

# **PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT**

**For**

**The Proposed Koppie Colliery  
near Bethal, Mpumalanga**

**Author ©:**

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**September 2021**

A Phase 1 Archaeological Impact Assessment for the Proposed Koppie  
Colliery near Bethal, Mpumalanga

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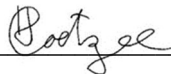
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I, Tobias Coetzee, declare that –

- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed Koppie Colliery 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: 17 September 2021

## Executive Summary

The author was appointed by Eco Elementum (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for the proposed Koppie Colliery intersecting 12 farm portions (listed in **Table 1**) of the Farms Koppie 228 IS and Uitgedacht 229 IS near Bethal in the Mpumalanga Province. The proposed colliery is located approximately 11 km NNE of Bethal and 25 km SW of Hendrina, between R35 and R38 Provincial roads. Surrounding towns include Secunda 31 km SW and Ermelo 50 km SE. The aim of the study is to determine the scope of archaeological resources that could be impacted on by the proposed Koppie Colliery.

Thirty-five sites (2629BC-K01 – K08; 2629AD-K09 – K16; 2629BC-K17; 2629AD-K18 – K22; 2629BC-K23; 2629AD-K24 – K27; 2629BC-K28; 2629AD-K29; 2629BC-K30 – K33; 2629AD-34; 2629BC-K35) were identified, pre-plotted and visited during the survey, while 16 additional sites (2629AD-K36 & K37; 2629BC-K38 & 39; 2629AD-K40 – K47; 2629BC-K48 – K51) were identified and plotted during the survey. Twenty-six sites are likely to be impacted by the proposed mining activities and are indicated on **Figure 104**.

In the event where impact is caused by the proposed mining development or if impact cannot be avoided on buildings or ruins, all buildings and structures associated with the demarcated areas must be adequately recorded by a qualified archaeologist and destruction permits be obtained from the relevant heritage authority.

Historical foundation mounds or areas where historical infrastructure once existed are considered sensitive from a heritage perspective and should be avoided by surface impacts. Subsurface cultural material might exist at these locations and care should therefore be exercised during construction and mining phases.

Intact buildings dating to the Historical Period should be monitored by the mine's ECO on a quarterly basis, as well as pre- and post-blasting. Should any impact be observed, or if impact cannot be avoided, a qualified archaeologist should be contacted to provide the required input to ensure the safeguarding of the sites.

A fenced-off conservation buffer of 50 m must be established around graves or cemeteries that are at risk of being impacted by the proposed development and a qualified archaeologist must compile a Conservation Management Plan to ensure the safeguarding of the burial sites. Also, access to the cemeteries/graves must not be refused. Alternatively, the graves may be relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of community leaders and the relatives of the deceased buried at the concerned location.

Graves/cemeteries located a significant distance from the proposed surface development, but within or within close proximity of the underground mining area, need to be monitored by the mine's ECO.

Subject to adherence of the recommendations and approval by SAHRA, the proposed Koppie Mining Project as per the indicated demarcations 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.

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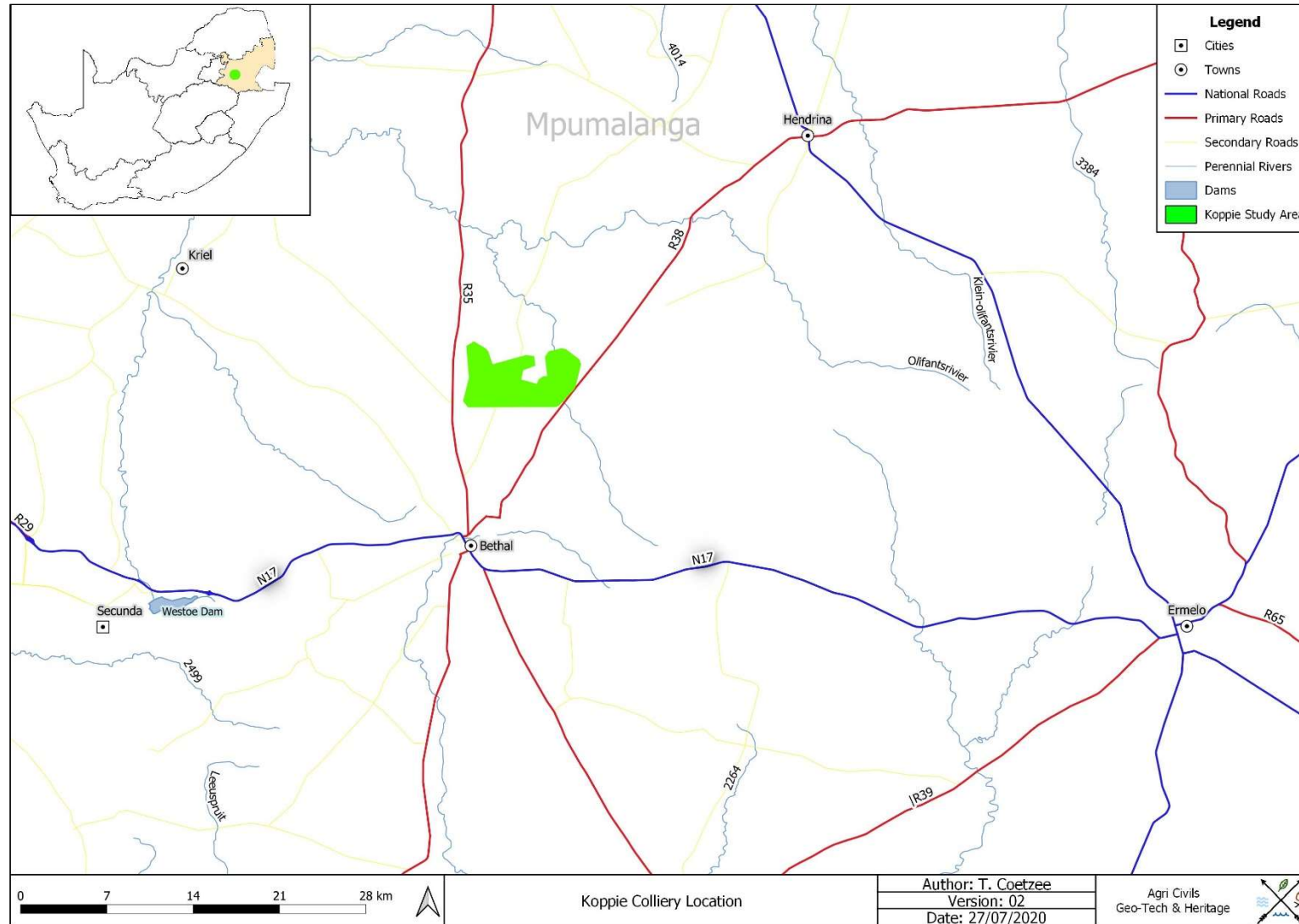
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# 1. Project Background

## 1.1 Introduction

Eco Elementum (Pty) Ltd appointed the author to undertake a Phase 1 Archaeological Impact Assessment for the proposed Koppie Colliery intersecting 12 farm portions (**Table 1**) of the Farms Koppie 228 IS and Uitgedacht 229 IS near Bethal in the Mpumalanga Province (**Figures 1 & 2**). The proposed colliery is located approximately 11 km north-northeast of Bethal and 25 km southwest of Hendrina, between the R35 and R38 Provincial roads. Surrounding towns include Secunda 31 km to the southwest and Ermelo 50 km to the southeast. 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 colliery, 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 portions with regard to heritage resources: Portion 4 of the Farm Koppie 228 IS, and portions 2, 3, 6, 9, 10, 11, 21, 27, 30, 31, and 32 of the farm Uitgedacht 229 IS. The development will consist of underground mining methods and a surface infrastructure area. The demarcated portions roughly form the southern half of each 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 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 5000m<sup>2</sup> 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 10000m<sup>2</sup> 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)*

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 Koppie Colliery project study area is situated between Bethal and Hendrina. The 12 identified farm portions are listed below:

**Table 1:** Property name & coordinates

Property	Portion	Map Reference (1:50 000)	Lat	Lon	Intersecting Parcel Size (ha)
Koppie 228 IS	4	2629 BC	-26.332416	29.536501	465.5
Uitgedacht 229 IS	2	2629 AD	-26.348170	29.477043	152.6
Uitgedacht 229 IS	3	2629 AD	-26.324140	29.477842	483.9
Uitgedacht 229 IS	6	2629 AD & BC	-26.343088	29.497806	462.6
Uitgedacht 229 IS	9	2629 AD & BC	-26.348388	29.506808	128.5
Uitgedacht 229 IS	10	2629 AD	-26.339240	29.477043	85.5
Uitgedacht 229 IS	11	2629 BC	-26.345339	29.527208	146.5
Uitgedacht 229 IS	21	2629 AD & BC	-26.333142	29.486118	88.18
Uitgedacht 229 IS	27	2629 AD & BC	-26.329295	29.488369	31.4
Uitgedacht 229 IS	30	2629 AD & BC	-26.330674	29.493632	31.4
Uitgedacht 229 IS	31	2629 AD & BC	-26.324576	29.504703	50.2
Uitgedacht 229 IS	32	2629 AD & BC	-26.328714	29.497008	74.6

The closest town to the study area is Bethal, located 11 km to the south-southwest. Hendrina is located roughly 25 km to the northeast and Ermelo 50 km to the southeast of the proposed mining project (**Figures 1 & 2**). The study area falls within the Gert Sibande District Municipality and the Musukaligwa Local Municipality in the Mpumalanga Province. The Govan Mbeki Local Municipality borders the study area along the western boundary. 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 1640 MASL and slopes from the more elevated eastern and western sides towards the lower middle section.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 689 mm per year. The average annual temperature is 15.5 °C. The average summer temperature is 20 °C, while the average winter temperature averages 8.8 °C (Climate-data.org accessed 28/07/2020).

The study area falls within the B11A Quaternary Catchment that forms part of the Olifants Water Management Area. The closest perennial river to the study area is the Diepsloot River, an offshoot from the Viskule River that divides Portion 4 of the Farm Koppie 228 IS in an eastern and western half. Several non-perennial offshoots and minor dams and pans, however, are found within the study area.

When the surrounding environment is considered, the general study area is associated with crop cultivation and grazing veldt for cattle with mining occurring approximately 6.6 km to the north-northeast. Access to the study area (**Figures 2 & 3**) is mostly via tertiary and jeep track farm roads turning from the R35 and R38 Provincial roads.

Historical topographical maps (**Appendix A**) show that in terms of cultivation, the demarcated study area remained relatively unchanged between 1963 and 2009. All the huts are also omitted from the 1973/1984 topographical map, while several buildings are no longer indicated. Several new buildings, however, are noted.

## 2.2 Project description

Canyon Resources (Pty) Ltd plans to obtain a mining right for the proposed Koppie Colliery intersecting several farm portions of the Farms Koppie 228 IS and Uitgedacht 229 IS (**Table 1**) in the vicinity of Bethal in the Mpumalanga Province. The proposed mining right area is 1955.450 ha and is indicated on **Figures 2 & 3**. Underground mining methods will be used to extract the coal, while a processing plant will be constructed as well. The extent of the surface infrastructure will be 80 ha. Two possibilities for surface infrastructure exist: The demarcated Alternative Option intersecting Portions 3, 6, 21, 27, 30, 32 of the Farm Uitgedacht 229 IS and the demarcated Preferred Option on Portions 3, 6, 10 and 21 of the Farm Uitgedacht 229 IS (**Table 2**). It should be noted that a larger area surrounding the proposed 80 ha plant area was surveyed in order to cover additional surface impacts associated with the infrastructure.

The following overview of the mining method was adapted from the Mining Work Programme (Canyon Resources 2020).

A boxcut or incline will be opened where the strip ratio is the lowest with an adit. The underground mining operations will be conducted by the owner or contractor. The underground mining method to be undertaken at Koppie is bord and pillar mining with continuous miners (CM) and shuttle cars, supported by roof bolters for roof support.

The underground bord and pillar mining was based on the following factors:

- The planned production rate of 1.8Mtpa
- Underground bord and pillar mining utilising CM with shuttle cars is a well-proven and flexible mining system, with acceptable production rates, operating and capital costs, and safe operational standards.

The mined coal from the underground workings will be transported via conveyer belts and the haul roads and stored on the Run of Mine (RoM) stockpile area. The coal will be fed into a crushing and washing plant with a conveyor after which the coal product will be temporarily stored at the product stockpile area before being transported to a siding for distribution or directly via truck to the relevant markets. A temporary discard dump containing one year's capacity will be constructed to store discard before being reworked.

