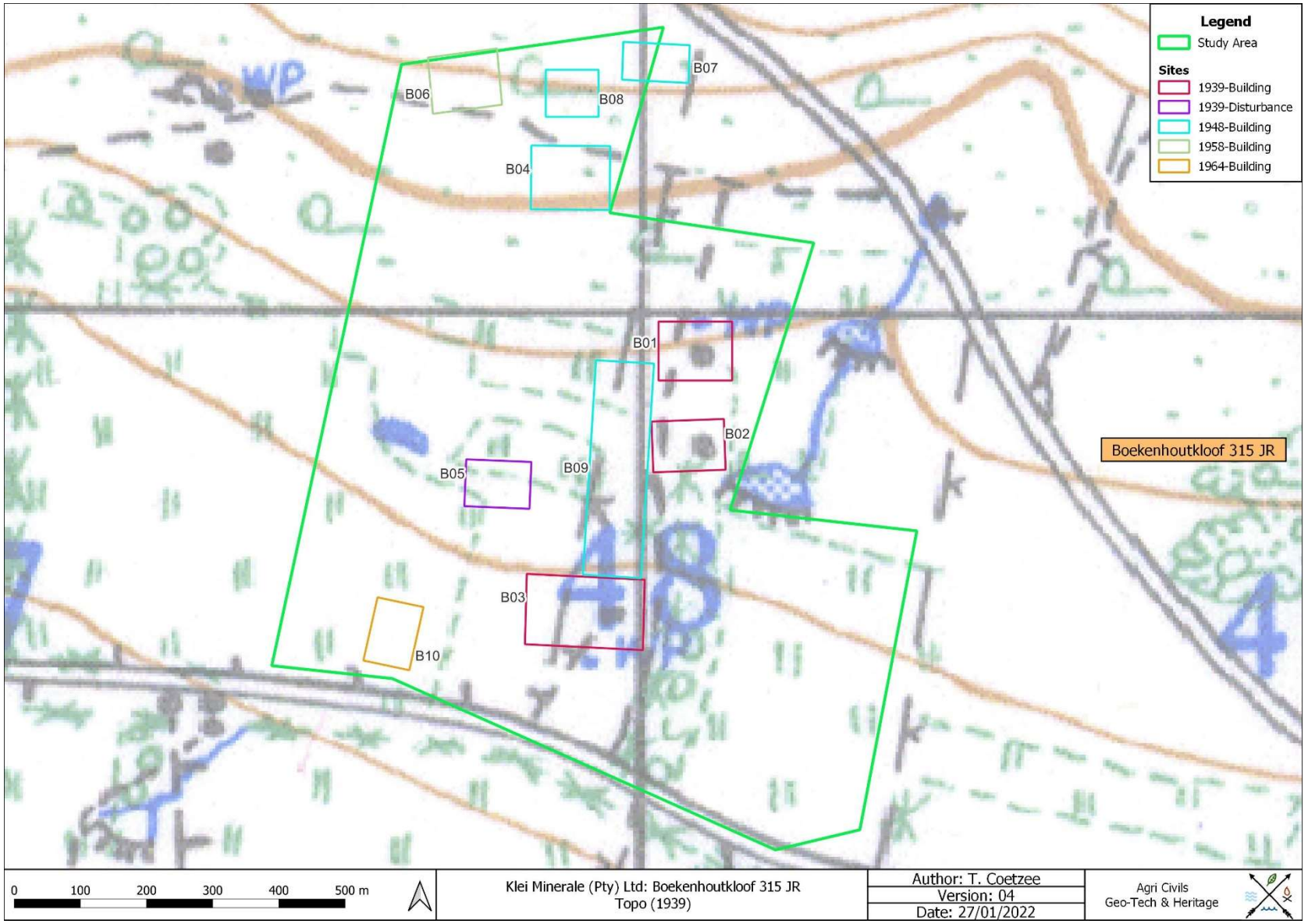

Figure 42: The study area superimposed on the 1939 1: 50 000 2528 CA topographical map.

