

PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT

For

**The Proposed Trentra Mining
Development near Kriel,
Mpumalanga**

Author ©:

Tobias Coetzee, MA (Archaeology) (UP)

September 2020

A Phase 1 Archaeological Impact Assessment for the Proposed Trentra
Mining Development near Kriel, Mpumalanga

For: Eco Elementum (Pty) Ltd
442 Rodericks Rd
Lynnwood
Pretoria
0081

Report No: 19-976-AUTH

Version: 2

Email: tobias.coetzee@gmail.com

I, Tobias Coetzee, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Trentra 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: 11 September 2020

Executive Summary

The author was appointed by Eco Elementum (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for the proposed Trentra coal mining development on the Remaining Extent of the Farm Vlaklaagte 45 IS near Kriel in the Mpumalanga Province. The proposed mining project is located towards the western border of Mpumalanga with several mining activities in the general surroundings. Surrounding towns include Kriel 15 km to the southwest, Ogies 36 km to the west-northwest, eMalahleni 35 km to the north-northwest and Hendrina 39 km to the east. The aim of the study is to determine the scope of archaeological resources that could be impacted on by the proposed Trentra coal mining development.

Due to no visible heritage material exceeding 60 years within the area demarcated for development and subject to adherence of the recommendations and approval by SAHRA, the proposed mining project may continue. Should skeletal remains be exposed during development and construction phases, 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 development, all activities must be suspended pending further investigation by a qualified archaeologist.

Table of Contents

Executive Summary	3
1. Project Background	6
1.1 Introduction	6
1.2 Legislation.....	8
1.2.1 The EIA and AIA processes	8
1.2.2 Legislation regarding archaeology and heritage sites	9
2. Study Area and Project Description	12
2.1 Location & Physical Environment.....	12
2.2 Project description.....	13
3. Archaeological Background	17
3.1 The Stone Ages	17
3.2 The Iron Age & Later History.....	18
3.2.1 The South African War	19
3.2.2 Coal mining general history near eMalahleni	19
4. Methodology	21
4.1 Sources of information	25
4.1.1 Previous Heritage Studies.....	25
4.2 Limitations	26
5. Archaeological and Historical Remains	26
5.1 Stone Age Remains	26
5.2 Iron Age Farmer Remains	26
5.3 Historical	26
5.4 Contemporary Remains	26
5.5 Graves & Burial Sites	26
6. Evaluation	27
6.1 Field Ratings	27
7. Statement of Significance & Recommendations	28
7.1 Statement of significance	28
7.2 Recommendations	28
8. Addendum: Terminology	29
9. References	30
Appendix A: Historical Topographical Maps	A

List of Figures

Figure 1: Regional and Provincial location of the study area.	7
Figure 2: Segment of SA 1: 50 000 2629AB indicating the study area.	15
Figure 3: Proposed site layout (Adapted from Eco Elementum 2020).	16
Figure 4: Proposed mining block with survey track on a 2019 aerial backdrop.....	22
Figure 5: Proposed mining block as seen from the western boundary.	23
Figure 6: Proposed mining block as seen from the north.....	23
Figure 7: Jeep track along the southern boundary of the proposed mining block.	24
Figure 8: Proposed mining block as seen from the west.....	24
Figure 9: Study area superimposed on a 1962 topographical map.....	B
Figure 10: Study area superimposed on a 1984 topographical map.....	C
Figure 11: Study area superimposed on a 1996 topographical map.....	D

List of Tables

Table 1: Property name & coordinates	12
Table 2: Proposed development and approximate extents.....	14
Table 4: Field Ratings	27

1. Project Background

1.1 Introduction

The author was appointed by Eco Elementum (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for the proposed Trentra mining development on the Remaining Extent of the Farm Vlaklaagte 45 IS near Kriel in the Mpumalanga Province (**Figures 1 & 2**). The proposed mining development is located towards the western border of Mpumalanga, with several mines operating in the general vicinity. Surrounding towns include Kriel 15 km to the southwest, Ogies 36 km to the west-northwest, eMalahleni 35 km to the north-northwest and Hendrina 39 km to the east. 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 on by the proposed mining development, 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.

In the following report, I discuss the implication for the mining of coal on the demarcated portion intersecting the Remaining Extent of the Farm Vlaklaagte 45 IS with regard to heritage resources. The demarcated portion is rectangular in shape, measures approximately 5 ha and is located towards the centre of the Farm Vlaklaagte 45 IS. 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 development and construction phases within the demarcated study area.