The following infrastructure is proposed:

- Access / haul roads
- Washing plant
- Workshops
- Offices
- Weighbridge
- Pollution Control Dams
- Stormwater management facilities
- Boreholes
- Powerlines
- Substation
- Sewage management systems
- Conveyor belt systems
- Explosive magazine
- Shaft complex
- Lamp room

- Ventilation Shafts
- Discard Dump
- Slurry dams

**Table 2:** Proposed surface development and approximate extents.

<b>Property</b>	<b>Portion</b>	<b>Farm</b>	<b>Approximate surface impact (ha)</b>	<b>Lat</b>	<b>Lon</b>
Alternative	3, 6, 21, 27, 30, 32	Uitgedacht 229 IS	157	-26.325739	29.540951
Preferred	3, 6, 10,21	Uitgedacht 229 IS	105	-26.335614	29.476995

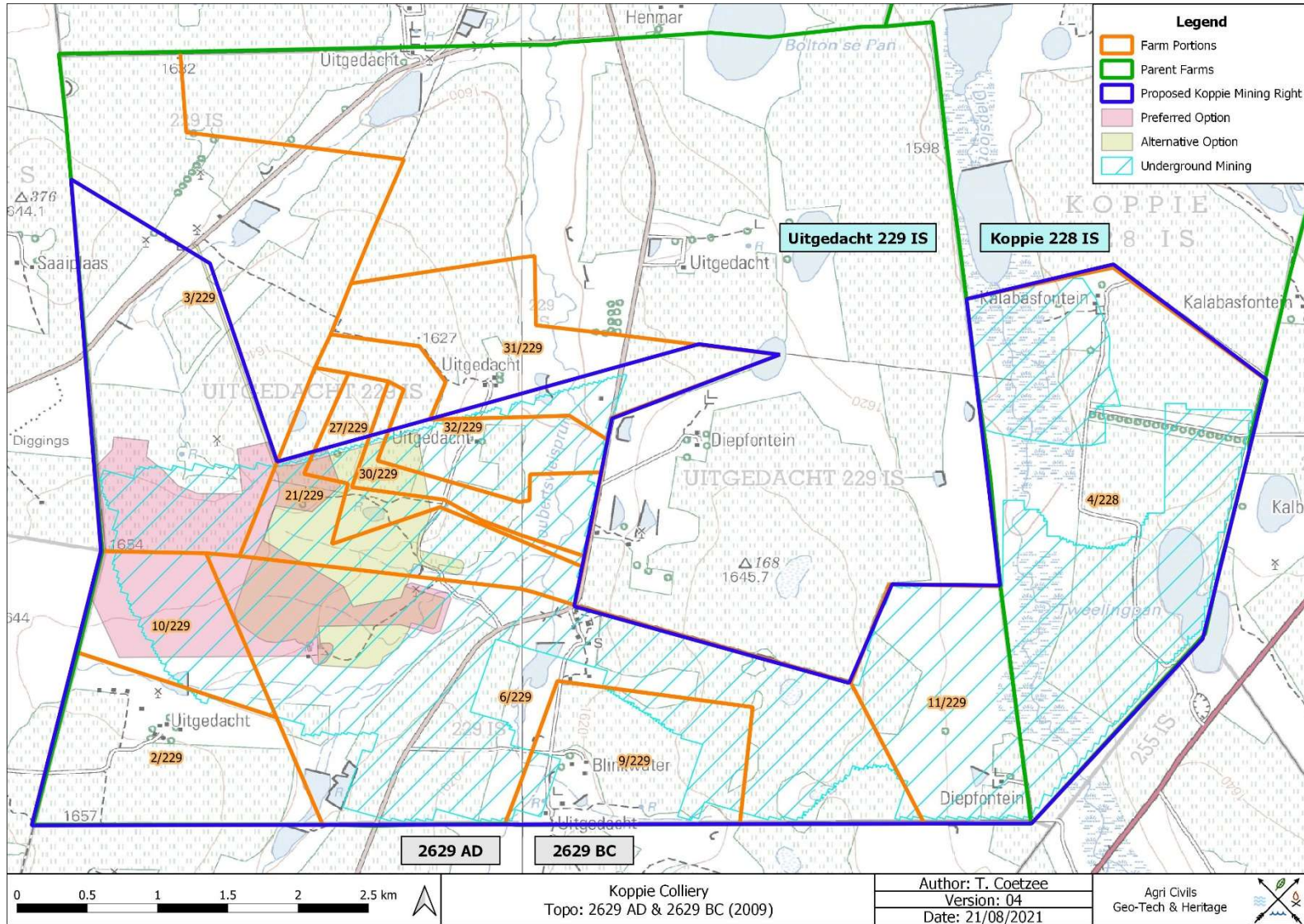
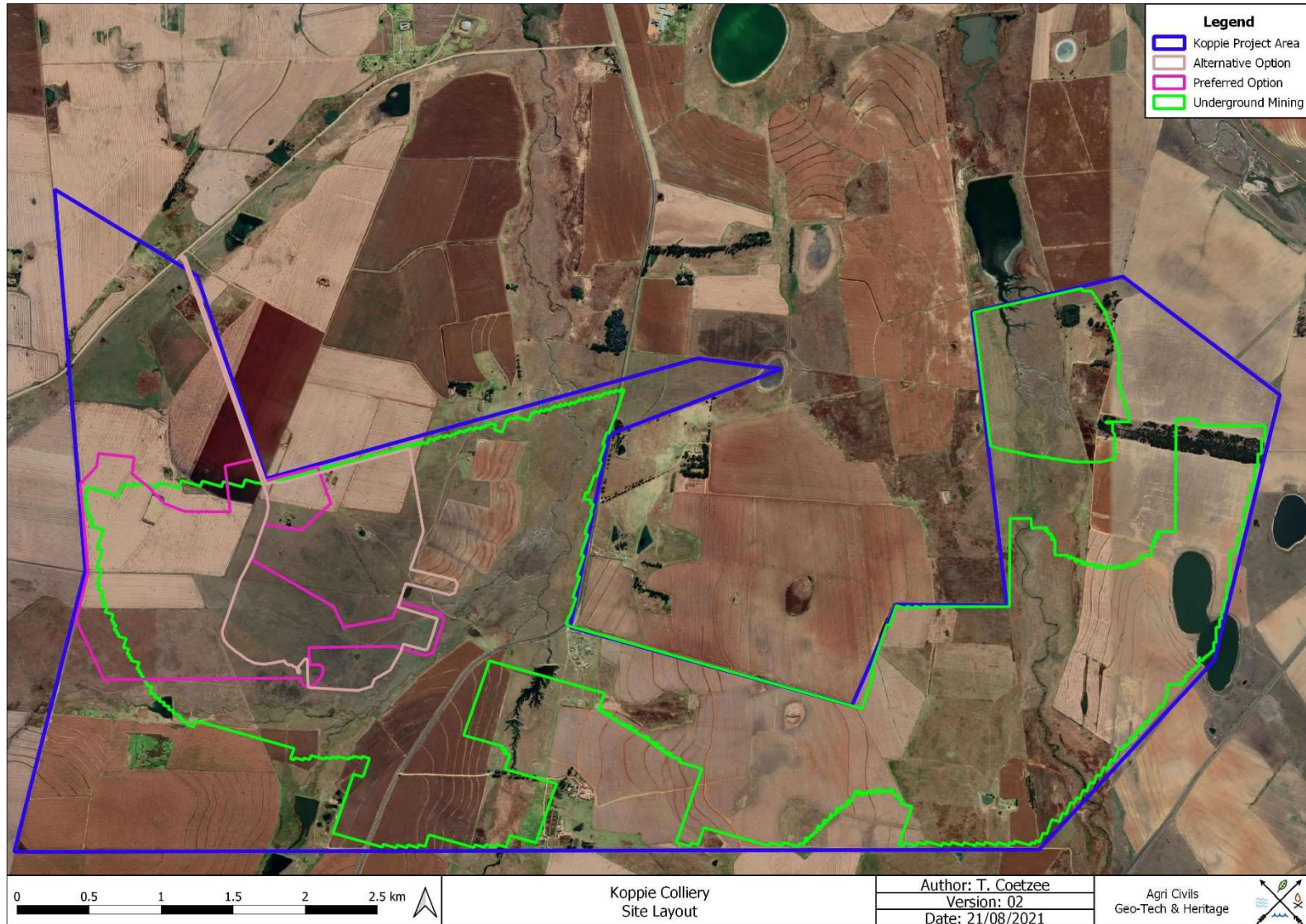


Figure 2: Segments of SA 1: 50 000 2629 AD & 2629 BC indicating the study area.



**Figure 3:**Proposed layout of the Koppie Project.

### 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 southeast 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, Middelburg, Bethal, Hendrina, Ermelo and Carolina

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).

### 3.2.3 Bethal general history

The town of Bethal, established on 12 October 1880 (Bergh 1998: 143), was named after the first and last parts of Alida Naude and Elizabeth de Plooy, owners of the farm on which the town was laid out (Bulpin 1986: 633). Bethal was proclaimed to a district on 23 February 1898 (Bergh 1998: 146). Initial produce included potatoes, maize and sunflowers, while several coal mines exist in the general area (Bulpin 1986:633).

## 4. Methodology

I conducted archaeological reconnaissance of the study area during September 2020 through a systematic pedestrian survey of the Alternative Option and an unsystematic pedestrian and vehicular site survey of the remaining area. The Preferred Option was identified at a later stage and was inspected in January 2021 through a combination of a pedestrian and vehicular survey. General site conditions were recorded via photographic record (**Figures 5 – 12**). Also, the project area was inspected beforehand on Google Earth, historical aerial imagery and topographical maps in order to identify possible heritage remains, especially on the areas demarcated for surface infrastructure and underground mining (**Appendix A**). Thirty-five sites (2629BC-K01 – K08; 2629AD-K09 – K16; 2629BC-K17; 2629AD-K18 – K22; 2629BC-K23; 2629AD-K24 – K27; 2629BC-K28; 2629AD-K29; 2629BC-K30 – K33; 2629AD-34; 2629BC-K35) were identified, pre-plotted and visited during the survey (**Table 3 & Figure 4**). Sixteen additional sites (2629AD-K36 & K37; 2629BC-K38 & 39; 2629AD-K40 – K47; 2629BC-K48 – K51) were identified during the study as a result of the pedestrian survey and personal communication with land owners and residents. It should be noted that the prefixes '2629BC' and '2629AD' are not used when referring to the site names due to the length of the name, but are recorded as such in **Table 3**. The historical topographical datasets dating to 1963/1964, 1973/1984 and 1996, as well as the historical aerial photographs dating to 1954, 1955 and 1969 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. The total area inspected was roughly 2190 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.