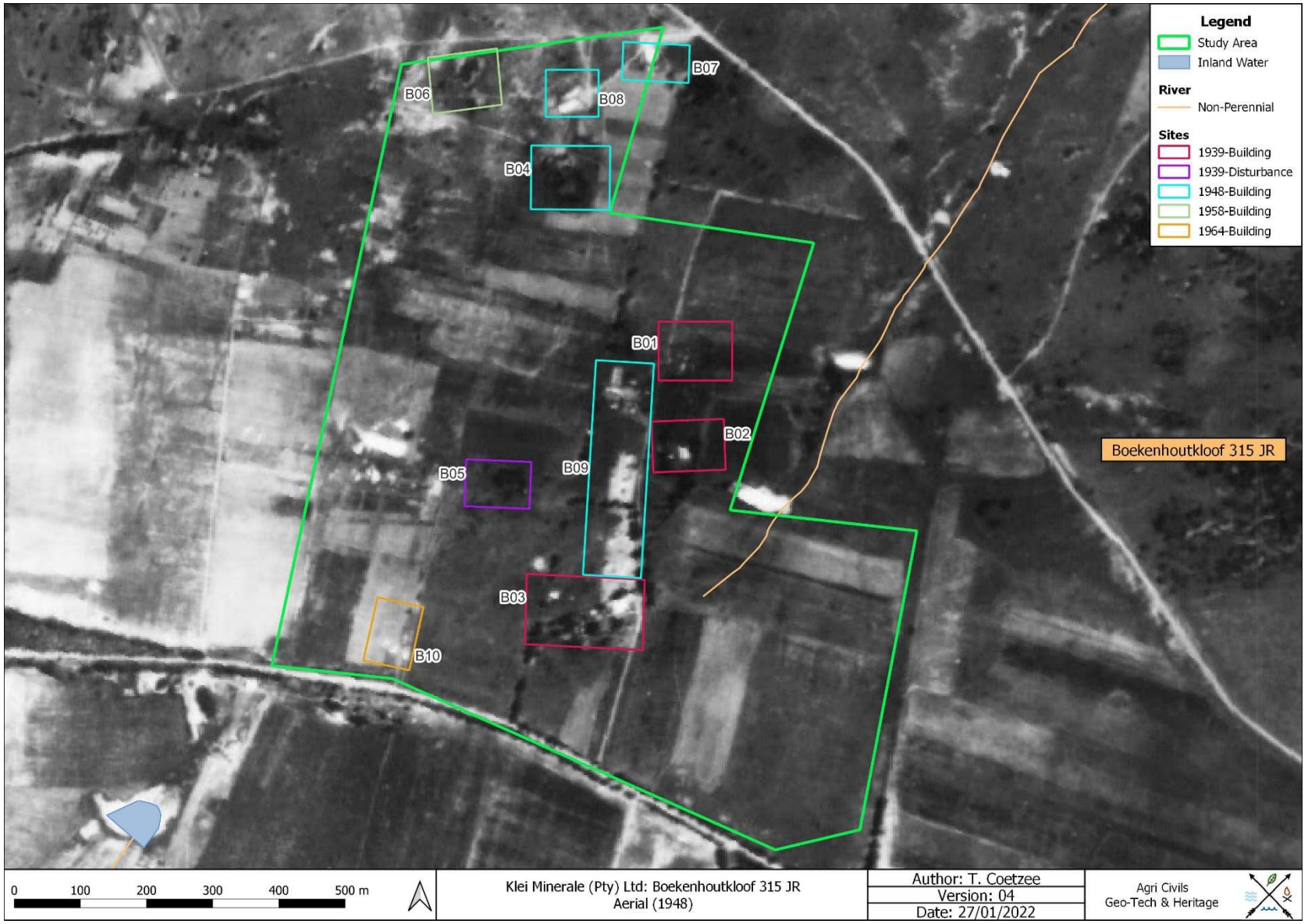

Figure 43: The study area superimposed on a 1948 aerial image.

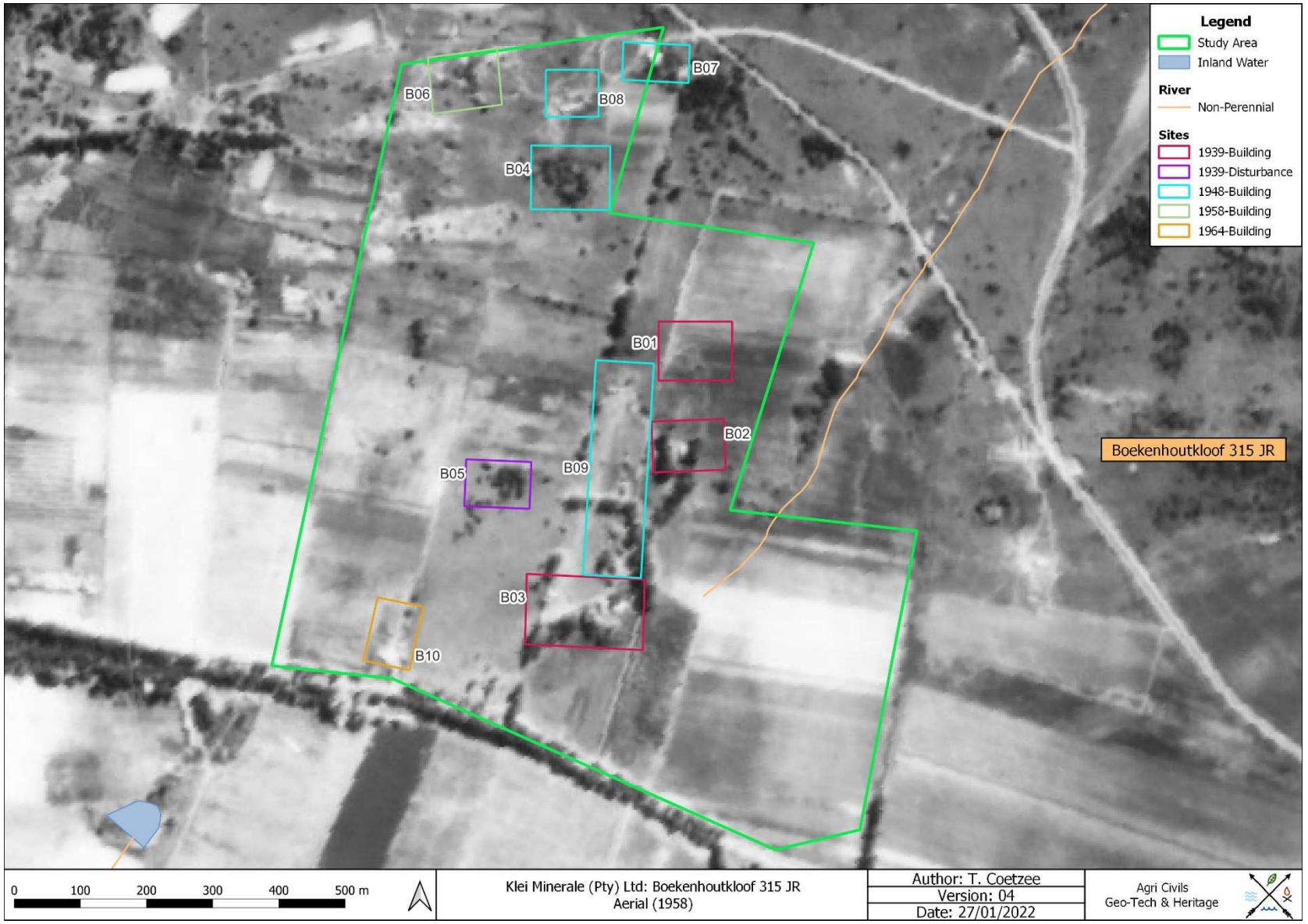

Figure 44: The study area superimposed on a 1958 aerial image.