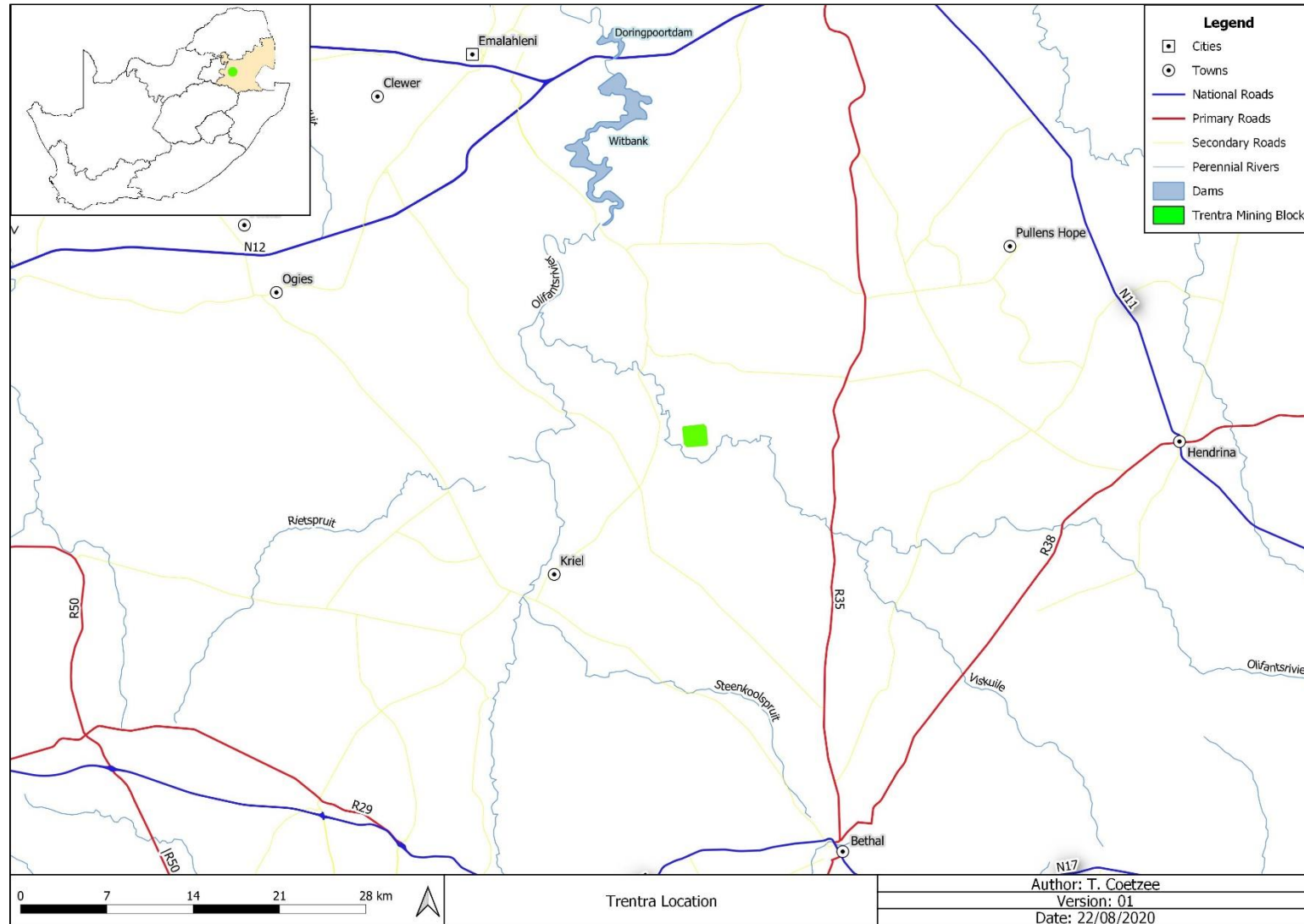


Figure 1: Regional and Provincial location of the study area.

1.2 Legislation

The South African Heritage Resources Agency (SAHRA) 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 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.

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 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 Trentra project study area is situated between Ogies and Hendrina and intersects the Remaining Extent of the Farm Vlaklaagte 45 IS (**Table 1**)

Table 1: Property name & coordinates

Property	Portion	Map Reference (1:50 000)	Lat	Lon	Parcel Size (ha)
Vlaklaagte 45 IS	RE	2629 AB	-26.154649	29.363996	422.9

The closest town to the study area is Kriel, located 15 km to the southwest. eMalaheni is located roughly 35 km to the north-northwest, Ogies 36 km to the west-northwest and Hendrina 39 km to the east of the proposed mining project (**Figures 1 & 2**). The study area falls within the Nkangala District Municipality and the eMalaheni Local Municipality in the Mpumalanga Province. The Steve Tshwete Local Municipality is located roughly 3 km northeast of the study area. In terms of vegetation, the study area falls within the Grassland Biome, Mesic Highveld Grassland Bioregion and the Eastern Highveld Grassland vegetation unit. The Grassland Biome covers approximately 28% of South Africa (Mucina & Rutherford 2006). This vegetation unit's conservation status is considered to be endangered with a conservation target of 24%. Only a small portion is conserved in statutory and private reserves. Eastern Highveld Grassland consists of the plains between Belfast in the east and the eastern side of Johannesburg in the west and also extends towards Bethal, Ermelo and to the west of Piet Retief. This vegetation type is associated with slightly to moderately undulating planes and includes low hills and pan depressions. The general vegetation is short dense grassland with small, scattered rocky outcrops and some woody species. About 44% of this vegetation unit has been transformed by cultivation, plantations, mines,

urbanisation and the building of dams. Although no serious alien invasions are reported, *Acacia mearnsii* may become dominant in disturbed areas. Erosion associated with this vegetation unit is low (Mucina & Rutherford 2006).

The average elevation for Eastern Highveld Grassland ranges from 1520 to 1780 MASL (Mucina & Rutherford 2006). The average elevation of the project area is 1592 MASL and slopes from the slightly more elevated northern side towards the lower southern section.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 693 mm per year. The average annual temperature is 15.4 °C. The average summer temperature is 20.1 °C, while the average winter temperature averages 8.7 °C (Climate-data.org accessed 22/08/2020).

The study area falls within the B11B Quaternary Catchment that forms part of the Upper Olifants Water Management Area. The closest perennial river to the study area is the Olifants River that flows 1.1 km to the southwest of the study area.

When the surrounding environment is considered, the general study area is associated with agricultural activity with mining occurring to the south, southwest, north and east. Access to the proposed mining block (**Figure 2**) is via an existing jeep track along the southern boundary of the demarcated portion.

On a local scale, the proposed mining block is located within a cultivated maize field.

Historical topographical maps (**Appendix A**) show the proposed mining block to be a cultivated field since at least 1962. The 1984 topographical map shows the presence of several structures to the south of the proposed mining block and a footpath leading to buildings further to the northeast. The 1996 topographical map, however, indicates that the structures have been demolished.