**Table 3:** Site coordinates & description

Abbreviated name	Site / Survey Point Name	Longitude	Latitude	Description	Current Status	Identification Source
K01	2629BC-K01	29.536652	-26.318996	Building	Intact	Aerial 1954
K02	2629BC-K02	29.535067	-26.325923	Hut	Demolished	Topo 1963
K03	2629BC-K03	29.530480	-26.349953	Building	Intact	Aerial 1954
K04	2629BC-K04	29.526663	-26.346903	Hut	Demolished	Topo 1963
K05	2629BC-K05	29.503491	-26.348585	Building	Intact	Aerial 1954
K06	2629BC-K06	29.502806	-26.351196	Building	Intact	Aerial 1954
K07	2629BC-K07	29.505210	-26.343222	Building	Demolished	Aerial 1954
K08	2629BC-K08	29.504117	-26.339949	Building	Intact	Aerial 1954
K09	2629AD-K09	29.497799	-26.339683	Building	Demolished	Aerial 1954
K10	2629AD-K10	29.488316	-26.349254	Building	Demolished	Topo 1963
K11	2629AD-K11	29.476421	-26.346291	Building	Demolished	Aerial 1954
K12	2629AD-K12	29.499407	-26.326616	Building	Demolished	Aerial 1954
K13	2629AD-K13	29.498956	-26.329790	Building	Demolished	Aerial 1954
K14	2629AD-K14	29.498073	-26.331035	Building	Demolished	Aerial 1954
K15	2629AD-K15	29.497124	-26.328121	Building	Intact	Aerial 1954
K16	2629AD-K16	29.495985	-26.327893	Grave/Cemetery	Unknown	Topo 1963
K17	2629BC-K17	29.505240	-26.324139	Building	Demolished	Aerial 1954
K18	2629AD-K18	29.494095	-26.335158	Building	Demolished	Aerial 1954
K19	2629AD-K19	29.490902	-26.331234	Building	Demolished	Aerial 1954
K20	2629AD-K20	29.488202	-26.329334	Building	Partially Demolished	Aerial 1954
K21	2629AD-K21	29.485529	-26.331829	Building	Partially Demolished	Aerial 1954
K22	2629AD-K22	29.477290	-26.315403	Building	Demolished	Aerial 1954
K23	2629BC-K23	29.543206	-26.331817	Soil Disturbance	Natural	Aerial 2019
K24	2629AD-K24	29.479178	-26.329019	Building	Demolished	Aerial 1954
K25	2629AD-K25	29.493214	-26.330802	Building	Demolished	Aerial 1954

Abbreviated name	Site / Survey Point Name	Longitude	Latitude	Description	Current Status	Identification Source
K26	2629AD-K26	29.492042	-26.334922	Midden	Intact	Aerial 1954
K27	2629AD-K27	29.472465	-26.343749	Building	Intact	Aerial 1954
K28	2629BC-K28	29.535263	-26.326714	Building	Demolished	Aerial 1969
K29	2629AD-K29	29.488729	-26.347168	Building	Demolished	Aerial 1969
K30	2629BC-K30	29.535124	-26.331812	Building	Demolished	Aerial 1969
K31	2629BC-K31	29.535346	-26.330397	Building	Demolished	Aerial 1969
K32	2629BC-K32	29.504892	-26.326946	Building	Demolished	Aerial 1969
K33	2629BC-K33	29.538364	-26.331558	Soil Disturbance	Natural	Aerial 1969
K34	2629AD-K34	29.487759	-26.351939	Building	Demolished	Aerial 1954
K35	2629BC-K35	29.503548	-26.343187	Building	Intact	Aerial 1969
K36	2629AD-K36	29.498450	-26.339726	Grave/Cemetery	Intact	Field/Pers. Com
K37	2629AD-K37	29.487722	-26.352223	Grave/Cemetery	Intact	Field/Pers. Com
K38	2629BC-K38	29.505759	-26.343688	Grave/Cemetery	Intact	Field/Pers. Com
K39	2629BC-K39	29.504944	-26.339120	Grave/Cemetery	Intact	Field/Pers. Com
K40	2629AD-K40	29.489425	-26.331428	Reservoir	Intact	Field/Pers. Com
K41	2629AD-K41	29.494597	-26.336016	Grave/Cemetery	Intact	Field/Pers. Com
K42	2629AD-K42	29.491678	-26.334957	Grave/Cemetery	Intact	Field/Pers. Com
K43	2629AD-K43	29.495617	-26.327055	Kraal	Intact	Field/Pers. Com
K44	2629AD-K44	29.498704	-26.330484	Grave/Cemetery	Intact	Field/Pers. Com
K45	2629AD-K45	29.498635	-26.338942	Grave/Cemetery	Intact	Field/Pers. Com
K46	2629AD-K46	29.472865	-26.343665	Grave/Cemetery	Intact	Field/Pers. Com
K47	2629AD-K47	29.472604	-26.343879	Grave/Cemetery	Intact	Field/Pers. Com
K48	2629BC-K48	29.536394	-26.325935	Grave/Cemetery	Intact	Field/Pers. Com
K49	2629BC-K49	29.536189	-26.321970	Grave/Cemetery	Intact	Field/Pers. Com
K50	2629BC-K50	29.535222	-26.335562	Grave/Cemetery	Intact	Field/Pers. Com
K51	2629BC-K51	29.535398	-26.334157	Foundation	Demolished	Field/Pers. Com

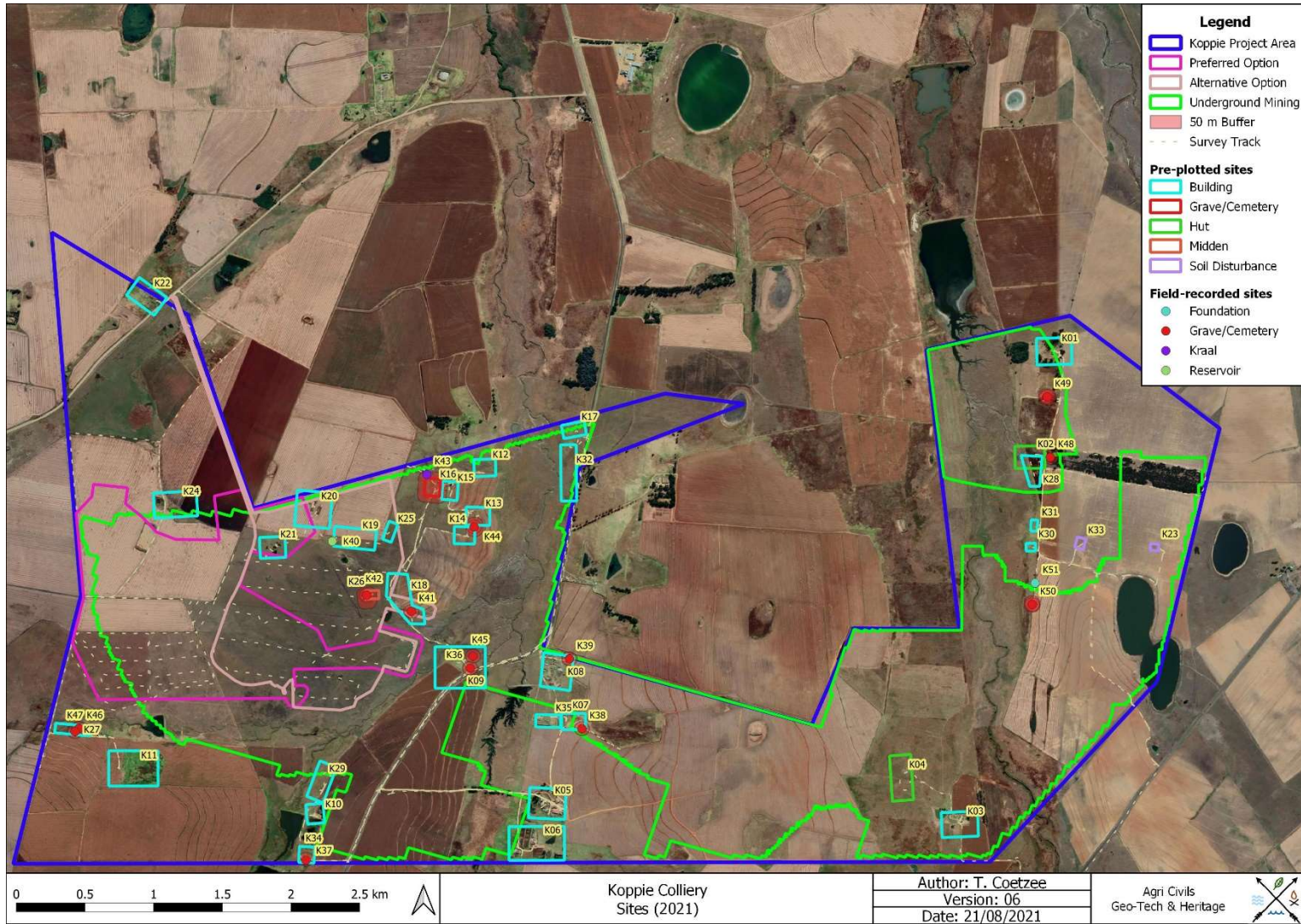


Figure 4: Study area with pre-plotted and field-recorded sites on a 2021 aerial backdrop.



**Figure 5:** Northern area of the Alternative Option.



**Figure 6:** Eastern area of the Alternative Option.



**Figure 7:** Southern area of the Alternative Option.



**Figure 8:** Western area of the Alternative Option.



**Figure 9:** Cultivated northern area of the Alternative Option.



**Figure 10:** Cultivated section at the Preferred Option.





**Figure 11:** Open veldt adjacent the cultivated section at the Preferred Option.



**Figure 12:** Section associated with cleared vegetation at the Preferred Option.

## 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 of 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.

Personal communication with the following owners proved useful in locating graves, cemeteries and historical infrastructure:

- Mr. Jacques Grobler (Portions 21, 27, 30, 32 of the Farm Uitgedacht 229 IS)
- Mr. Trevor Friedman (Portion 6 & 9 of the Farm Uitgedacht 229 IS)
- Mr. Michael da Silva – son of MR. Fernando da Silva (Portion 4 of the Farm Koppie 228 IS)
- Mr. Jervis Grobler (Portion 11 of the Farm Uitgedacht 229 IS)

Personal communication with several local people living in the area proved equally as useful.

### 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 600 m and is located roughly 7 km north-northeast of the Koppie Colliery 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 coal mine near Hendrina in the Mpumalanga Province. The Goedehoop site is located roughly 7 km north of the Koppie Colliery 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 2 km north of the Koppie Colliery 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 majority of the study area was characterised by a combination of burnt grassland, cultivated maize fields and grazing areas during the time of the first survey (September 2020). Visibility was generally considered good (**Figure 13**), though a few places were characterised by patches of dense vegetation that hampered the detection of small or dilapidated structures (**Figure 14**). The second survey that took place in January 2021 was less favourable in terms of visibility as subsequent rain resulted in relatively short but dense groundcover. Rain on the day of surveying also hampered movement and access to some extent, though visibility was still considered to be relatively good. Also, according to Mr. Michael da Silva, a bushpig sow with piglets reside in the patch of trees on Portion 4 of the Farm Koppie 228 IS (Michael da Silva, pers. Comm. 2020). Accordingly, she is very protective over her young and it was strongly advised not to enter the area. The area, although not within an area demarcated for surface infrastructure, was therefore not surveyed. However, the owner pointed out graves at the border of the trees and stated that to his knowledge, no structure or any other graves existed deeper within the patch of trees (**Figure 15**).



**Figure 13:** Generally short grass cover.



**Figure 14:** Dense vegetation in some areas.



**Figure 15:** Dense tree cover on Portion 4 of the Farm Koppie 228 IS.

## **5. Archaeological and Historical Remains**

### **5.1 Stone Age Remains**

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

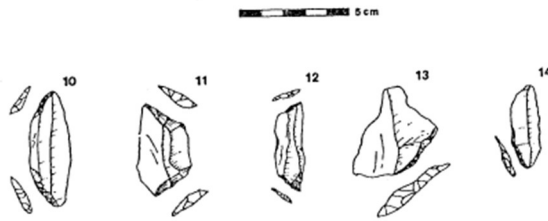
Although I located no Stone Age archaeological remains, such artefacts may occur in the area. These artefacts are often associated with rocky outcrops or water sources. **Figures 16 – 18** below are examples of stone tools often associated with the Early, Middle and Later Stone Age of southern Africa.

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

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



**Figure 16:** ESA artefacts from Sterkfontein (Volman 1984).



**Figure 17:** MSA artefacts from Howiesons Poort (Volman 1984).



**Figure 18:** LSA scrapers (Klein 1984).

## 5.2 Iron Age Farmer Remains

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

The Archaeological and Cultural Historical study done Huffman & Steel (1995) located two circular homesteads that could possibly date to the Late Iron Age.

## 5.3 Historical

Twenty-eight sites dating to the Historical Period were identified using a combination of historical topographical maps, aerial images and via personal observation.

**Table 4** lists the 15 sites (**Figures 19 - 33**) that date to the Historical Period, fall outside of the area demarcated for surface development and have been demolished. These sites mostly include huts indicated on historical topographical maps and buildings visible on historical aerial imagery and are not associated with surface remains (**Appendix A**).