Figure 45: The study area superimposed on a 1964 aerial image.

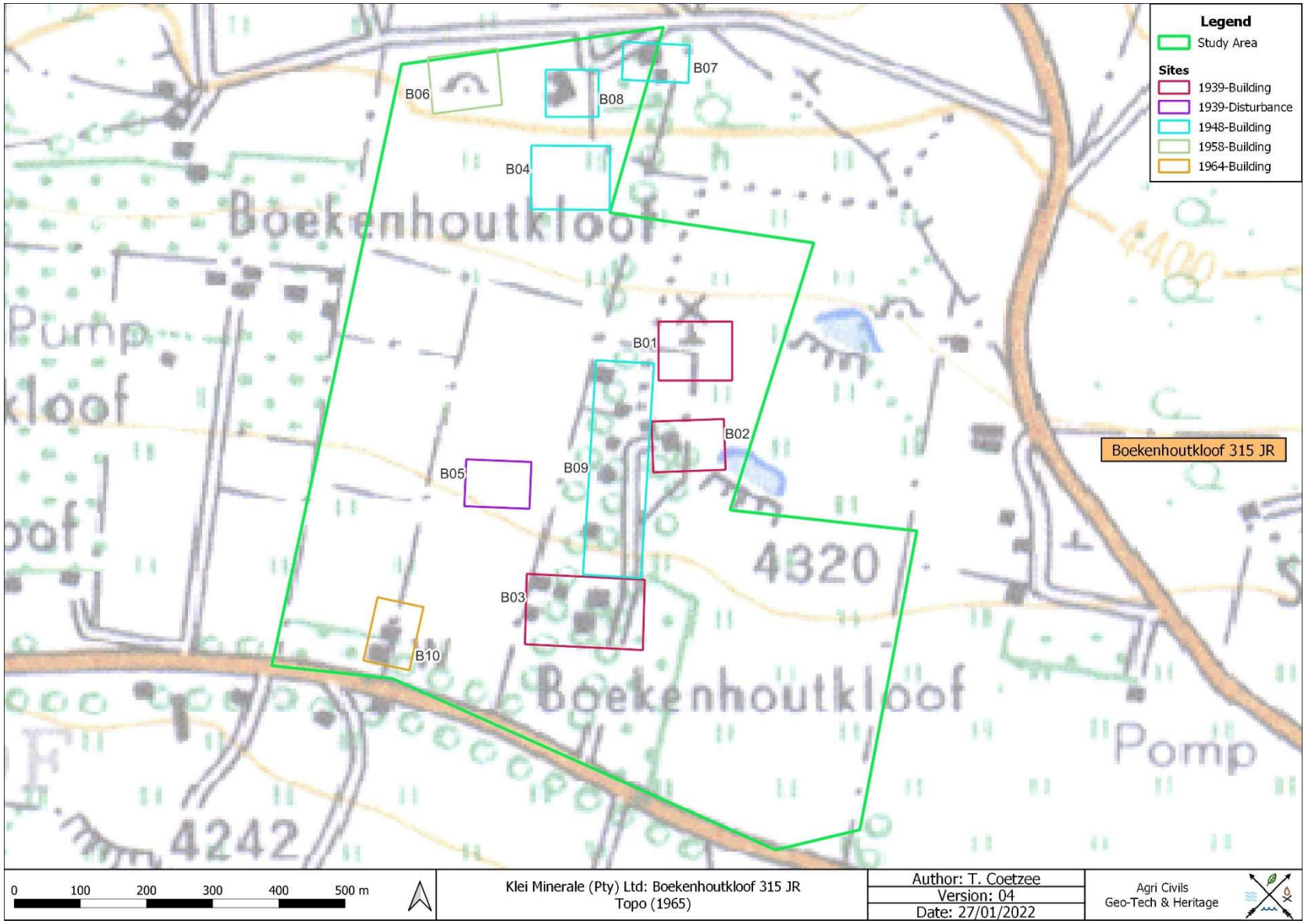

Figure 46: The study area superimposed on the 1965 1: 50 000 2528 CA topographical map.