2.2 Project description

Trentra (Pty) Ltd plans to obtain a mining right for the proposed mining activities on a portion of the Remaining Extent of the Farm Vlaklaagte 45 IS belonging to Dorstfontein Coal Mines (Pty) Ltd (**Table 1**) in the vicinity of Kriel near the western border of the Mpumalanga Province. The proposed mining block and the associated layout is indicated on **Figures 2 & 3**. The proposed mining development entails the mining of bituminous coal found in the coal seams of the Witbank Coal Field. The coal from possible two coal seam horizons, Seam 4 and 5, is mined with an estimated thickness of 1 to 2m at a depth varying from 40 to 50m deep. The mining method to be used will be opencast mining following a roll-over concurrent rehabilitation methodology. It is anticipated that a maximum 30 000 tons per month of Coal will be moved / screened. No coal washing will take place on the site,

only truck and haul to a nearby beneficiation plant. The life of mine will be approximately 36 months. The following infrastructure/activities will be located on-site:

- Box cut opencast mining with a roll over rehabilitation sequence; hauling access road, haul road;
- Mobile offices;
- Mobile sanitation and change house;
- Mobile fuel storage;
- Pollution control facility/dam(s);
- Clean and dirty water separation system;
- Topsoil, subsoil, overburden, stockpiles;
- Weighbridge.

The location and approximate extent of the proposed Mining Block are indicated in **Table 2** below:

Table 2: Proposed development and approximate extents.

Development	Property	Portion	Approximate Size (ha)	Lat	Lon
Mining Block	Vlakraagte 45 IS	RE	5	-26.154260	29.363486

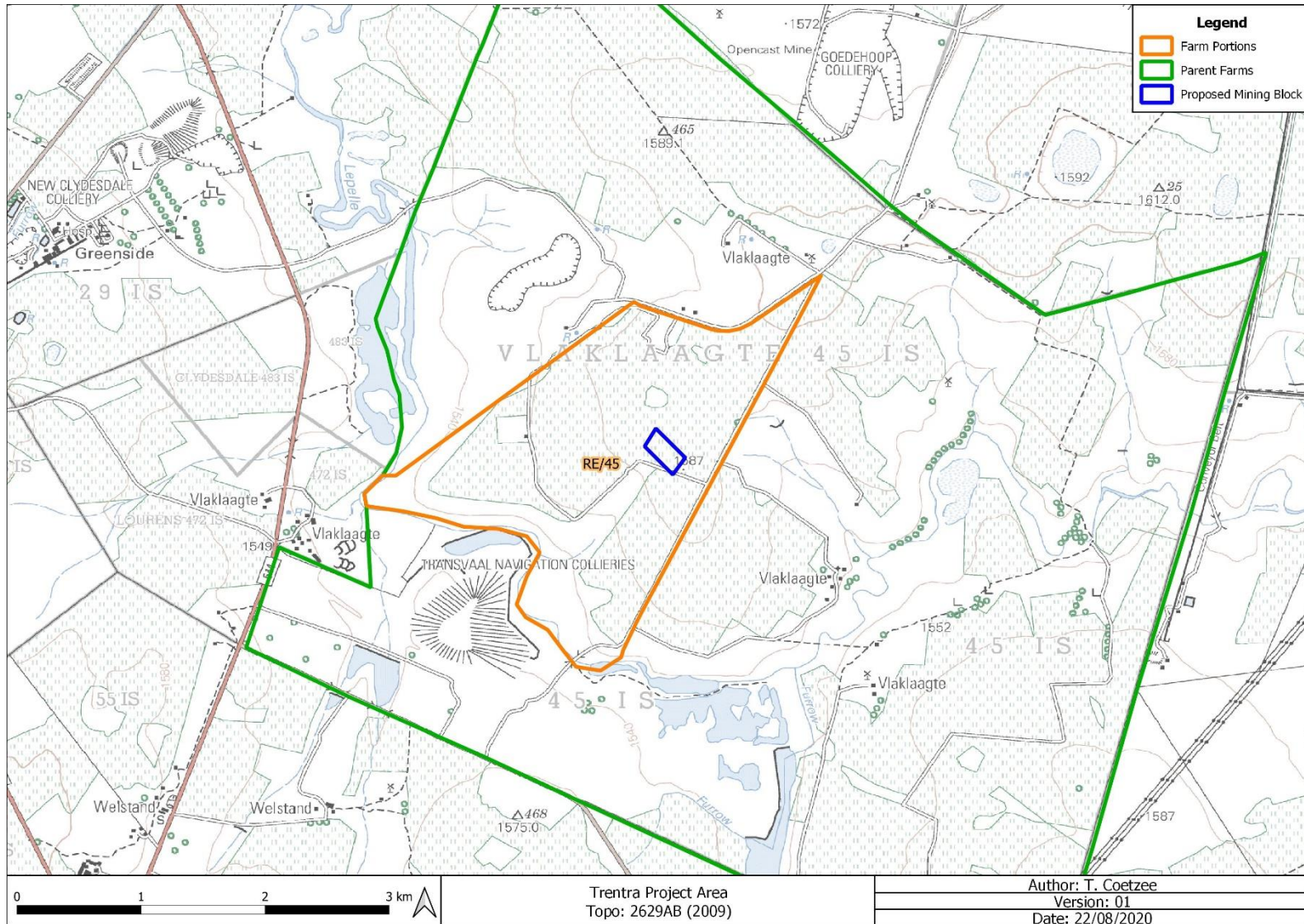


Figure 2: Segment of SA 1: 50 000 2629AB indicating the study area.

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 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 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 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).

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 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.

The Historical period mainly deals with Europe’s discovery, settlement and impact on southern Africa. Some topics covered by the Historical period include Dutch settlement in the Western Cape, early mission stations, Voortrekker routes and the Anglo Boer War. This time period also saw the compilation of early maps by missionaries, explorers, military personnel, etc.

3.2.1 The South African War

Several small skirmishes took place in the general area. However, no evidence could be found during the survey. The phase in the South African War that is significant in terms of the study area relates to the period after the British occupied Pretoria on 5 June 1900. During this time the republican forces retreated towards the eastern boundary of the *Zuid-Afrikaansche Republiek* under General Louis Botha and started employing guerrilla tactics (Matakoma Heritage Consultants 2007).