**Table 4:** Demolished historical sites outside of the areas demarcated for surface development.

<b>Name</b>	<b>Type</b>	<b>Source</b>	<b>Year</b>	<b>Status</b>	<b>Age</b>	<b>Estimated extent (ha)</b>	<b>Parcel</b>
K02	Hut	Topo	1963	Demolished	Historical	3.2	4/228
K04	Hut	Topo	1963	Demolished	Historical	4.6	11/229
K07	Building	Aerial	1954	Demolished	Historical	1.8	6/229
K10	Building	Topo	1963	Demolished	Historical	1.6	6/229
K11	Building	Aerial	1954	Demolished	Historical	8.2	2/229
K12	Building	Aerial	1954	Demolished	Historical	1.7	32/229
K13	Building	Aerial	1954	Demolished	Historical	2.0	32/229
K14	Building	Aerial	1954	Demolished	Historical	1.7	32/229
K17	Building	Aerial	1954	Demolished	Historical	1.5	31/229
K22	Building	Aerial	1954	Demolished	Historical	3.6	3/229
K24	Building	Aerial	1954	Demolished	Historical	5.1	3/229
K28	Building	Aerial	1969	Demolished	Historical	2.2	4/228
K29	Building	Aerial	1969	Demolished	Historical	3.2	6/229
K32	Building	Aerial	1969	Demolished	Historical	4.1	31 & 32/229
K51	Building	Survey	Unknown	Demolished	Historical	0.05	4/228



**Figure 19:** K02 – demolished hut.



**Figure 20:** K04 – demolished hut.



**Figure 21:** K07 – demolished building.



**Figure 22:** K10 – demolished building.



**Figure 23:** K11 – demolished building.



**Figure 24:** K12 – demolished building.





**Figure 25:** K13 – demolished building.



**Figure 26:** K14 – demolished building.



**Figure 27:** K17 – demolished building.



**Figure 28:** K22 – demolished building.



**Figure 29:** K24 – demolished building.



**Figure 30:** K28 – demolished building.



**Figure 31:** K29 – demolished building.



**Figure 32:** K32 – demolished building.



**Figure 33:** K51 – potential foundation mounds.

**Table 5** lists the four sites (**Figures 34 - 37**) that date to the Historical Period, fall within or within close proximity of the areas demarcated for surface development and have been demolished. Only two of these sites, K18 & K19, are associated with surface remains in the form of scattered broken bricks. These sites mostly include huts indicated on historical topographical maps and buildings visible on historical aerial imagery (**Appendix A**). It should be noted that due to subsequent mining layout alterations, Site K09 is no longer located within close proximity of areas demarcated for surface development.

**Table 5:** Demolished historical sites within or near areas demarcated for surface development.

Name	Type	Source	Year	Status	Age	Estimated extent (ha)	Parcel
K09	Building	Aerial	1954	Demolished	Historical	9.9	6/229
K18	Building	Aerial	1954	Demolished	Historical	5.1	21/229
K19	Building	Aerial	1954	Demolished	Historical	3.9	27/229
K25	Building	Aerial	1954	Demolished	Historical	5.1	27/229



**Figure 34:** K09 – demolished building.



**Figure 35:** K18 – demolished building.



**Figure 36:** K19 – demolished building.



**Figure 37:** K25 – demolished building.

**Table 6** lists the three sites that date to the Historical Period, fall within the boundary of the Alternative Option and are characterised by surface structures or features (**Figures 38 - 41**). It should be noted that Sites K20 & K21 intersect both the Preferred and Alternative Options. Site K20 is located within a cultivated field near the northern border of the Alternative Option and consists of four structures. Two of the structures are circular and were built with bricks and cement (**Figures 38 – 39**). Another building was built from stone and is rectangular in form (**Figure 40**), while only cement rubble is left of the last building (**Figure 41**). Historical aerial imagery dating to 1954 and 1955 (**Appendix A: Figures 105 & 106**), as well as the 1964 topographical map (**Appendix A: Figure 108**) show the presence of structures. However, the 1969 aerial image as well as the 1984 topographical map, show the area to be vacant of buildings (**Appendix A: Figures 107 & 109**).

Site K21 is located just south of a cultivated field near the north-eastern border of the Alternative Option and consists of several structures. The building remains portray a homestead with several outbuildings, as well as structures possibly used for small stock. The majority of the buildings were constructed from bricks, but a few smaller structures were built using stone (**Figures 42 - 45**). Historical aerial imagery dating to 1954, 1955 and 1969 (**Appendix A: Figures 105 & 106**), as well as the 1964 and 1984 topographical maps (**Appendix A: Figures 108 & 109**) show the presence of structures. However, the 2009 topographical map, show the presence of a ruin

(**Appendix A: Figure 111**). This means the buildings were demolished between 1996 and 2009. It should also be noted that another building is indicated to northwest of the main building on the 1984 topographical map (**Appendix A: Figure 109**), but appears to have been demolished by 1996 (**Appendix A: Figure 110**).

Site K26 is located near cemetery K42 on Portion 21/229 and within the Alternative Option surface boundary. The sites consists of a midden and is rich in material culture. Also, building rubble consisting of bricks and cement were observed in close proximity of the site (**Figures 46 – 49**). A few structures are visible on historical aerial imagery dating to 1954 and 1955 (**Appendix A: Figures 105 & 106**) at this locality, with an apparent increase in the number of structures and activity on the 1969 aerial image (**Appendix A: Figure 107**). A building is indicated at this locality on the 1984 topographical map, but is not indicated on the 1996 topographical map (**Appendix A: Figure 110**).

**Table 6:** Partially demolished historical sites within or near areas demarcated for surface development

Name	Type	Source	Year	Status	Age	Estimated extent (ha)	Parcel
K20	Building	Aerial	1954	Partially demolished	Historical	5.9	27/229
K21	Building	Aerial	1954	Partially demolished	Historical	2.5	21/229
K26	Midden	Survey	N/A	Intact	Historical	0.5	21/229



**Figure 38:** K20 – Brick structure.



**Figure 39:** K20 – Circular brick & cement structure.



**Figure 40:** K20 – Stone ruin.



**Figure 41:** K20 – Cement ruin.



**Figure 42:** K21 – Building ruin.



**Figure 43:** K21 – Outbuildings.



**Figure 44:** K21 – Stone ruin.



**Figure 45:** K21 – Small stock structure.



**Figure 46:** K26 – Midden.



**Figure 47:** K26 – Extent of midden.



**Figure 48:** K26 – Material culture at midden.



**Figure 49:** K26 – building remains at midden.

**Table 7** lists the six historical sites (**Figures 50 - 63**) that consist of mostly intact buildings/structures that fall outside of the area demarcated for surface development but within or within close proximity of the boundary demarcated for underground mining. Site K03 is located on Portion 11 of the Farm Uitgedacht 229 IS (**Figure 4**). The site consist of two dilapidated historical buildings built using stone and cement, as well as one angular structure and a reservoir (**Figures 50 – 52**). One of the buildings has been partially repaired with modern building bricks. Structures are visible on the 1954, 1955 and 1969 aerial photographs (**Appendix A: Figures 105 – 107**), as well as on all the topographical maps (**Appendix A: Figures 108 – 111**). The general area is associated with cattle farming activities that include a cattle crush and kraal. One of the buildings appear to be used as a store.

Sites K05 & K06 are located on Portion 9 of the Farm Uitgedacht 229 IS and consists of several buildings. Site K05 (**Figures 53 – 55**) is the residence of Mr. Trevor Friedman and according to Mr. Friedman, Site K06 used to be a dairy (**Figures 56 – 57**), but was later partially demolished (Trevor Friedman, pers. Comm. 2020). Presently, local farm workers stay in the building. Several contemporary buildings are also associated with Site K05 and it was noted that the residence has been significantly altered over the years. The farm has been in Mr. Friedman's family for several years and Mr. Friedman noted that the main residence had already existed in 1941 and that additions were made in 1948 (Trevor Friedman, pers. Comm. 2020). Structures are visible at both locations on the 1954, 1955 and 1969 aerial images (**Appendix A: Figures 105 – 107**). When the historical topographical maps are considered, the 1963 map shows four buildings at Site K05 and two at Site K06 (**Appendix A: Figure 108**), while the 1973 topographical map shows one building at each site (**Appendix A: Figure 109**). The 1996 topographical map, however, again shows four buildings at Site K05 and three at Site K06 (**Appendix A: Figure 110**). The 2009 topographical map (**Appendix A: Figure 111**) indicates four buildings at Site K05 and two buildings and a ruin at Site K06.

Site K08 is located on Portion 6 of the Farm Uitgedacht 229 IS and consists of several buildings (**Figures 58 – 60**). The aerial images dating to 1954 and 1955 show a few buildings along the eastern boundary of the site while the 1969 aerial image several new buildings. However, it is not clear whether the buildings visible on the 1954 and 1955 aerial images are still present or if they have been demolished and replaced by new buildings (**Appendix A: Figure 105 & 106**). When the historical topographical maps are considered, however, a hut is shown along the eastern boundary of the site by 1963, suggesting that the structures visible on the 1954 and 1955 aerial images might be the same. The 1973 topographical map (**Appendix A: Figure 109**) shows the presence of a shop and four other buildings. Personal communication with one of the residents who claim to have lived there his entire life, stated that the shop and the few face brick houses are the oldest. This suggests that the initial structures indicated on the 1954 and 1955 aerial images were demolished after 1963, but also that new buildings were erected between 1963 and 1969. Also, when recent aerial imagery is inspected, the areas where the initial buildings of 1954 were seen appear vacant (**Figure 4**).

Site K15, located on Portion 32 of the Farm Uitgedacht 229 IS, consists of an intact fenced-off residence, outbuilding and water tank (**Figures 61 & 62**). The residence appear to have been repaired to certain extent in recent years as the building is plastered and painted. The building is visible on all the historical aerial photographs, as well as the historical topographical maps (**Appendix A**). Both the 1984 and 1996 topographical maps show two buildings, while the 1964 and 2009 topographical maps only show one building. Presently the residence is empty and several cracks can be observed in the walls.

Site K43 is located on Portion 32 of the Farm Uitgedacht 229 IS and a short distance to the northwest of Site K15 (**Figure 63**). The structure consist of a stone structure that appears to have been used for small stock farming. No feature is visible on the 1954 and 1955 aerial images (**Appendix A: Figures 105 & 106**), but might be attributed to the small size of the structure. The 1969 aerial image, however, shows a clearing that might relate to the repeated use of the small stock kraal and crush (**Appendix A: Figure 107**). This also means that the structure was most likely constructed between 1955 and 1969. No structures are indicated on any of the topographical maps.

**Table 7:** Intact historical sites on or near areas demarcated for underground mining.

Name	Type	Source	Year	Status	Age	Estimated extent (ha)	Parcel
K03	Building	Aerial	1954	Intact	Historical	4.3	11/229
K05	Building	Aerial	1954	Intact	Historical	5.2	9/229
K06	Building	Aerial	1954	Intact	Historical	8.9	9/229
K08	Building	Aerial	1954	Intact	Historical	4.8	6/229
K15	Building	Aerial	1954	Intact	Historical	1.3	32/229
K43	Kraal	Survey	N/A	Intact	Historical	0.05	32/229





**Figure 50:** K03 –Stone building repaired using bricks.



**Figure 51:** K03 – Stone & cement ruin.



**Figure 52:** K03 – Angular building & reservoir.



**Figure 53:** K05 – Residence



**Figure 54:** K05 – Store.



**Figure 55:** K05 – Contemporary building.



**Figure 56:** K06 – Farm workers' section.



**Figure 57:** K06 – Dilapidated section.



**Figure 58:** K08 – Old shop.



**Figure 59:** K08 – Old brick buildings.



**Figure 60:** K08 – Modern structure.



**Figure 61:** K15 – Old residence.



**Figure 62:** K15 – Outbuilding & eater tank.



**Figure 63:** K43 – Possible small stock enclosure.

The Heritage study done by Huffman & Steel (1995) for the Forzando Coal Holdings on the Farms Weltevreden 193 IS and Halfgewonnen 190 IS recorded angular settlement remains that might date to the same time period as the structures recorded in this study.

## 5.4 Contemporary Remains

**Table 8** lists the nine sites (**Figures 64 – 73**) that date to contemporary times. These sites mostly include natural soil disturbances and buildings and structures of recent origin (**Appendix A**).

Site K01, located on Portion 4 of the Farm Koppie 228 IS, first appears on the 1963 topographical map (**Appendix A: Figure 108**) as a building and is visible on the 1969 aerial photograph as well (**Appendix A: Figure 107**). By 1973 two buildings are indicated (**Appendix A: Figure 109**), but by 1996 only a ruin is shown on the topographical map (**Appendix A: Figure 110**), while the 2009 topographical map again shows two buildings (**Appendix A: Figure 111**). Personal communication with Mr. Michael da Silva, however, revealed that the old residence that existed on the northern side of the current building, was completely demolished (Michael da Silva, pers. Comm. 2020) (**Figures 64 & 65**).

Sites K23 & K33 are located on Portion 4 of the Farm Koppie 228 IS and appear as disturbances on the 1969 aerial photographs (**Appendix A: Figure 107**). No evidence, however, of buildings or structures were detected at these localities during the pedestrian survey (**Figures 66 & 67**).