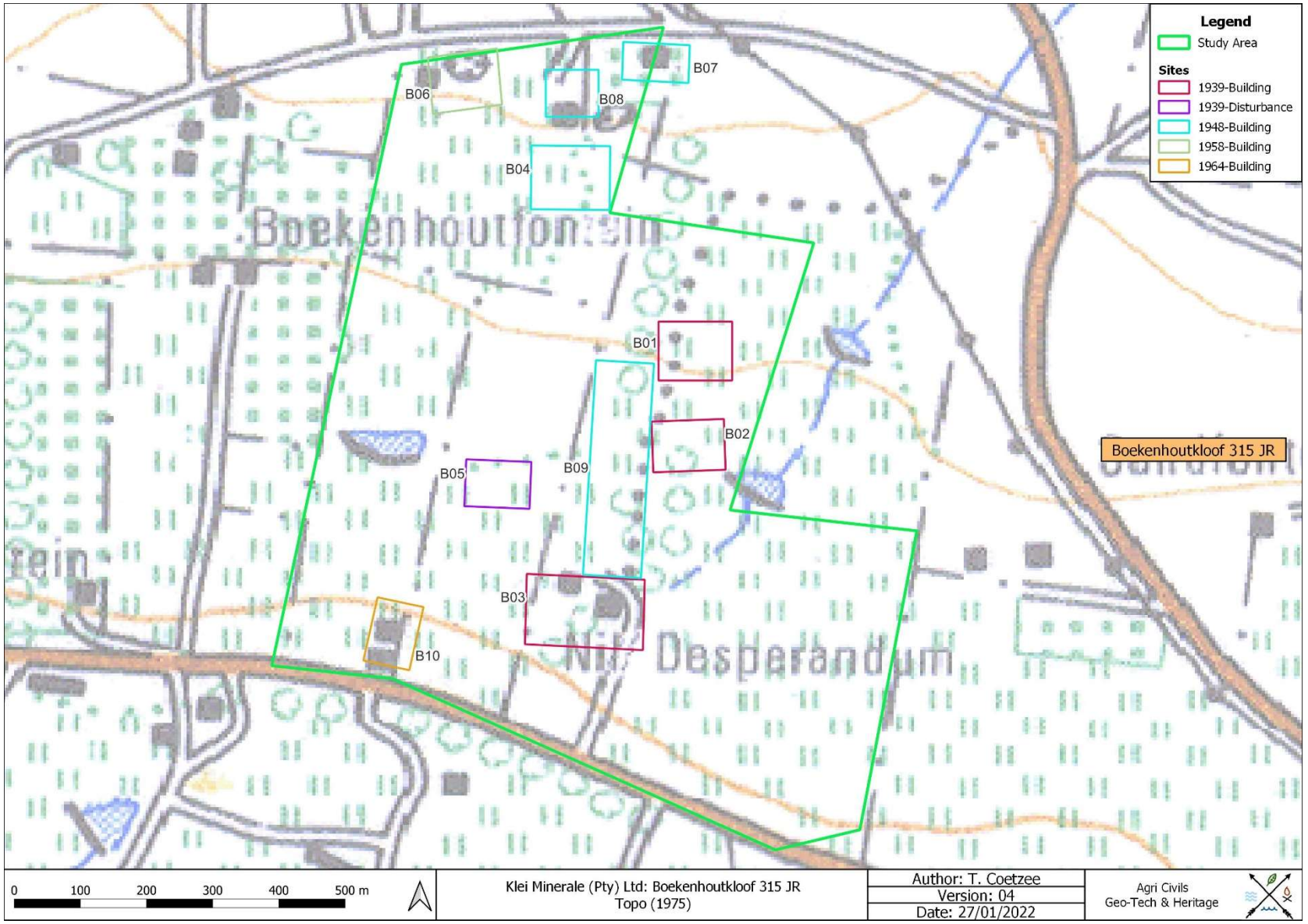

Figure 47: The study area superimposed on the 1975 1: 50 000 2528 CA topographical map.

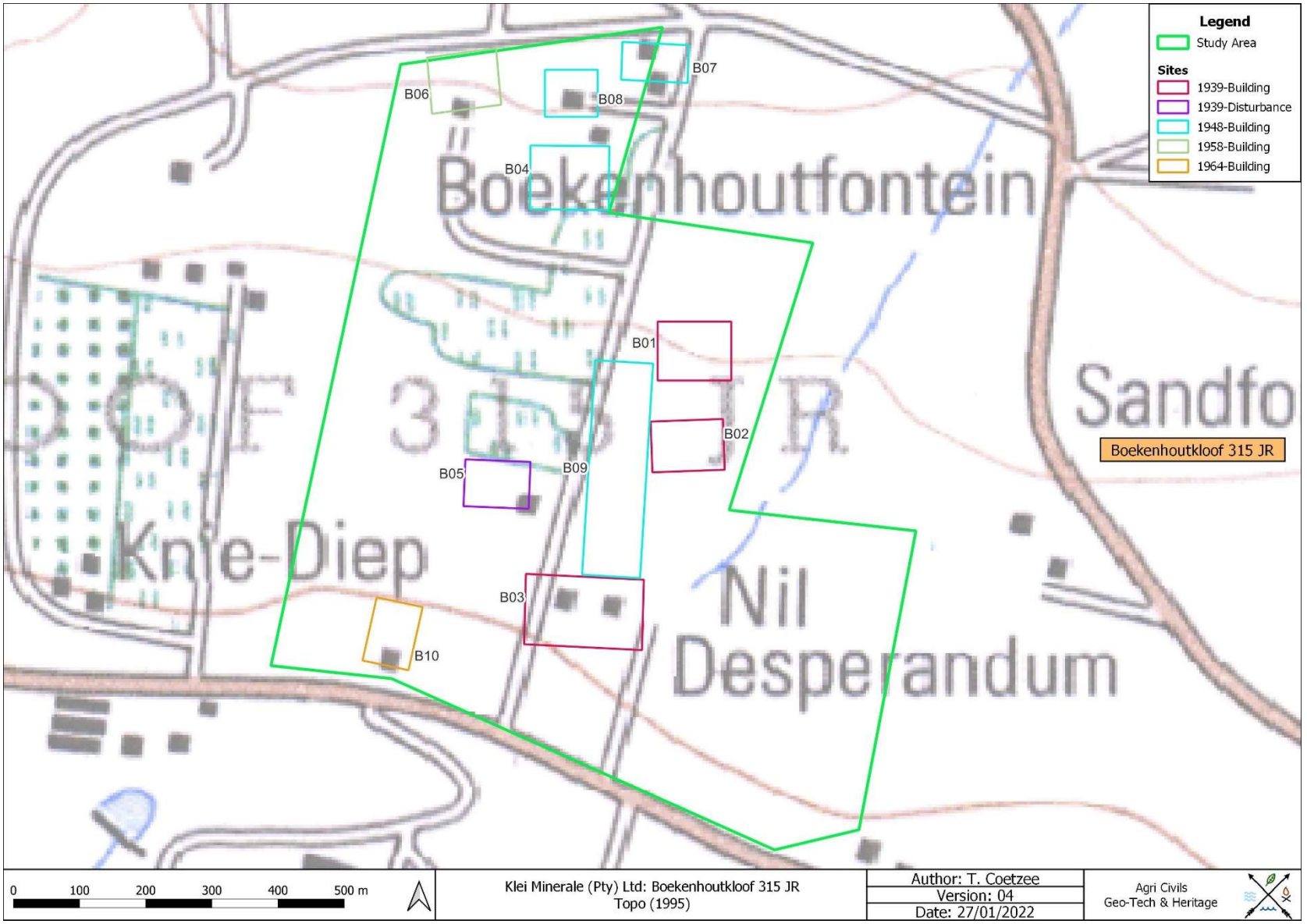

Figure 48: The study area superimposed on the 1995 1: 50 000 2528 CA topographical map.