One of the more important and well-known South African War sites in the vicinity of the study area is the Battle of Bakenlaagte, located approximately 27 km southwest of the study area. The battle took place on 30 October 1901 between Lieutenant Colonel George Benson's Flying Column and the joint forces of General Louis Botha and General Sarel Grobler. Benson's Flying Column continuously threatened Boer commandos that caused the commandos to move camp every two days. Grobler had been following Benson's trail and harassed his rearguard, but it was only after Botha and his commando joined Grobler's commando that an attack could be launched. Benson's column was enroute from Syferfontein to Balmoral to resupply his men and horses. The column, consisting of more than 300 wagons, 800 horses and 600 infantry, aimed to camp at Bakenlaagte farmstead (Von der Heyde 2013: 208-209).

During the march, the column stretched out over a distance of approximately 2 km. The advance guard reached the Bakenlaagte farmstead at 09:00, but one of the rearguard wagons got stuck in mud when crossing a drift. Because the Boers were close by and visibility was poor, Benson rode back towards the rearguard and ordered two field guns be placed on a stony ridge between the camp and the rearguard. Benson was on his way to rescue the wagon when Botha with 800 men launched his attack. Upon seeing the attack, Benson ordered a retreat to Gun Hill, where the field guns were positioned. Two companies were also on their way from the camp to Gun Hill. At this stage Benson ordered some of the rearguard toward the northeast to protect the camp, creating a gap through which the Boers attacked. The position was overrun and of the 280 soldiers, the British suffered 231 casualties. Before Benson succumbed to his wounds, he ordered the camp to fire their guns at the hill, despite the danger to him and his men. The shelling drove the Boers back, but ambulance wagons provided cover and they managed to capture the two field guns. The Boers lost almost 100 men and decided not to follow up with an attack. The 73 British soldiers, including Benson, who were killed in the Battle were buried on Gun Hill, but were later exhumed and reburied in Germiston's Primrose Cemetery (Von der Heyde 2013: 208-209).

3.2.2 Coal mining general history near eMalahleni

eMalahleni, previously known as Witbank, has a rich history in terms of development and mineral exploitation. Mpumalanga, especially the area between eMalahleni, Middelburg, Bethal, Hendrina, Ermelo and Carolina, is associated with vast coal fields. These coal fields formed between 200 and 300 million years ago from rotten forests in swamps. During this period, Africa was still attached to South America, India and Antarctica as part of

the Gondwana supercontinent. By 250 million years ago, the climate changed to dry warm conditions and the swamps in Mpumalanga were replaced by desert-like conditions around 200 million years ago. By 180 million years ago, when the Gondwana supercontinent started to split up, volcanic lava fields covered areas in Mpumalanga (De Wit 2007: 37).

With the rich coal deposits in Mpumalanga, it was only a matter of time before its value was realised and the coal extracted. Coal mining is Mpumalanga's most important industrial activity and produces about 80% of South Africa's coal. The earliest coal mining in the area dates to 1868 when farmers extracted coal for personal use in the Middelburg district. Large-scale coal mining around eMalahleni, however, only started after the discovery of gold on the Witwatersrand in 1886. Due to the discovery of coal in the Brakpan and Springs surroundings in 1887 and no railway linking eMalahleni with the Rand, these early eMalahleni coal mines closed down. It was more cost effective to exploit the closer Brakpan and Springs coal deposits than the coal found at eMalahleni (Schirmer 2007: 316).

After the construction of the railway line between the Rand and eMalahleni the deposits were exploited on large scale again. The coal fields, which are about 40 km wide, are concentrated around eMalahleni and run towards Belfast in the east. The first collieries around eMalahleni were Douglas, Transvaal and Delagoa Bay, Witbank and Landau and are of a higher quality compared to the coal found at Brakpan and Springs. During the 1890s some of the coal was exported via Delagoa Bay. In addition, the coal was readily accessible as the deposits occurred at a depth of 100 m or less (Schirmer 2007: 316-317). It should also be noted that the railway line between Pretoria and Lorenzo Marques (Maputo) was completed on 2 November 1894 and the connection between eMalahleni and Johannesburg during the 1910s (Heydenrych 1999).

Between 1900 and 1920 many new collieries were established and the coal price dropped. This led to the establishment of the Transvaal Coal Owners' Association with the main aim to regulate output coal prices. This also acted to counter possible competition. It should also be noted that not all collieries joined this association. The establishment of the Transvaal Coal Owners' Association had positive as well as negative influences. On the one hand eliminating the competition might have impacted negatively on efficiency and the workers. On the other hand, it is possible that the capacity of coal mines was enhanced and facilitated further development in the industry. One positive point was that the association eased interaction with international buyers. During the 1930s, however, the coal price continued to drop and resulted in mechanisation. This introduced electric coal cutters and eliminated the need for high number of unskilled workers. By 1946 eMalahleni and Middelburg saw the emergence of a modern coal industry. The Transvaal had 34 large collieries that were responsible for 99.7% of the province's coal (Schirmer 2007: 317-319).

Between 1940 and 1960 coal output in the Eastern Transvaal increased from 13 million to 25 million tons. Although industrialisation expanded throughout this time in South Africa and a demand existed for coal both locally

and internationally, a steady shift to oil as the dominant form of energy was noted. In light of these developments Anglo American Corporation launched three research programmes in the 1960s. As a result of these programmes the region's coal mines became export orientated. This trend continued throughout the 1980s. During these times a series of coal-burning power stations around the eastern Highveld coal deposits were constructed (Schirmer 2007: 321).

The town of Witbank was founded in 1903 by Neumann's Witbank Colliery as a result of the mining activity. In 1906 Witbank became a health board, a village council in 1910 and a municipality in 1914 (Schirmer 2007: 338). On 3 March 2006 Witbank was renamed eMalahleni.

4. Methodology

I conducted archaeological reconnaissance of the study area during August 2020 through an unsystematic pedestrian and vehicular site survey (**Figure 4**). General site conditions were recorded via photographic record (**Figures 5 – 8**). Also, the site was inspected beforehand on Google Earth and topographical maps in order to identify possible heritage remains (**Appendix A**). The historical topographical datasets dating to 1962, 1984 and 1996, as well as Google Earth Imagery indicate the absence of potential sites as the proposed mining block is located within a cultivated maize field. No sites were identified within the demarcated boundary. The total area inspected was roughly 5 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 areas 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 during the site visit.