Site K27, located on Portion 2 of the Farm Welgedacht 229 IS, consists of several buildings (**Figure 68**). Buildings are seen on the 1954 and 1955 aerial photographs (**Appendix A: Figure 105 & 106**), but appear to have been demolished and replaced by more recent buildings by 1969 (**Appendix A: Figure 107**). It should also be noted that no buildings are indicated on the 1964 topographical map (**Appendix A: Figure 108**) and one building on the 1984 topographical map (**Appendix A: Figure 109**). By 1996 (**Appendix A: Figure 110**) five buildings are shown and by 2009 three (**Appendix A: Figure 111**).

Sites K30 & K31 are located on Portion 4 of the Farm Koppie 228 IS and first appear on the 1969 aerial image (**Appendix A: Figure 107**). The 1963 topographical map (**Appendix A: Figure 108**), however, do not show the buildings, but they are indicated on the 1973 and 1996 topographical maps (**Appendix A: Figures 109 & 110**). This suggests that the buildings were constructed between 1963 and 1969, but was demolished before 2009 (**Figures 69 & 70; Appendix A: Figure 111**).

Site K34, located on Portion 6 of the Farm Welgedacht 229 IS, is associated with a structure appearing on the 1969 aerial image (**Appendix A: Figure 107**), although no structure is shown on any of the topographical maps. The pedestrian survey also revealed no structure or material remains at the site (**Figure 71**).

Site K35, located on Portion 6 of the Farm Welgedacht 229 IS, consists of several buildings (**Figure 72**). No buildings or structures are seen on the 1954 and 1955 aerial photographs (**Appendix A: Figures 105 & 106**), but a few do appear by 1969 (**Appendix A: Figure 107**). The 1963 and 1973 topographical maps (**Appendix A: Figure 109**) make no reference to structures in this vicinity, but two buildings are shown on the 1996 topographical map (**Appendix A: figure 110**). It should also be noted that the buildings appearing on the 1969 aerial photograph appear not to be in the same location as the buildings currently associated with the site, suggesting that the buildings were replaced by more recent buildings (**Figure 4**).

Site K40 consist of a windpump and reservoir to the east of Site K21. The site appears to date to contemporary times and the reservoir was constructed from corrugated iron. No structures are visible on the 1954 and 1955 historical aerial imagery (**Appendix A: Figures 105 & 106**), but a reservoir is indicated on the 1969 aerial photograph (**Appendix A: Figure 107**), as well as on the 2009 topographical map (**Appendix A: Figure 111**). Three modern storage tanks are also located next to the reservoir (**Figure 73**).

**Table 8:** Contemporary Remains.

Name	Type	Source	Year	Status	Age	Estimated extent (ha)	Parcel
K01	Building	Aerial	Unknown	Intact	Contemporary	4.4	4/228
K23	Soil Disturbance	Aerial	2019	Natural	N/A	0.3	4/228
K27	Building	Aerial	1954	Intact	Contemporary	1.6	2/229
K30	Building	Aerial	1969	Demolished	Contemporary	0.3	4/228
K31	Building	Aerial	1969	Demolished	Contemporary	0.4	4/228
K33	Soil Disturbance	Aerial	1969	Natural	N/A	0.5	4/228
K34	Building	Aerial	1954	Demolished	Contemporary	1.2	6/226
K35	Building	Aerial	1969	Intact	Contemporary	1.5	6/229
K40	Reservoir	Field	Unknown	Intact	Contemporary	0.1	27/229



**Figure 64:** K01 – Modern building



**Figure 65:** K01 – Demolished building.



**Figure 66:** K23 – Soil disturbance



**Figure 67:** K33 – Soil disturbance.



**Figure 68:** K27 – Typical structure resembling the rest.



**Figure 69:** K30 – Foundation mound.



**Figure 70:** K31 – Foundation mound.



**Figure 71:** K34 – Possible demolished structure.



**Figure 72:** K35 – Buildings.



**Figure 73:** K40 – Reservoir & windpump.

Heritage studies done in the surrounding area did not record buildings or structures dating to contemporary times. See Van Vollenhoven (2013); National Cultural History Museum (2003); Huffman & Steel (1995).

## 5.5 Graves

Thirteen confirmed graves or cemeteries and one possible cemetery were identified using a combination of historical topographical maps, aerial images, personal communication with land owners or local farm workers and via personal observation.

**Table 9** lists the three sites that fall outside of the area demarcated for surface development and underground mining. Site K37 is located on the southern border of Portion 6 of the Farm Uitgedacht 229 IS and approximately 130 m from the closest planned underground mining. The site is a formal cemetery consisting of approximately 60 graves oriented in an east-west direction. The cemetery consists of a fenced-off section, housing about 19 graves with formal grave dressings belonging to the Mahlangu Family. These graves are generally better preserved (**Figures 74 & 75**). The graves falling on the outside of the fenced-off area, approximately 41, are not as well preserved and consists of a combination of formal as well as informal grave dressings (**Figure 76**). Also, not all graves have headstones. A recent grave, **Figure 77**, means the cemetery is still in use. A few snuff box

lids and empty bottles were observed in association with the graves. The age of the cemetery is unclear, but one of the earliest dates visible are 1981.

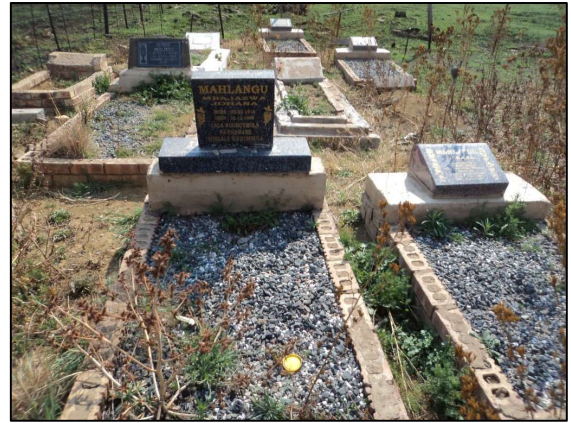
Sites K46 & K47 are located near the western border of the study area on Portion 2 of the Farm Uitgedacht 229 IS and approximately 520 m from the nearest proposed underground mining (**Figure 4**). Both sites are associated with Site K27 as these graves are located directly behind some of the buildings. The graves associated with these sites are not fenced-off, but are heavily overgrown and the number of graves are unknown (**Figures 78 & 79**). The age of the cemetery is not known, but could date to the late 1950's or 1960's.

**Table 9:** Graves/cemeteries located outside of the areas demarcated for surface development and underground mining.

<b>Name</b>	<b>Type</b>	<b>Source</b>	<b>Status</b>	<b>Estimates extent (m<sup>2</sup>)</b>	<b>Parcel</b>
K37	Grave/Cemetery	Pers. Comm	Intact	640	6/229
K46	Grave/Cemetery	Pers. Comm	Intact	70	2/229
K47	Grave/Cemetery	Pers. Comm	Intact	100	2/229



**Figure 74:** K37 – Fenced-off section.



**Figure 75:** K37 – Preserved graves.



**Figure 76:** K37 – Dilapidated graves.



**Figure 77:** K37 – Recent grave.



**Figure 78:** K46 – Grave.



**Figure 79:** K47 – Overgrown graves.



The nine graves/cemeteries that fall outside of the demarcated surface development, but within the boundary of the proposed underground mining area are listed in **Table 10**.

**Table 10:** Graves/cemeteries located outside of the areas demarcated for surface development, but within the underground mining boundary.

Name	Type	Source	Year	Status	Estimated extent (m <sup>2</sup> )	Parcel
K16	Grave/Cemetery	Topo	1964	Unknown	1.2 (ha)	32/229
K36	Grave/Cemetery	Pers. Comm	N/A	Intact	25	6/229
K38	Grave/Cemetery	Pers. Comm	N/A	Intact	25	6/229
K39	Grave/Cemetery	Pers. Comm	N/A	Intact	1733	6/229
K44	Grave/Cemetery	Pers. Comm	N/A	Intact	390	32/229
K45	Grave/Cemetery	Survey	N/A	Intact	25	6/229
K48	Grave/Cemetery	Pers. Comm	N/A	Intact	30	4/228
K49	Grave/Cemetery	Pers. Comm	N/A	Intact	410	4/228
K50	Grave/Cemetery	Pers. Comm	N/A	Intact	200	4/228

Site K16, located on Portion 32 of the Farm Uitgedacht 229 IS and approximately 250 m east of the proposed Alternative Option surface development, was identified on the 1964 Topographical map (**Appendix A: Figure 108**). The cemetery is not indicated on any of the other topographical maps. Also, no burial site could be detected during the pedestrian survey. Two possibilities exist. The farm name on the 1964 topographical map is spelled 'Uitgedach' and with a final 't' about half the size of the rest of the text and without the bottom part of the letter, mimicking the symbol for a cemetery. The other possibility is that a cemetery or grave does exist at this location, but that the map symbol infringes on the label of the farm name, thereby cutting the last 't' from the word 'Uitgedacht'. The areas associated with Site K16 is shown in **Figure 80**.

Sites K36 & K45 fall on Portion 6 of the Farm Uitgedacht 226 IS and approximately 380 m east of the proposed Alternative Option (**Figure 4**). Site K36 (**Figure 81**) consist of a single broken headstone with the name 'Mahlangu' visible. The orientation and age of the grave is not known and no surface material were observed. Site K46 is located 86 m to the north of Site K36 and on the same farm portion. Site K45 is marked by a single formal grave oriented in an east-west direction. Due to the dilapidated state no inscriptions are visible on the headstone. A pile of rocks is found next to the grave and it is believed that the informal grave dressing was at some stage replaced by a formal one (**Figure 82**). Except for an empty bottle, no other grave goods were observed.

Site K38 is located on the border of Portion 6/229 and 9/229, is roughly in the middle of the study area and was pointed out by the land owner (**Figure 4**). The site is fenced-off in a rectangular shape, is overgrown and no orientation or grave goods could be identified (**Figure 83**).

Site K39, also located on Portion 6 of the Farm Uitgedacht 229 IS, lies roughly 500 m to the north of Site K38 (**Figure 4**). The cemetery is associated with the settlement next to which it is found, is not fenced-off, consists of approximately 100 graves with patches of relatively short but dense vegetation. The majority of the graves consist of informal grave dressings with an identification tag, while two formal grave dressings were observed. All the graves appear to be oriented in an east-west direction. Also, the cemetery is still on use as the most recent identification plaque dates to 2019 (**Figures 84 - 86**). Few grave goods were observed and several of the graves are in a dilapidated state.

Site K44 is located approximately 550 m east of the proposed Alternative Option on Portion 32 of the Farm Uitgedacht 229 IS and within a cultivated field (**Figure 4**). Due to the dilapidated state of the graves and the short but dense grass cover, the exact number of graves could not be determined, but is estimated at nine. The visible graves are oriented in an east-west direction and four graves are characterised by formal grave dressings (**Figures 87 – 89**). The cemetery is not fenced-off and appears not to be in use anymore. The earliest burial date visible on the headstones appear to be '1975'.

Site K48, located within a patch of trees on Portion 4 of the Farm Koppie 228 IS and approximately 40 m east of the Sites K02 and K28, was pointed out by Mr. Michael da Silva. According to Mr. da Silva, these graves date to the Anglo Boer War (Michael da Silva, pers. Comm. 2020). Three graves were observed, but due to the dilapidated state on poor visibility caused by tree cover, more might exist. No headstones are visible and the graves appear to consist of stone cairns of unknown orientation. Also, no grave goods were observed (**Figures 90 & 91**).

The cemetery, K49, is located between Site K01 and K02 on Portion 4 of the Farm Koppie 228 IS (**Figure 4**). The graves are located within a patch of trees, are not fenced-off and are in a severely dilapidated state, possibly due to cattle. Due to the poorly preserved state of the graves, the exact number of graves could not be determined, but appear to be between eight and 11. In four instances the graves were oriented in a north-south direction. Two of the headstones were found on the southern end, while two were found on the northern end. One grave was oriented in an east-west direction, while the orientation of three graves were uncertain (**Figures 92 – 94**). No grave goods or inscriptions were observed. The cemetery also appears not to be in use anymore.

Site K50 consists of approximately 14 graves oriented in an east-west direction in an open field on Portion 4 of the Farm Koppie 228 IS (**Figure 4**). One of the graves are characterised by a formal grave dressing, while the rest consists of stacked stones and in two cases, an upright stone serves as a headstone. The cemetery is not

fenced-off and is in slightly dilapidated state (**Figures 95 – 97**). No grave goods or inscriptions were observed. The cemetery also appears not to be in use anymore.