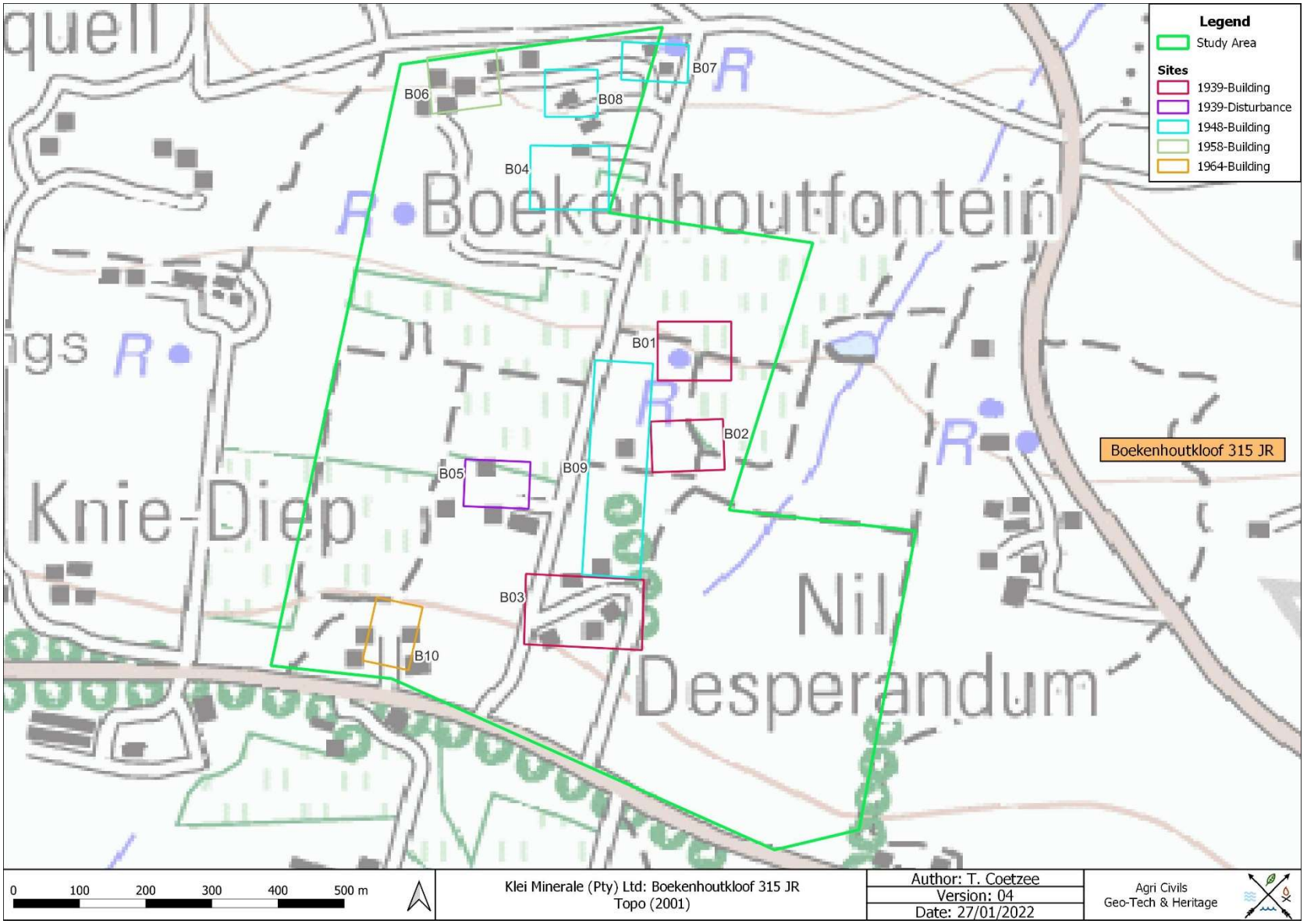

Figure 49: The study area superimposed on the 2001 1: 50 000 2528 CA topographical map.

Appendix B: NEMA Appendix 6

NEMA Specialist reports	
Item	**Section**
1. (1) A specialist report prepared in terms of these Regulations must contain—	
(a) details of-	
(i)the specialist who prepared the report; and	Cover, p2
(ii)the expertise of that specialist to compile a specialist report including a curriculum vitae;	Cover, p2, Appendix C
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	p2
(c) an indication of the scope of, and the purpose for which, the report was prepared;	1.1
(cA) an indication of the quality and age of base data used for the specialist report;	4
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	2.1, 2.2
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	4
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	4
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	4, 5
(g) an identification of any areas to be avoided, including buffers;	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;	p26, p46
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	4.1
(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]or activities;	5, 7
(k) any mitigation measures for inclusion in the EMPr;	7.2
(l) any conditions for inclusion in the environmental authorisation;	7.2
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	7.2
(n) a reasoned opinion—	
(i)[as to] whether the proposed activity, activities or portions thereof should be authorised	7.2
(iA) regarding the acceptability of the proposed activity or activities; and	7.2
(ii)if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	7.2
(o)a description of any consultation process that was undertaken during the course of preparing the specialist report;	N/A