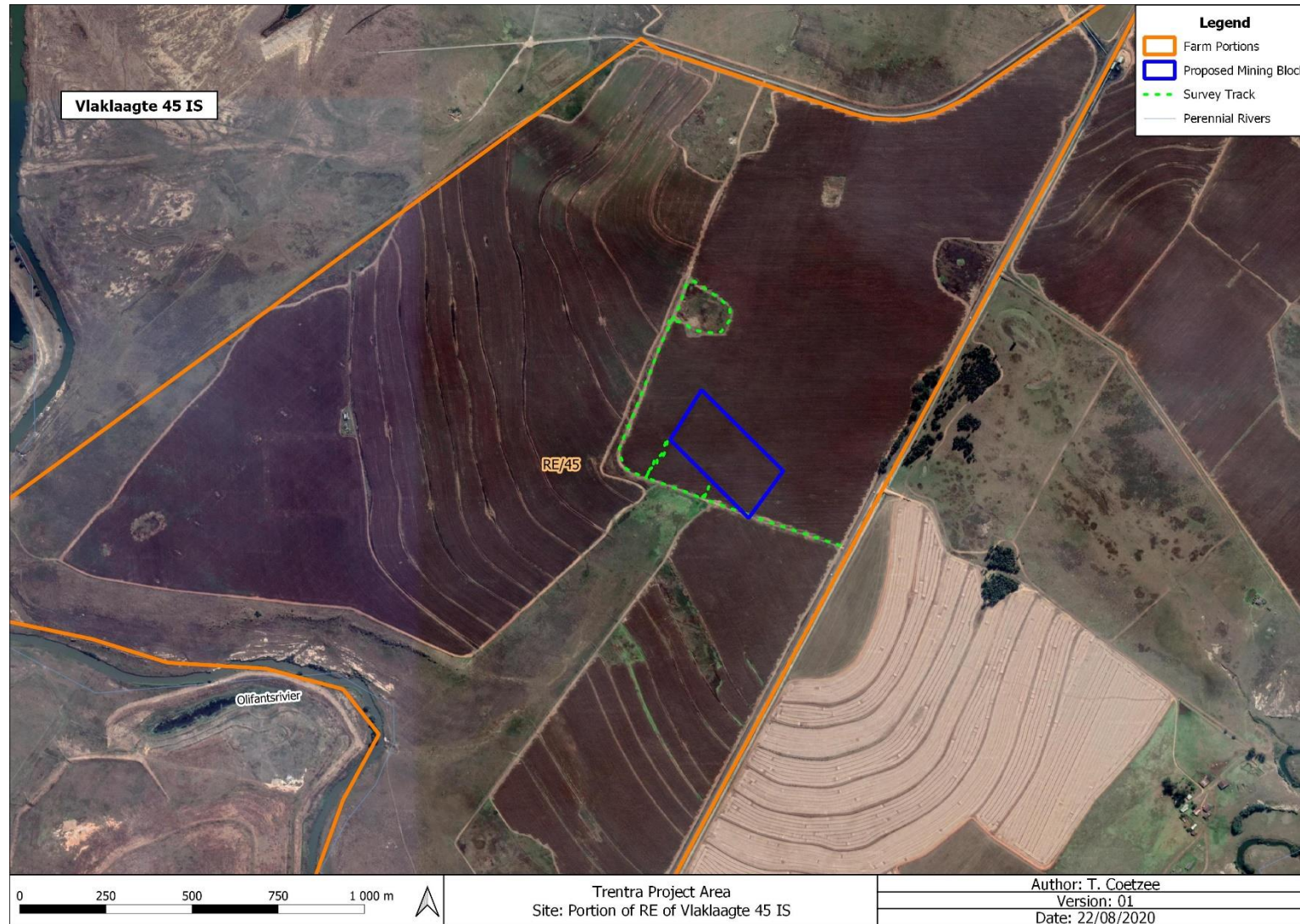


Figure 4: Proposed mining block with survey track on a 2019 aerial backdrop.



Figure 5: Proposed mining block as seen from the western boundary.



Figure 6: Proposed mining block as seen from the north.



Figure 7: Jeep track along the southern boundary of the proposed mining block.



Figure 8: Proposed mining block as seen from the west.

4.1 Sources of information

At all times during the survey, I followed standard archaeological procedures for the observation of heritage resources. As most archaeological material occur in single or multiple stratified layers beneath the soil surface, I paid special attention to disturbances; both man-made such as roads and clearings, and those made by natural agents such as burrowing animals and erosion. I recorded locations of archaeological material remains by means of a Garmin Oregon 550 GPS and photographed these sites as well as general conditions on the terrain with a Sony Cyber-shot camera.

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

4.1.1 Previous Heritage Studies

Forzando Coal Holdings on the Farms Weltevreden 193 IS and Halfgewonnen 190 IS

An archaeological survey was done for a coal mine on the Farms Weltevreden 193 IS and Halfgewonnen 190 IS. The demarcated impact area was 600 X 600m and is located roughly 22 km southeast of the Trentra project study area concerned in this report. Archaeological Resources Management (ARM) surveyed the study area and the remains of two circular homesteads that possibly date to the Late Iron Age were observed. Both homesteads consist of between 3 and 6 structures and are located close to a stream. More recent angular settlement remains, as well as 2 graveyards associated with the settlements were observed. The graves consisted of mounds made with ferricrete. One of the graveyards consisted of 8 graves, and the other of 5 graves (Huffman & Steel 1995).

Goedehoop Coal Mine, Mpumalanga

An Archaeological and Cultural Historical survey and impact assessment was conducted by the National Cultural History Museum (2003) for the development of the Goedehoop opencast coalmine near Hendrina in the Mpumalanga Province. The area surveyed for the Goedehoop site is located roughly 18 km east-southeast of the Trentra project study area concerned in this report. Opencast areas that were surveyed included portions of the Farms Schurvekop 227 IS, Vlakkuielen 76 IS, Middelkraal 50 IS, and Halfgewonnen 190 IS. It was noted that a few graveyards located outside of the impacted areas were observed and would therefore not be impacted.