Two burial sites have been identified that fall within the proposed Alternative Option (**Figure 4**). These sites are listed in **Table 11**.

**Table 11:** Graves/cemeteries located within the areas demarcated for surface development.

Name	Type	Source	Status	Estimated extent (m <sup>2</sup> )	Parcel
K41	Grave/Cemetery	Pers. Comm	Intact	25	21/229
K42	Grave/Cemetery	Pers. Comm	Intact	2100	21/229

Site K41 is located within the boundary of the proposed Alternative Option towards the eastern boundary (**Figure 4**). The grave is oriented in a north-south direction, although the extent is unclear due to dense vegetation. No date is visible on the headstone and the grave is not fenced-off (**Figure 98**). The grave also falls within the area associated with Site K18.

Site K42, located roughly 340 m northwest of Site K42, falls well within the demarcated Alternative Option on Portion 21 of the Farm Uitgedacht 229 IS and in close proximity of Site K26 (midden). Site K42 consists of 13 fenced-off graves of which five have formal grave dressings oriented in an east-west direction, as well as approximately 40 graves that are not fenced-off. Of the graves that are not fenced-off, eight are characterised by formal grave dressings, while the rest are informal. Dense vegetation and a dilapidated state of some graves hampered visibility. The area is also characterised by a high number of beer bottles, as well as tin cups (**Figures 99 - 103**). It is unclear whether the cemetery is still in use, but the most recent bury date observed was 2014.



**Figure 80:** K16 – No visible cemetery.



**Figure 81:** K36 – Single dilapidated grave.



**Figure 82:** K45 – Formal grave.



**Figure 83:** K38 – Single grave.



**Figure 84:** K39 – Informal grave with identification plaque.



**Figure 85:** K39 – Formal grave dressing.



**Figure 86:** K39 – General view of the cemetery.



**Figure 87:** K44 – General view of cemetery.



**Figure 88:** K44 – Formal grave.



**Figure 89:** K44 – Informal grave.



**Figure 90:** K48 – Stone cairn grave.



**Figure 91:** K48 – Poor visibility.



**Figure 92:** K49 – General view of cemetery.



**Figure 93:** K49 – Formal grave, headstone to the North.



**Figure 94:** K49 – Unclear grave.



**Figure 95:** K50 – General view of cemetery.



**Figure 96:** K50 – Formal grave.



**Figure 97:** K50 – Informal grave.



**Figure 98:** K41 – Single grave.



**Figure 99:** K42 – Fenced-off section.



**Figure 100:** K42 – General view.



**Figure 101:** K42 – Formal graves.



**Figure 102:** K42 – beer bottles.



**Figure 103:** K42 – Informal graves.

Two of the heritage studies done in the area (Cultural History Museum 2003; Huffman & Steel 1995) recorded similar burial sites.

## 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 12:** 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 13:** Individual site ratings

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2629BC-K01	Building	General Protection C	4 C	Low	No recording necessary
2629BC-K02	Demolished Structure	General Protection C	4 C	Low	No recording necessary
2629BC-K03	Building	General Protection B	4 B	Medium	Record site



Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2629BC-K04	Demolished Structure	General Protection C	4 C	Low	No recording necessary
2629BC-K05	Building	Local	Grade 3 A	High	Mitigation not advised
2629BC-K06	Building	General Protection B	4 B	Medium	Record site
2629BC-K07	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629BC-K08	Building	General Protection B	4 B	Medium	Record site
2629AD-K09	Demolished Building	Local	Grade 3 A	High	Mitigation not advised
2629AD-K10	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629AD-K11	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629AD-K12	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629AD-K13	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629AD-K14	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629AD-K15	Building	Local	Grade 3 A	High	Mitigation not advised
2629AD-K16	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629BC-K17	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629AD-K18	Demolished Building	General Protection B	4 B	Medium	Record site
2629AD-K19	Demolished Building	General Protection B	4 B	Medium	Record site
2629AD-K20	Partially Demolished Building	General Protection B	4 B	Medium	Record site
2629AD-K21	Partially Demolished Building	General Protection B	4 B	Medium	Record site
2629AD-K22	Demolished Building	General Protection B	4 B	Medium	Record site
2629BC-K23	Soil Disturbance	General Protection C	4 C	Low	No recording necessary
2629AD-K24	Demolished Building	General Protection C	4 C	Low	No recording necessary

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2629AD-K25	Demolished Building	General Protection B	4 B	Medium	Record site
2629AD-K26	Midden	Local	Grade 3 A	High	Mitigation not advised
2629AD-K27	Building	General Protection C	4 C	Low	No recording necessary
2629BC-K28	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629AD-K29	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629BC-K30	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629BC-K31	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629BC-K32	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629BC-K33	Soil Disturbance	General Protection C	4 C	Low	No recording necessary
2629AD-K34	Demolished Building	General Protection C	4 C	Low	No recording necessary
2629BC-K35	Building	General Protection C	4 C	Low	No recording necessary
2629AD-K36	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629AD-K37	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629BC-K38	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629BC-K39	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629AD-K40	Reservoir	General Protection C	4 C	Low	No recording necessary
2629AD-K41	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629AD-K42	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629AD-K43	Kraal	General Protection B	4 B	Medium	Record site
2629AD-K44	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629AD-K45	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2629AD-K46	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629AD-K47	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629BC-K48	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629BC-K49	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629BC-K50	Grave/Cemetery	Local	Grade 3 A	High	Mitigation not advised
2629BC-K51	Demolished Structure	General Protection B	4 B	Medium	Record site

## 7. Statement of Significance & Recommendations

### 7.1 Statement of significance

#### **The study area: The Proposed Koppie Mining Project**

Some of the proposed areas demarcated for the proposed Koppie Mining Project are considered to be significant from a heritage perspective. The significance of the proposed areas and the observed sites are discussed here.

The general study area is associated with a combination of historical buildings, foundation mounds, building ruins, single graves and cemeteries. Because the majority of the study area will consist of underground mining methods, only the heritage sites that might be impacted on by the proposed surface development and underground mining are indicated on **Figure 104**.

#### **Demolished historical sites falling outside of the areas demarcated for surface development.**

The following 16 sites that have been identified on historical aerial and topographical maps have been demolished, are not associated with surface material and fall outside of the areas demarcated for surface development (Alternative & Preferred). Although these sites are significant from a heritage perspective, no surface impact is envisaged: K02, K04, K07, K09, K10-K14, K17, K22, K24, K28, K29, K32, K51.

#### **Demolished historical sites within or near areas demarcated for surface development.**

Three sites (K18, K19, K25) have been identified falling within or within close proximity of the areas demarcated for surface development. These sites have been demolished and two sites, K18 and K19, are associated with surface remains. Significant subsurface heritage material exceeding 60 years of age might therefore be unearthed during construction and mining phases and would therefore be considered significant from a heritage perspective as such remains would be protected under the NHRA act 25 of 1999.

#### **Partially demolished historical sites within or near areas demarcated for surface development.**

Sites K20, K21 and K26 fall within the boundary of the Alternative Option and consist of a combination of intact and partially demolished structures. Sites K20 & K21 also intersects the Preferred Option. Significant surface and subsurface heritage material exceeding 60 years of age might therefore be impacted during construction and mining phases due to the sites' proximity to the proposed surface development. These remains are therefore considered significant from a heritage perspective as such remains are be protected under the NHRA act 25 of 1999.

#### **Intact historical sites on or near areas demarcated for underground mining.**

The following sites date to historical times that consist mostly of intact buildings/structures that fall outside of the area demarcated for surface development but within or within close proximity of the boundary demarcated for underground mining: K03, K05, K06, K08, K15, K43. Because these buildings/structures exceed 60 years of age, they are considered significant form a heritage perspective and are protected under the NHRA act 25 of 1999.

#### **Contemporary remains**

Nine sites (K01, K23, K27, K30, K31, K33, K34, K35, K40), consisting of a combination of intact buildings, natural features or ruins, proved to date to contemporary times and are therefore not considered significant from a heritage perspective as these sites do not exceed 60 years of age and appear not to bear any other heritage importance.

#### **Graves/Cemeteries located outside of the demarcated surface development and underground mining areas**

Three sites (K37, K46, K47) were identified as graves/cemeteries falling outside of the demarcated surface development and underground mining areas. It is likely that the cemeteries contain graves older, as well as younger than 60 years and are significant from a heritage perspective as the Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925), as well as the National Heritage Resources Act 25 of 1999 apply. However, it is unlikely that these sites will be impacted on by the proposed development as they are located a significant distance from the proposed development.

### **Graves/Cemeteries located outside of the demarcated surface development but within the underground mining boundary**

The following graves/cemeteries fall outside of the area demarcated for surface development, but within the boundary of underground mining activity. These sites might therefore be at risk of suffering impact from the proposed development: K16, K36, K38, K39, K44, K45, K48, K49, K50. As stated above, it is uncertain whether a grave or cemetery is located at Site K16, but it should be regarded as a burial site until proven otherwise. Also, the burial dates of the majority of the graves could not be determined. However, it is likely that the cemeteries contain graves older, as well as younger than 60 years and are significant from a heritage perspective as the Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925), as well as the National Heritage Resources Act 25 of 1999 apply.

### **Graves/cemeteries located within the areas demarcated for surface development.**

Sites K41 & K42 are graves/cemeteries falling within the proposed Alternative Option surface area. These sites are therefore at risk of being negatively impacted by the proposed development. It is likely that the cemeteries contain graves older, as well as younger than 60 years and are significant from a heritage perspective as the Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925), as well as the National Heritage Resources Act 25 of 1999 apply.

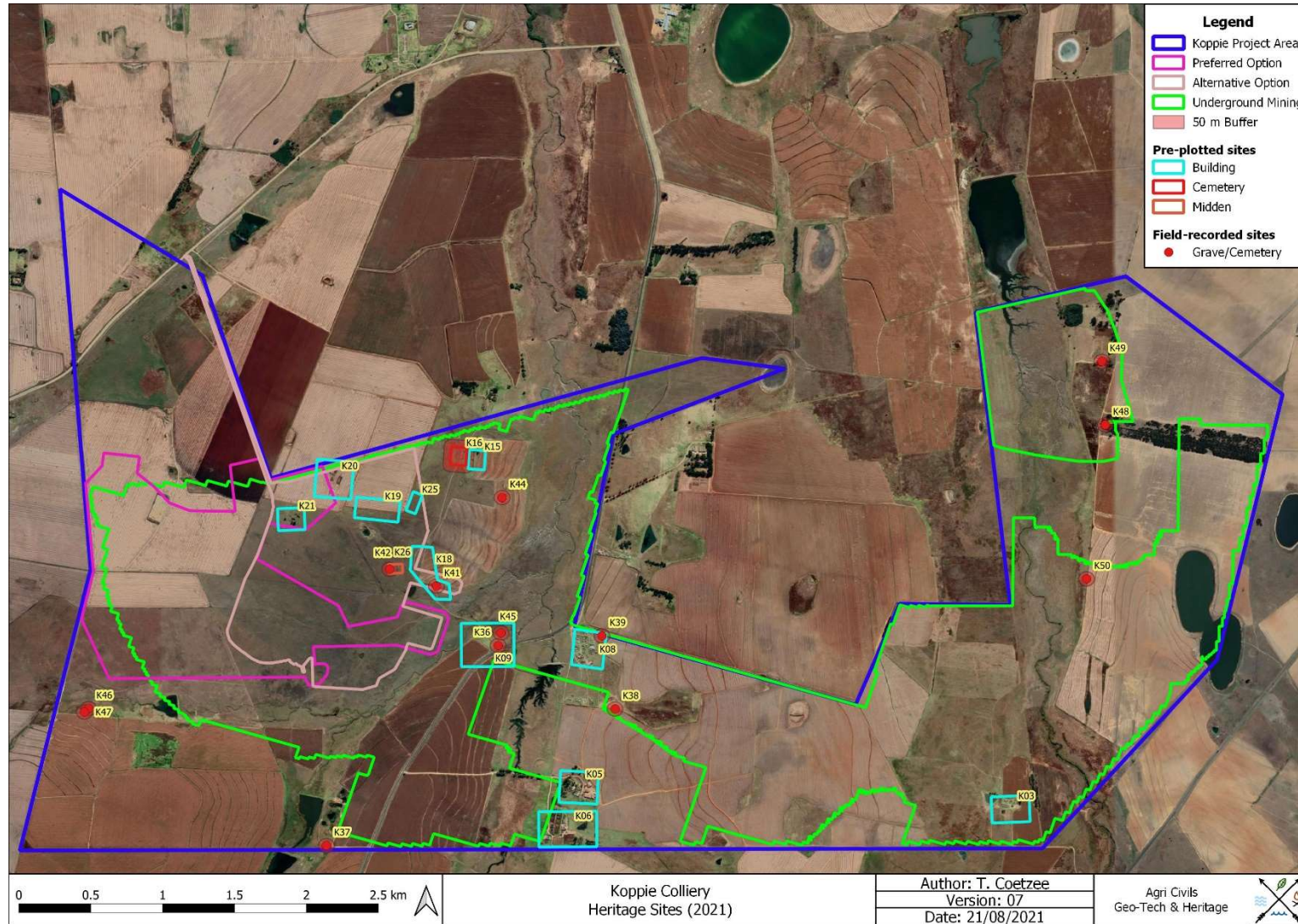


Figure 104: Heritage sites and buffer zones indicated on a 2021 aerial backdrop.