NEMA Specialist reports	
Item	**Section**
(p)a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
(q)any other information requested by the competent authority.	Nothing received to date
(2) Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	Noted

Appendix C: Curriculum Vitae

Tobias Coetzee

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082 821 3104
Registered Professional Archaeologist, Association of Southern African Professional Archaeologists (ASAPA), CRM accredited, membership no: 289

Full names: Tobias Johannes Coetzee
Date of birth: 19 May 1986
Qualifications: MA (Archaeology)

Education:

2017	MA (Archaeology) University of Pretoria Dissertation: *Mapping Bokoni: Exploring Bokoni settlement choices and changes in Mpumalanga and Limpopo, South Africa using GIS site distribution analysis techniques*
2008	BA (Hons) (Archaeology) University of Pretoria Dissertation: *Mapping Bokoni towns & trade: Applying Geographic Information Systems to the articulation of Mpumalanga stonewalled sites with pre-colonial trade routes*
2006 – 2008	BA (Archaeology & Geography) University of Pretoria Subjects: Zulu, Afrikaans, Cartography, GIS and ArcGIS applications, Meteorology, Anthropology, Ancient History, Isotope Ecology and Dating, Computer and Information Literacy, Academic Skills and Introduction to research

Employment:

2020 – present	Heritage Practitioner Agri Civils Geo-Tech & Heritage
2013 – 2019	GIS Practitioner Bigen Group (Pty) Ltd
2013	Specialist consultant: Heritage Environmental Assurance (Pty) Ltd
2011	Junior lecturer in Archaeology at the University of South Africa (UNISA) at the department of Anthropology & Archaeology Primary lecturer for: The Prehistory of South Africa Assistant lecturer for: Applied Archaeology - Heritage Conservation
2009	Tutor Department of Anthropology & Archaeology, University of Pretoria

Conference papers, publications & Cultural Resources Management Reports:

Coetzee, T. 2020. *Conservation Management Plan for Cemetery 1 at the Kwagga North Mine, Middelburg, Mpumalanga*. Lydenburg: Agri Civils Geo-Tech & Heritage

Coetzee, T. 2020. *Conservation Management Plan for Cemetery 4 at the Kwagga North Mine, Middelburg, Mpumalanga*. Lydenburg: Agri Civils Geo-Tech & Heritage

Coetzee, T. 2020. *A Phase 1 Archaeological Impact Assessment for the Proposed Trentra Mining Development near Kriel, Mpumalanga*. Lydenburg: Agri Civils Geo-Tech & Heritage

Coetzee, T. 2020. *A Phase 1 Archaeological Impact Assessment for the Proposed Lakeside/Leeuwfontein Colliery Expansion near Ogies, Mpumalanga*. Lydenburg: Agri Civils Geo-Tech & Heritage

Coetzee, T. 2020. *A Phase 1 Archaeological Impact Assessment for the proposed Blesboklaagte Colliery near eMalahleni, Mpumalanga*. Lydenburg: Agri Civils Geo-Tech & Heritage

Coetzee, T. 2020. *Integrated Heritage Impact Assessment for The Proposed Buchuberg Resources Prospecting Right Project On Portion 1 Of The Farm Karoovlei 454; Portion 21 Of The Farm Elsie Erasmuskloof 158; Erf 624 In The Matzikama Local Municipality, West Coast District Municipality, Western Cape Province*. Pretoria

Coetzee, T. 2019. *Grave relocation report of Tlabane Mamoloko Mankge from Portion 2 of the Farm Diepgezet 18 JT, Mashishing, Mpumalanga*. Pretoria

Coetzee, T. 2019. *Conservation Management Plan for the Cemetery on the Farm Portions of the Proposed Bothashoek Mine, Pullens Hope, Mpumalanga*. Pretoria

Coetzee, T. 2019. *A Phase 1 Archaeological Impact Assessment for Rivanet Mining & Exploration on Several Portions of the Farm Palmietfontein 189 IP near Ventersdorp, North West*. Pretoria

Coetzee, T. 2019. *A Phase 1 Archaeological Impact Assessment for the Wildebeestfontein Colliery near Phola, Mpumalanga*. Pretoria

Coetzee, T. 2019. *A Phase 1 Archaeological Impact Assessment for the Weltevreden Colliery near Emalahleni, Mpumalanga*. Pretoria

Coetzee, T. 2019. *A Phase 1 Archaeological Impact Assessment for the Construction of Chicken Broiler Houses on a Portion of Portion 78 of the Farm Mezeg 77 JP, Zeerust, North West*. Pretoria

Coetzee, T. 2019. *A Phase 1 Archaeological Impact Assessment for South 32 on a Portion of the Farm Prinshof 2 IS near Ogies, Mpumalanga*. Pretoria

Coetzee, T. 2019. *Phase 1 Archaeological Impact Assessment for the Isiko Malt Grain Milling Plant on Pt 7 of the Farm Reydal 165 IQ, Krugersdorp, Gauteng*. Pretoria

Coetzee, T. 2019. *Heritage Scoping Report for the Development of Erf 96, Kilner Park, Pretoria, Gauteng*. Pretoria

Coetzee, T. 2019. *Archaeological Scoping Report for the Proposed Prospecting of Manganese, Baryte and Iron Ore on the Farm Vlak Fontein 433, Postmasburg, Northern Cape*. Pretoria

Coetzee, T. 2019. *Phase 1 Archaeological Impact Assessment for the Proposed Woestalleen/Noodhulp Coal Mining Project near Middelburg, Mpumalanga*. Pretoria

Coetzee, T. 2019. *Phase 1 Archaeological Impact Assessment for the Refurbishment of the Reception and Construction of a New Double Storey Office Extension at Sender Technology Park, Roodepoort, Gauteng*. Pretoria