Halfgewonnen Colliery, Mpumalanga

Van Vollenhoven (2013) conducted a Cultural Heritage Impact Assessment for a mining right application at the Halfgewonnen Colliery between Hendrina and Bethal. The Halfgewonnen Colliery is located on the Farm Halfgewonnen 190 IS and is located about 17 km east-southeast of the Trentra project study area concerned in this report. The project entailed the extraction of pillars from the underground mining area that was previously

mined through bord-and-pillar methods. Van Vollenhoven (2013) located no sites of cultural heritage significance during the survey.

4.2 Limitations

The study areas consists of a harvested maize field that provided good visibility during the time of surveying and no access constraints were encountered (August 2020).

5. Archaeological and Historical Remains

5.1 Stone Age Remains

I found no Stone Age archaeological remains within the demarcated study area.

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

According to Bergh (1999: 5), no major Stone Age archaeological sites are located in the direct vicinity of Kriel.

5.2 Iron Age Farmer Remains

I found no Iron Age Farmer remains within the demarcated study area.

The Forzando Coal Holdings project identified two circular homesteads that could date to the LIA.

5.3 Historical

I found no cultural remains dating to historical times within the demarcated study area.

One of the heritage studies done in the surrounding area, however, did record angular settlement remains dating to historical times (see Huffman & Steel 1995).

5.4 Contemporary Remains

I found no contemporary remains within the demarcated study area.

Archaeological studies done on the surrounding areas did not mention the presence of contemporary remains.

5.5 Graves & Burial Sites

I observed no cemeteries or burial sites within the demarcated study area.

Two of the heritage studies done in the surrounding area recorded several burial sites and cemeteries (see Huffman & Steel 1995 and National Cultural History Museum 2003).

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 3: 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

* It should be noted that no sites of heritage importance were observed

7. Statement of Significance & Recommendations

7.1 Statement of significance

The study area: The proposed mining block on a Portion of the Remaining Extent of the Farm Vlaklaagte 45 IS

No sites of heritage importance were observed within the demarcated boundary on the Remaining Extent of the Farm Vlaklaagte 45 IS. Historical topographical maps verified that the area was used for crop cultivation since at least 1962 and that no structures appear to have existed at that stage. No other material of heritage importance were observed within the demarcated study area. The study area is disturbed due to the presence of maize cultivation.

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 development:

- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the development and construction phases, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed during development and construction phases, 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 development beyond the surveyed area outlined in this study, the following applies: A qualified archaeologist must conduct a full Phase 1 Archaeological Impact Assessment (AIA) on the sections beyond the demarcated areas 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, development may proceed within the boundaries of the demarcated mining block, 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 salvage 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.

9. References

Bergh, J.L. 1999. *Geskiedenisatlas van Suid-Afrika: Die Vier Noordelike Provinsies*. Pretoria: Van Schaik Uitgewers.

Climate-Data.org. eMalahleni Climate. <https://en.climate-data.org/africa/south-africa/mpumalanga/eMalahleni-641/>
Accessed 22-08-2020.

Clarke, R.J. & Kuman, K. 2000. *The Sterkfontein Caves Palaeontological and Archaeological Sites*. Johannesburg: University of the Witwatersrand.

De Wit, M. 2007. A History of Deep Time. In: Delius, P. (ed.) *Mpumalanga History and Heritage*: 27-38. Scottsville: University of KwaZulu-Natal Press.

Deacon, H. & Deacon, J. 1999. *Human beginnings in South Africa*. Cape Town: David Philip.

Heydenrych, D. H. 1999. Mynbou-, landbou-en spoorwegontwikkeling in die 19de en 20ste eeu. In: Bergh, J. (ed.) *Geskiedenisatlas Van Suid-Afrika: Die Vier Noordelike Provinsies*. 327-332. Pretoria: J. L. van Schaik Uitgewers

Tobias Coetzee ©

19-976-AUTH

September 2020 (version 2)

- Huffman, T.N. & Steel, R.H. 1995. Archaeological Survey of Forzando Coal Holdings. University of the Witwatersrand: Archaeological Resources Management
- Huffman, T.N. 2007. *Handbook to the Iron Age*. Pietermaritzburg: UKZN Press.
- Mitchell, P. 2002. *The archaeology of southern Africa*. Cambridge: Cambridge University Press.
- Mucina, L. & Rutherford, M. C. 2006. *The Vegetation of South Africa, Lesotho and Swaziland*. Strelitzia 19. South African National Biodiversity Institute, Pretoria.
- Matakoma – ARM, 2007. Digby Wells & Associates Heritage Impact Assessment – Certain portions of the farms Zondagsvlei, Schoongezicht, Leeuwfontein, Klippoortje, Springboklaagte, Cologne, Bombardie and Smithfield, Nkangala District, Mpumalanga. University of the Witwatersrand: Matakoma – ARM Heritage Contract Unit.
- National Cultural History Museum. 2003. Goedehoop mine, Mpumalanga: Archaeological and cultural historical survey and impact assessment. Pretoria: National Cultural History Museum.
- Schirmer, S. 2007. Enterprise and Exploitation in the 20th Century. In: Delius, P. (ed.) *Mpumalanga History and Heritage*: 291-346. Scottsville: University of KwaZulu-Natal Press
- Toth, N. & Schick, K. 2007. *Handbook of paleoanthropology*. Berlin: Springer.
- Van Vollenhoven, A.C. 2013. A report on a Cultural Heritage Impact Assessment for a proposed mining right amendment application at the Halfgewonnen Colliery, between Bethal and Hendrina, Mpumalanga Province. Pretoria: Archaeos Culture & Cultural.
- Volman, T. P. 1984. Early Prehistory of southern Africa. In: Klein, R. G. (ed.) *Southern African prehistory and paleoenvironments*. Rotterdam: Balkema.
- Von der Heyde, N. 2013. *Field Guide to the Battlefields of South Africa*. Century City: Struik Travel & Heritage.
- 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 Topographical Maps