## 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 areas demarcated for development. It should be noted that the AIA requires all identified sites, regardless of significance, to be listed in this section.

The following recommendations are made should the **Alternative Option** be considered:

- The areas associated with sites K18, K25 and K19 are considered potentially significant from a heritage perspective as these localities are associated with structures dating to historical times. Even though the surface has completely been disturbed, subsurface cultural material might exist and care should therefore be exercised during construction and mining phases.
- Site K40 consist of a windpump and reservoir dating to contemporary times. The site is therefore not of heritage significance and no further action is required.
- Site K26 is a midden that might date to historical times as some activity is evident on historical aerial imagery. It is recommended that this area be avoided by the proposed surface development, especially since the nearby cemetery (Site K42) might be related to the midden.
- Site K41, a single grave, is significantly overgrown and appears to be partially dilapidated. It is recommended that a fenced-off conservation buffer of 50 m be established around the grave and that a qualified archaeologist compile a Conservation Management Plan to ensure the safeguarding of the grave. Also, access to the grave must not be refused. Alternatively, the grave may be relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of community leaders and the relatives of the deceased buried at the concerned location.
- Site K42 consists of a cemetery, is partially overgrown and is slightly dilapidated. It is recommended that a fenced-off conservation buffer of 50 m be established around the cemetery and that a qualified archaeologist compile a Conservation Management Plan to ensure the safeguarding of the graves. Also, access to the cemetery must not be refused. Alternatively, the graves may be relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of community leaders and the relatives of the deceased buried in the concerned cemetery.

- Should the Alternative Option not be used, the following applies to Sites K41 & K42 as underground mining activity might still affect the burial sites: It is recommended that a fenced-off conservation buffer of 50 m be established around the grave/cemetery and that a qualified archaeologist compile a Conservation Management Plan to ensure the safeguarding of the graves. Also, access to the grave/cemetery must not be refused. Alternatively, the graves may be relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of the relatives of the deceased buried in the concerned cemetery. The distance from Site K42 to the proposed adit is approximately 258 m.

The following recommendations are made should the **Preferred Option** be considered:

- No sites of heritage importance were observed during the survey or on historical aerial imagery and topographical maps. This location appears to have a low sensitivity in terms of heritage resources as the majority of this area is disturbed by cultivation. Therefore, from a heritage perspective, the Preferred Option is preferred for surface development.

The following recommendations are made for sites intersecting both the **Preferred and Alternative Options**:

- Site K20 & K21 consist of partially demolished historical buildings. It is recommended that these sites be avoided by the proposed development. These sites should also be monitored by the mine's ECO for any impact caused by the proposed mining development and should any impact be observed, or if impact cannot be avoided, all buildings and structures associated with the demarcated areas must be adequately recorded by a qualified archaeologist and destruction permits be obtained from the relevant heritage authority.

**Areas falling outside of the proposed surface development area, but within or close to the proposed underground mining boundary.**

- A historical building used to be located at Site K01, but was demolished and replaced by a modern building. The site is therefore not of heritage significance and no further action is required.
- Site K23 was identified as a natural soil disturbance and is not of heritage significance. No further action is therefore required.
- According to historical datasets Sites K30 & K31 (foundation mounds) are of contemporary origin and therefore not of heritage significance. No further action is required.



- Sites K03, K15 and K43 fall within the boundary of the proposed underground section and consist of several buildings dating to historical times. It is therefore recommended that the mine's ECO quarterly, as well pre- and post-blasting, inspect these structures. Should any impact be observed, or if impact cannot be avoided, all buildings and structures associated with the demarcated areas must be adequately recorded by a qualified archaeologist and destruction permits be obtained from the relevant heritage authority.
- Sites K05, K06 & K08 are associated with intact buildings dating to the Historical Period. It is therefore recommended that the mine's ECO quarterly, as well as pre- and post-blasting, inspect these structures. Should any impact be observed, or if impact cannot be avoided, a qualified archaeologist should be contacted to provide the required input to ensure the safeguarding of the sites.
- Historical aerial images indicate the presence of several buildings at Site K09. These buildings, however, have been demolished. At two of these locations, graves were observed. This area is therefore considered to be sensitive from a heritage perspective and should be avoided by surface development. Based on the current mining layout, Site K09 will not be impacted by the proposed development.
- Sites K02, K04, K07, K13, K14, K12, K32, K17, K28, K29, K10, K34, K24 are located on, or within close proximity of the demarcated underground mining area, and was identified using historical aerial and topographical datasets. The structures, however, no longer exist and no surface impact is expected. No further action is required.
- Site K35 falls just outside of the demarcated underground mining section and although historical structures might have existed in this locality, the current structures appear to be of modern origin. No further action is therefore required.
- Because grave/cemetery Sites K44, K45 and K36 are located relatively close to the planned surface development and because the cemeteries appear not to be in use anymore, the following is recommended: A fenced-off conservation buffer of 50 m be established around the grave/cemetery and that a qualified archaeologist compile a Conservation Management Plan to ensure the safeguarding of the graves. Also, access to the cemetery must not be refused. Alternatively, the graves may be relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of community leaders and the relatives of the deceased buried at the concerned location.
- Due to the uncertainty regarding the existence of a grave at Site K16 caused by a lack of surface indications, it is envisaged that this site will not be impacted by the proposed underground mining activities. Therefore, no further action is required.

- Site K38 consists of a single fenced-off grave located on the area demarcated for underground mining. However, the site is located a considerable distance from any proposed surface activity and no headstone or associated surface remains are associated with the site. Therefore, no further action is required.
- Site K39, a cemetery still in use, may be impacted by the proposed underground mining. Therefore it is recommended that the mine's ECO quarterly, as well as pre- and post-blasting, inspect these graves. Should any impact be observed, or if impact cannot be avoided, a qualified archaeologist should be contacted to provide the required input to ensure the safeguarding of the graves. Also, access to the cemetery must not be refused.
- Sites K48, K49 and K50 are located a considerable distance from the proposed surface development, but may be impacted by the proposed underground mining. Therefore it is recommended that the mine's ECO quarterly, as well as pre- and post-blasting, inspect these graves. Should any impact be observed, or if impact cannot be avoided, a qualified archaeologist should be contacted to provide the required input to ensure the safeguarding of the graves. Also, access to the cemeteries must not be refused.

#### **Areas falling outside of the proposed surface and underground mining boundary**

- Site K51 consists of potentially historical foundation mounds associated with no surface cultural remains. No further action is required.
- Site K33 was identified as a natural soil disturbance and is not of heritage significance. No further action is therefore required.
- Sites K22 & K11, consisting of demolished buildings dating to the Historical Period, are located outside of the demarcated underground mining area. No further action is required.
- The structures associated with Site K27 appear to have replaced older buildings at the same location and are therefore not considered significant from a heritage perspective. No further action is therefore required.
- Cemetery K37, which appears to be in use, is located relatively close of the boundary of the proposed underground mining section, but a conservable distance from the planed surface development. Therefore it is recommended that the mine's ECO quarterly, as well as pre- and post-blasting, inspect these graves. Should any impact be observed, or if impact cannot be avoided, a qualified archaeologist should be contacted to provide the required input to ensure the safeguarding of the graves. Also, access to the cemeteries must not be refused

- The burial sites associated with Sites K46, K47 are located outside of the proposed underground mining section, but close to the Preferred Option. Should the Preferred Option be used, it is recommended that a fenced-off conservation buffer of 50 m be established around the graves/cemeteries and that a qualified archaeologist compile a Conservation Management Plan to ensure the safeguarding of the graves. Also, access to the graves/cemeteries must not be refused. Alternatively, the graves may be relocated by a qualified graves relocation unit to a premises earmarked by the local municipality, but will set in motion a substantial process as new legislation will be triggered. These processes, however, must be performed in accordance with the involvement of community leaders and the relatives of the deceased buried at the concerned location. Should the Preferred Option not be used, it is envisaged that Sites K46 & K47 will not be impacted.

### **General Recommendations**

- The above recommendations are based on the specific surface and underground mining boundaries as indicated in this report. Should the proposed development expand to any area outside of the proposed surface or underground boundaries, a qualified archaeologist must revise the recommendations made in this report to ensure the safeguarding of heritage sites. Also, should the proposed surface impact areas be changed, a qualified archaeologist must conduct a pedestrian survey on the new area and amend the report accordingly.
- 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)).
- From a heritage point of view, development may proceed on the demarcated areas, 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.

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

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*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



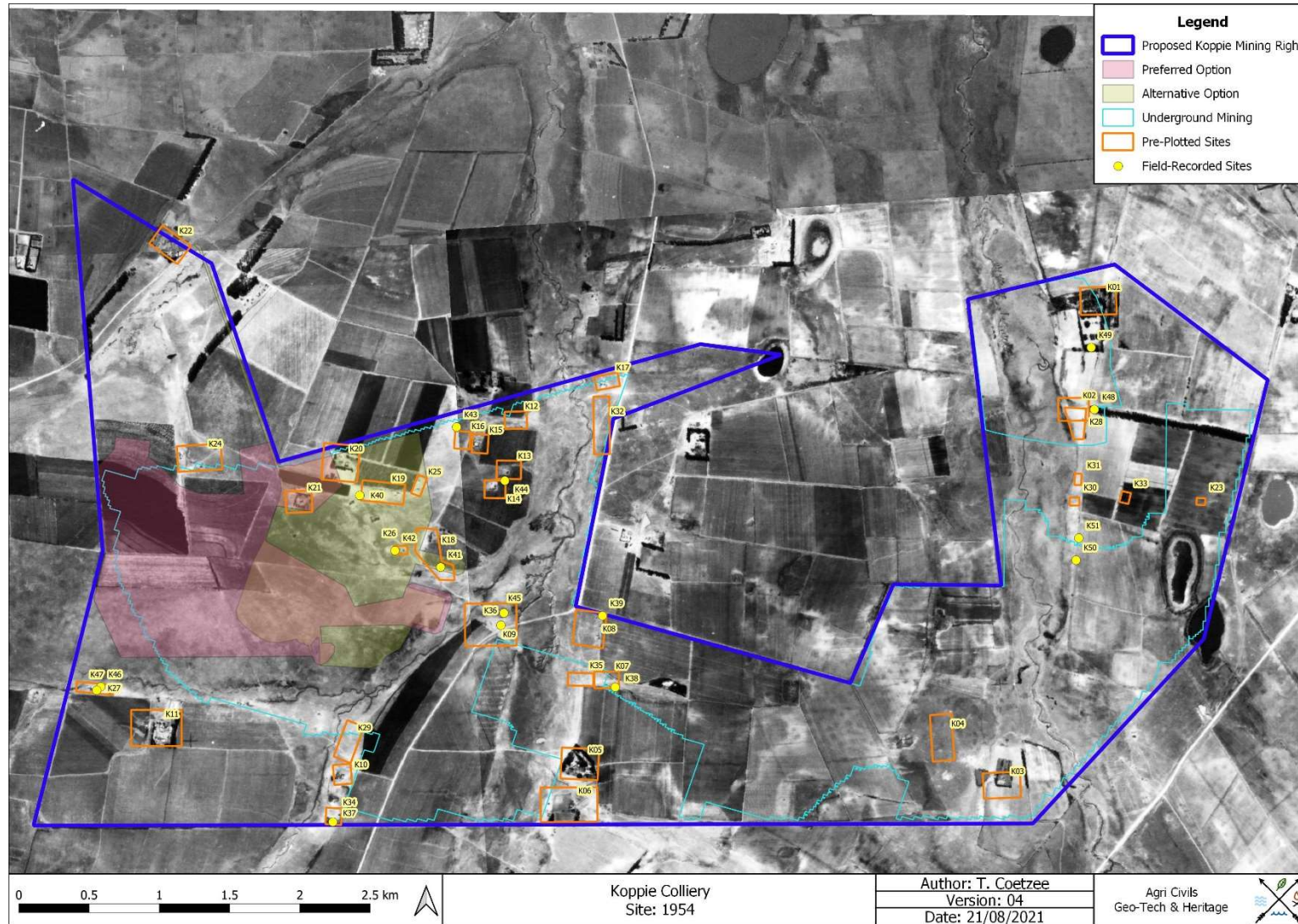


Figure 105: Study area superimposed on a 1954 aerial photograph.