Coetzee, T. 2019. *Conservation Management Plan for the Graveyards and Infrastructure on Portion 5 of the Farm Op Goedenhoop 205 IS, Mpumalanga*. Pretoria

Coetzee, T. 2018. *Conservation Management Plan for a Graveyard on Portion 5 of the Farm Van Dykspruit 431 JR, Mpumalanga*. Pretoria

Coetzee, T. 2018. *A Phase 1 Archaeological Impact Assessment for Environmental Assurance (Pty) Ltd for the Construction of the Mareesburg Haul Road near Boschfontein, Mpumalanga*. Pretoria

Coetzee, T. 2018. *Phase 1 Archaeological Impact Assessment for the proposed Gulf service station on erf 10742, Umhlathuze Village, Empangeni, KwaZulu-Natal*. Pretoria

Coetzee, T. 2018. *A Phase 1 Archaeological Impact Assessment for the Proposed Tala Bethal Coal Project Between Hendrina and Bethal, Mpumalanga*. Pretoria

Coetzee, T. 2018. *A Phase 1 Archaeological Impact Assessment for the Proposed Diep Vaalbank Coal Project Between Hendrina and Bethal, Mpumalanga*. Pretoria

Coetzee, T. 2018. *A Phase 1 Archaeological Impact Assessment for the Expansion of the Kleinfontein Colliery Between Hendrina and Bethal, Mpumalanga*. Pretoria

Coetzee, T. 2018. *Grave Relocation Report for the Jeremiah Nyathi Grave from Portion 7 of the Farm Enkeldedoorns 35 JT, Lydenburg, Mpumalanga*. Pretoria

Coetzee, T. 2017. *Phase 1 Archaeological Impact Assessment for M² Environmental Connections (Pty) Ltd for the proposed Township Blue Hills Ext. 77 on the Farm Blue Hills 397 JR, Midrand, Gauteng.* Pretoria

Coetzee, T. 2017. *A Phase 1 Archaeological Impact Assessment for the Proposed Witbank Siding on erf 5197 and portions of portion 2, 144, 150, 219 and 244 of the Farm Blesboklaagte 296 JS, Emalahleni, Mpumalanga.* Pretoria

Coetzee, T. 2017. *Heritage Management Plan for Sedibeng Iron Ore Mine on Annex Taaibosch 1, Portion 3 and the RE of Farm 445 Postmasburg, Northern Cape.* Pretoria

Coetzee, T. 2017. *A Phase 1 Archaeological Impact Assessment for the Emfuleni Local Municipality landfill development on a Portion of Portion 178 of the Farm Vlakfontein 546 IQ, Vereeniging, Gauteng.* Pretoria

Coetzee, T. 2017. *A Phase 1 Archaeological Impact Assessment for Environmental Assurance (Pty) Ltd on a portion Intersecting Portions 19, 22 and 29 of the Farm Kennedy's Vale 361 KT, Steelpoort, Limpopo Province.* Pretoria

Coetzee, T. 2017. *A Phase 1 Archaeological Impact Assessment for Environmental Assurance (Pty) Ltd on erf 1 of Masehlaneng and erf 1480 of Sekgakgapeng, Mokopane, Limpopo.* Pretoria

Coetzee, T. 2017. *A Phase 1 Archaeological Impact Assessment for Environmental Assurance (Pty) Ltd on two portions of Portion 6 of the Farm Mareesburg 8 JT, Steelpoort, Limpopo*. Pretoria

Coetzee, T. 2017. *A Phase 1 Archaeological Impact Assessment for Environmental Assurance (Pty) Ltd for the construction of a powerline to supply electricity to a Vodacom tower between Roossenekal and Mashishing, Mpumalanga.* Pretoria

Coetzee, T. 2017. *Phase 1 Archaeological Impact Assessment for Eco Elementum (Pty) Ltd for the proposed expansion of the Moeijelyk Chrome Mine on the remaining extent of the Farm Moeijelijk 412 KS, Sekhukhune, Limpopo.* Pretoria

Coetzee, T. 2017. *Phase 1 Archaeological Impact Assessment for M² Environmental Connections (Pty) Ltd for the proposed Service Station on a portion of Portion 836 of the Farm Knopjeslaagte 385 JR, Centurion, Gauteng*. Pretoria

Coetzee, T. 2017. *Limited Phase 1 AIA for Diepsoils Investments (Pty) Ltd on a portion of Portion 5 of the Farm Kalabasfontein 232 IS and a portion of Portion 10 of the Farm Rietkuil 224 IS, Bethal, Mpumalanga*. Pretoria

Coetzee, T. 2017. *Phase 1 Archaeological Impact Assessment for the proposed opencast mining and initial site areas of the Northern and Southern Clusters of the Bauba Platinum Farms Mining Project, Sekhukhune, Limpopo.* Pretoria

Coetzee, T. 2016. *Phase 1 Archaeological Impact Assessment for Vunene Mining (Pty) Ltd on a portion of portion 6 of the Farm Jan Hendriksfontein 263 IT and a portion of the Farm Transutu 257 IT, Ermelo, Mpumalanga.* Pretoria

Coetzee, T. 2016. *Phase 1 Archaeological Impact Assessment for I-Cat (Pty) Ltd on a Portion of Portion 25 of the Farm Vlakfontein 523 JR, Bronkhorstspruit, Gauteng.* Pretoria

Coetzee, T. 2016. *Phase 1 AIA & Scoping for Yoctolux Collieries (Pty) Ltd on Portions 13 & 16 of the Farm Mooifontein 109 IT, Ermelo, Mpumalanga.* Pretoria

Coetzee, T. 2016. *Phase 1 Archaeological Desktop Study for Eco Elementum (Pty) Ltd on a portion of the remaining portion of the Farm Dingwell 276 JT, White River, Mpumalanga.* Pretoria