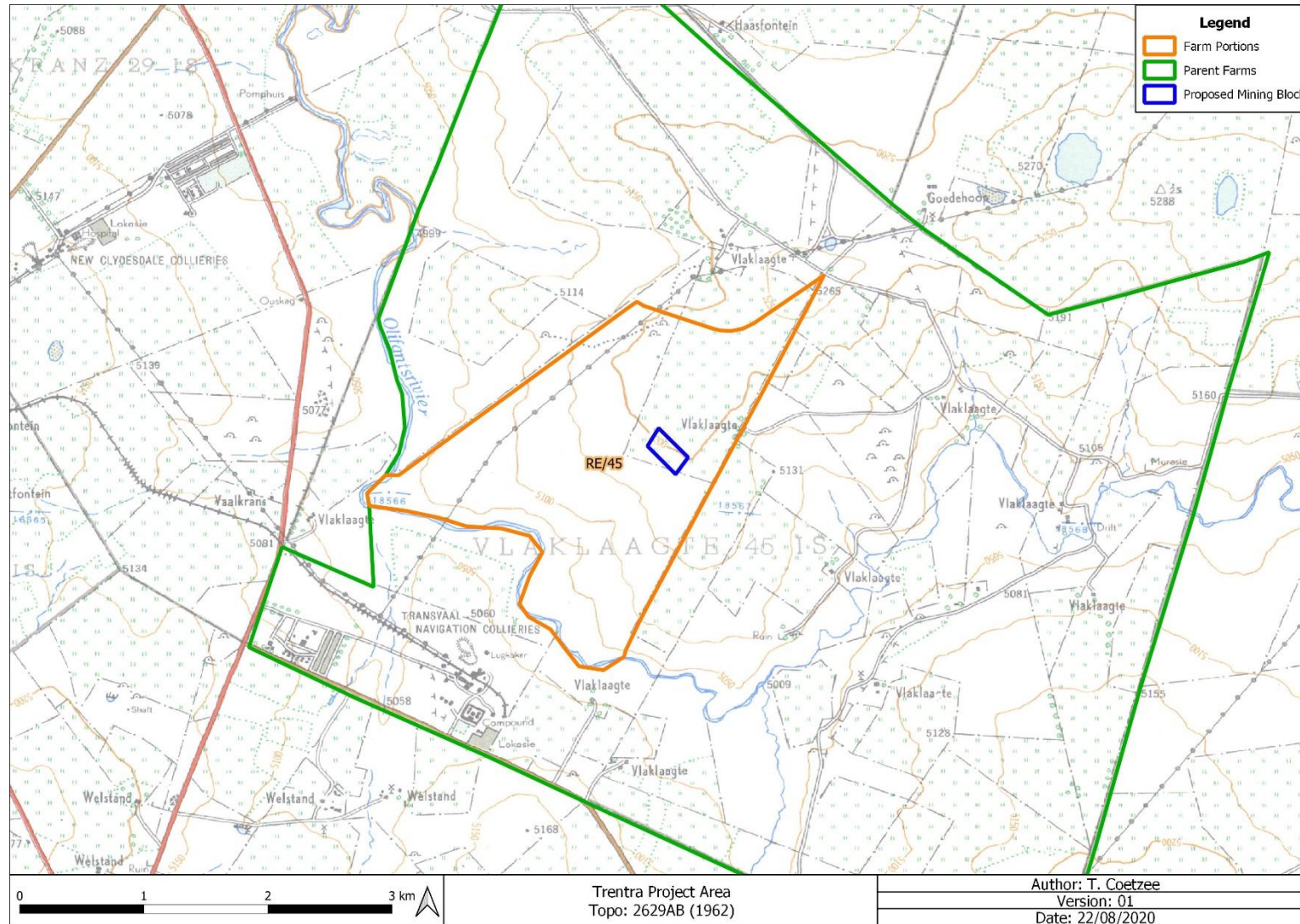


Figure 9: Study area superimposed on a 1962 topographical map.

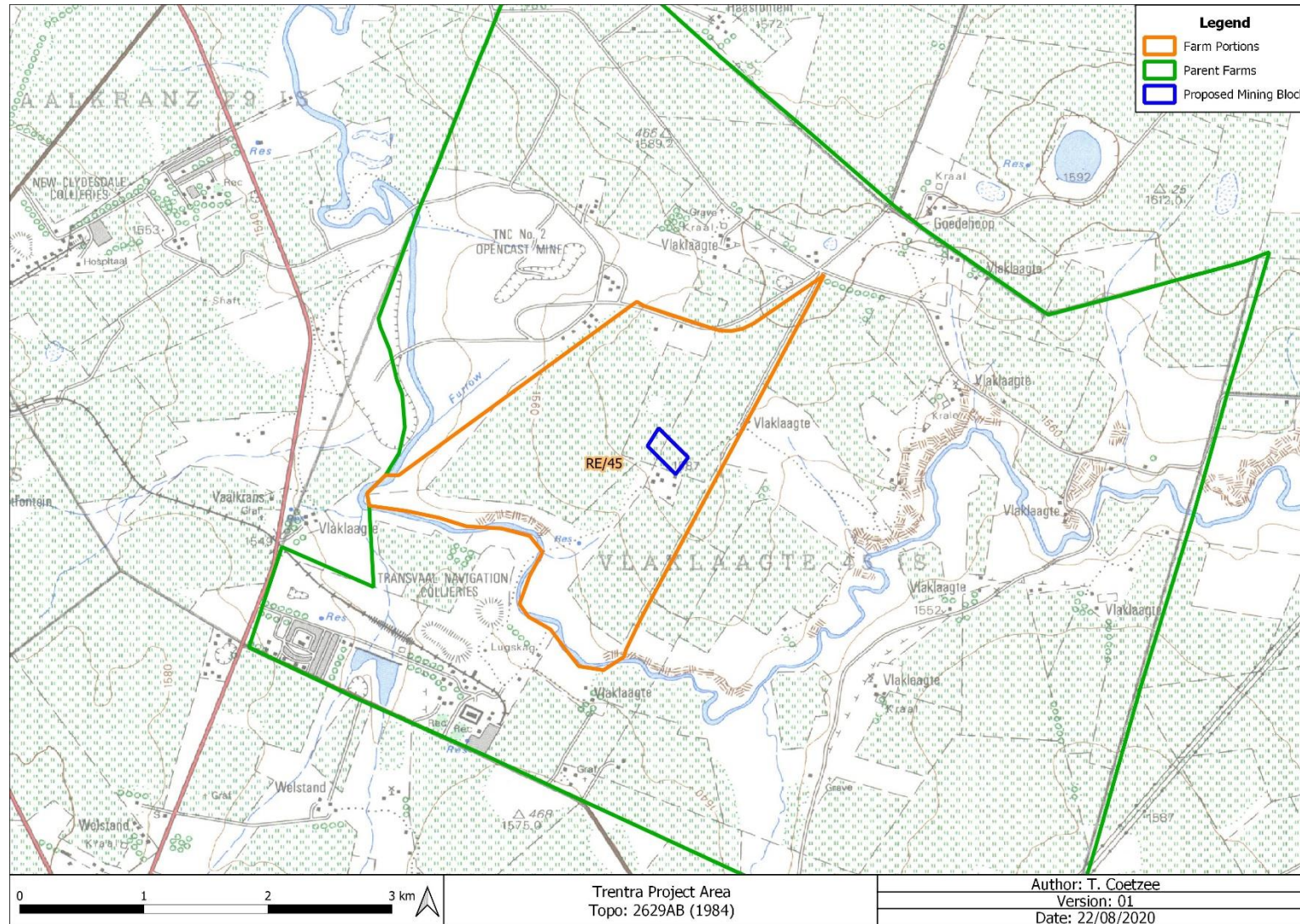


Figure 10: Study area superimposed on a 1984 topographical map.

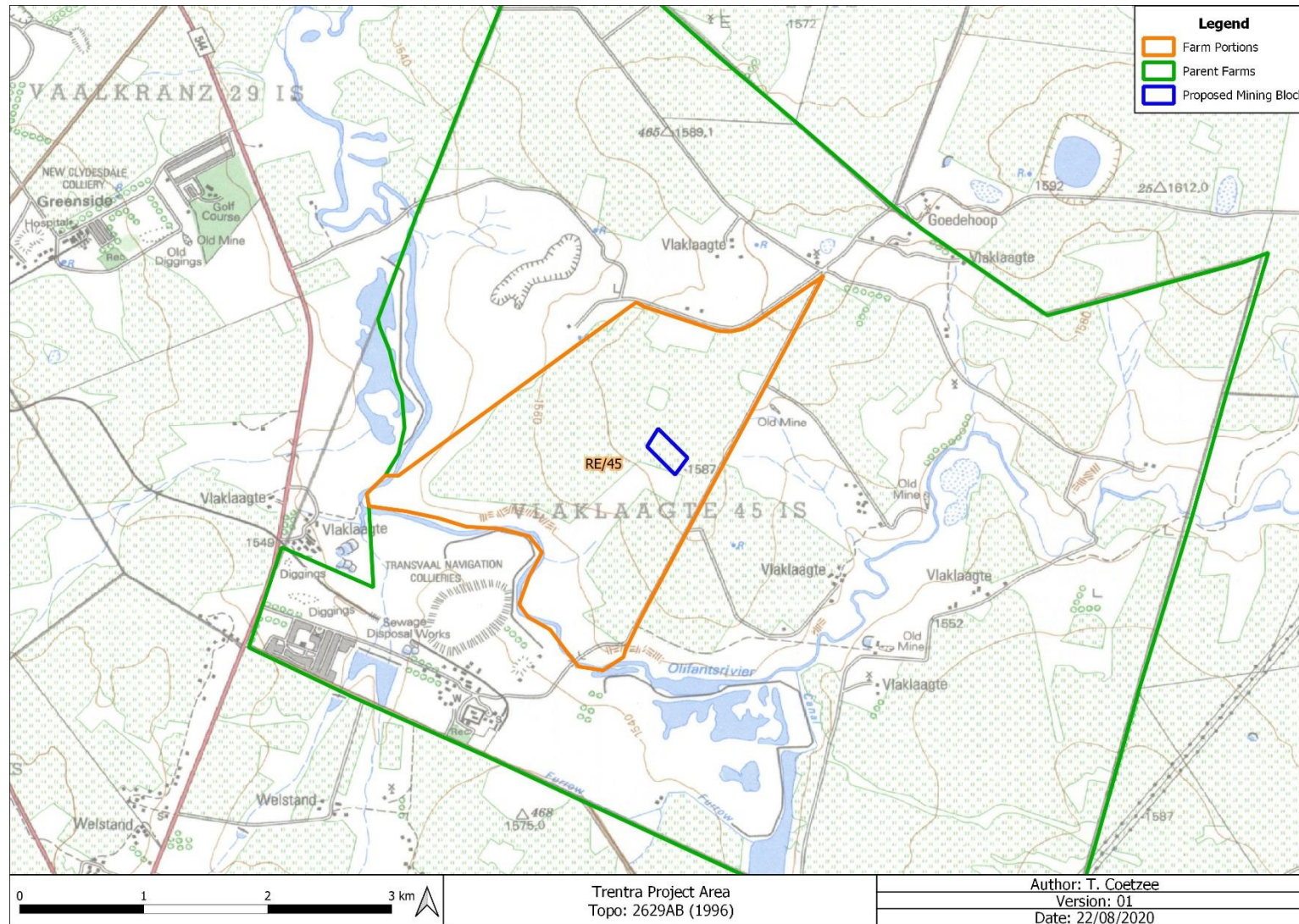


Figure 11: Study area superimposed on a 1996 topographical map.