Coetzee, T. 2016. *Phase 1 Archaeological Impact Assessment for Eco Elementum (Pty) Ltd on a Portion of Portion 9 of the Farm Goedvertrouwd 499 JR, Emalahleni.* Pretoria

Coetzee, T. 2015. *Conservation Management Plan for Vunene Mining Usutu Colliery on Portion 3 and 4 of the farm Jan Hendriksfontein 263 IT, Ermelo, Mpumalanga.* Pretoria

Coetzee, T. 2015. *Phase 1 Archaeological Impact Assessment for Millsell Chrome Mine on a portion of portion 410 of the farm Waterkloof 305 JQ, Rustenburg, North West.* Pretoria

Coetzee, T. 2015. *Phase 1 Archaeological Impact Assessment for Eco Elementum (Pty) Ltd on a portion of the remaining extent of the farm Moeijelik 412 KS, Sekhukhune, Limpopo.* Pretoria

Coetzee, T. 2015. *Phase 1 Archaeological Impact Assessment for Vus'ithemba Project Solutions CC on a portion of the remaining extent of the farm Witklip 388 KR, Modimolle, Limpopo.* Pretoria

Coetzee, T. 2015. *Phase 1 Archaeological Impact Assessment for Rock Environmental Consulting (Pty) Ltd on a portion of Portion 74 of the Farm Rietkol 237 IR, Delmas, Mpumalanga.* Pretoria

Coetzee, T. 2015. *Phase 1 Archaeological Impact Assessment for Eco Elementum (Pty) Ltd on a portion of Portion 1 of the farm Vygenhoek 10 JT - Mpumalanga.* Pretoria

Coetzee, T. 2014. Bokoni from Above: Using Geographical Information Systems to discover settlement patterns and migrations. Poster presented at the SAFA/PAA Congress, Johannesburg, July 2014.

Coetzee, T. 2014. *Phase 1 Archaeological Impact Assessment for Eco Elementum (Pty) Ltd on a Portion of Portion 11 of the Farm Driefontein 297 JS, eMalahleni.* Pretoria

Coetzee, T. 2014. *Phase 1 Archaeological Impact Assessment for Eco Elementum (Pty) Ltd on Portion 7, a portion of Portion 3 of the Farm Rietspruit 437 IS - Mpumalanga.* Pretoria

Coetzee, T. 2014. *A Phase 1 Archaeological Impact Assessment for the proposed Kebrafield (Pty) Ltd open cast coal mine on Portion 17 of the farm Roodepoort 151 IS, Pullens Hope, Mpumalanga.* Pretoria

Coetzee, T. 2014. *Phase 1 Archaeological Impact Assessment for Environmental Assurance (Pty) Ltd on Portion 43, a portion of Portion 16 of the Farm Rooidraai 34 JT - Mpumalanga.* Pretoria

Coetzee, T. 2014. *Phase 1 Archaeological Impact Assessment for Environmental Assurance (Pty) Ltd on the area demarcated for the development of Argent Siding near Delmas, Mpumalanga.* Pretoria

Coetzee, T. & George, L. 2013. *Archaeological Impact Assessment for Assmang Limited – Black Rock Mine Operations on Erf 5529, a portion of Erf 01 Kuruman.* Pretoria

Coetzee, T. & George, L. 2013. *A Phase 1 Archaeological Impact Assessment for the proposed mining on portions 3, 8, 19, and the remaining extent of the Farm Mamatwan 331, Northern Cape Province.* Pretoria

Coetzee, T. & George, L. 2013. *A Phase 1 Archaeological Impact Assessment for the proposed Yoctolux (Pty) Ltd open cast coal mine on Portion 38 of the farm Elandspruit 291 JS, district Middelburg, Mpumalanga.* Pretoria

Coetzee, T. 2012. *Phase 1 AIA for the proposed Medium Density Fibre plant on portion 60 of the farm Lothair 124 IT, Mpumalanga.* Pretoria: ENVASS Pty. Ltd.

Coetzee, T. 2012. *Phase 1 AIA for the proposed mining of sand and clay from the remaining portion of the Farm Papkuilfontein 469 JR, Mpumalanga.* Pretoria: ENVASS Pty. Ltd.

Coetzee, T. 2012. *Archaeological Scoping Report for the Proposed Prospecting for Iron Ore and Manganese Ore for Amari Manganese (Pty) Ltd on the Farms Constantia 309, Simondium 308 and Portions 1,2, 3 and 8 of the Farm Goold 329 in the Vicinity of District Municipality: Kgalagadi Northern Cape Province, South Africa.* Pretoria: ENVASS Pty. Ltd.

Coetzee, T. & Schoeman, A. 2011. Mapping Trade in Bokoni. *The Digging Stick 28 (1): 7-9.*

Coetzee, T. 2010. *Comments on Bokoni settlement pattern and its geographical relationship to pre-colonial trade routes in Mpumalanga.* Paper presented at the Five Hundred Year Initiative (FYI), Johannesburg, October 2010.

Coetzee, T. 2010. *Mapping Bokoni: Applying Geographic Information Systems to the articulation of Mpumalanga stonewalled sites with pre-colonial trade routes.* Paper presented at the SAFA/PAA Congress, Dakar, November 2010.

Kruger, N. & Coetzee, T. 2010. Phase 1 Archaeological Impact Assessment of the demarcated surface areas Bantu Bonke, located on the farm Panfontein 437 IR, Gauteng Province. Pretoria: AGES Pty. Ltd.

Kruger, N. & Coetzee, T. 2010. Phase 1 Archaeological Impact Assessment of the demarcated surface areas at Rooderand, Northwest Province. Pretoria: AGES Pty. Ltd

References:

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