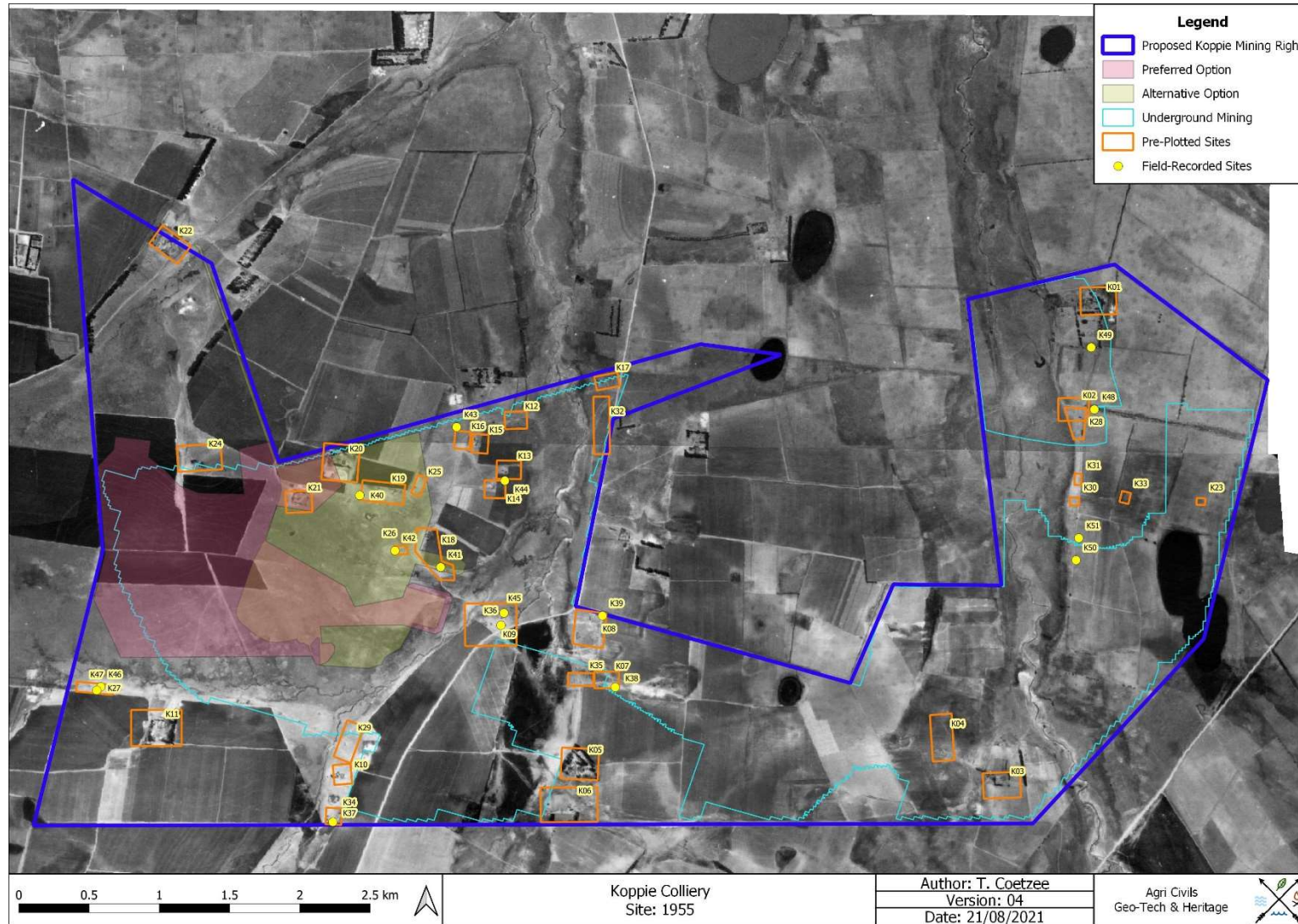


Figure 106: Study area superimposed on a 1955 aerial photograph.

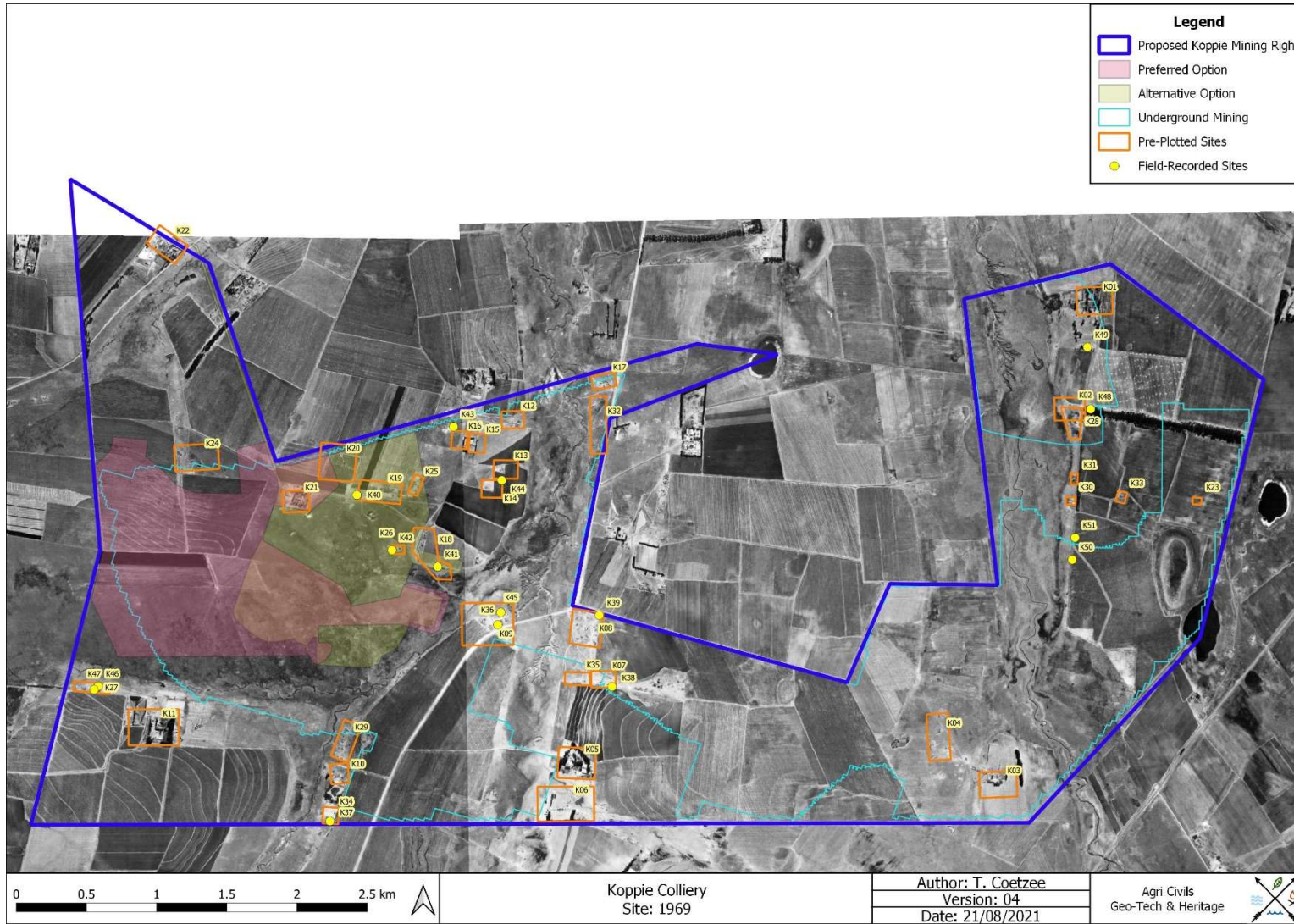


Figure 107: Study area superimposed on a 1969 aerial photograph.

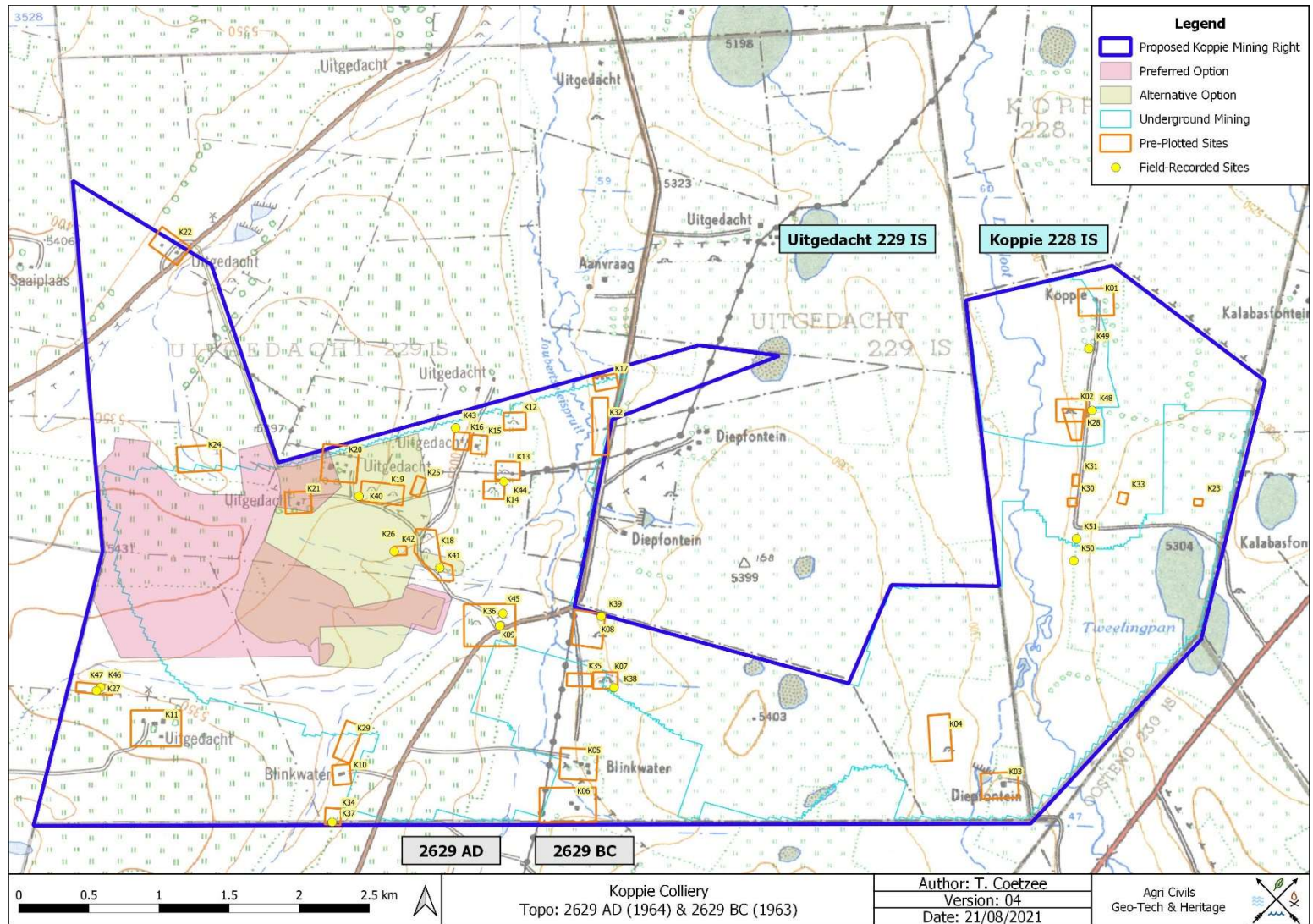


Figure 108: Study area superimposed on a 1963 and 1964 topographical map.

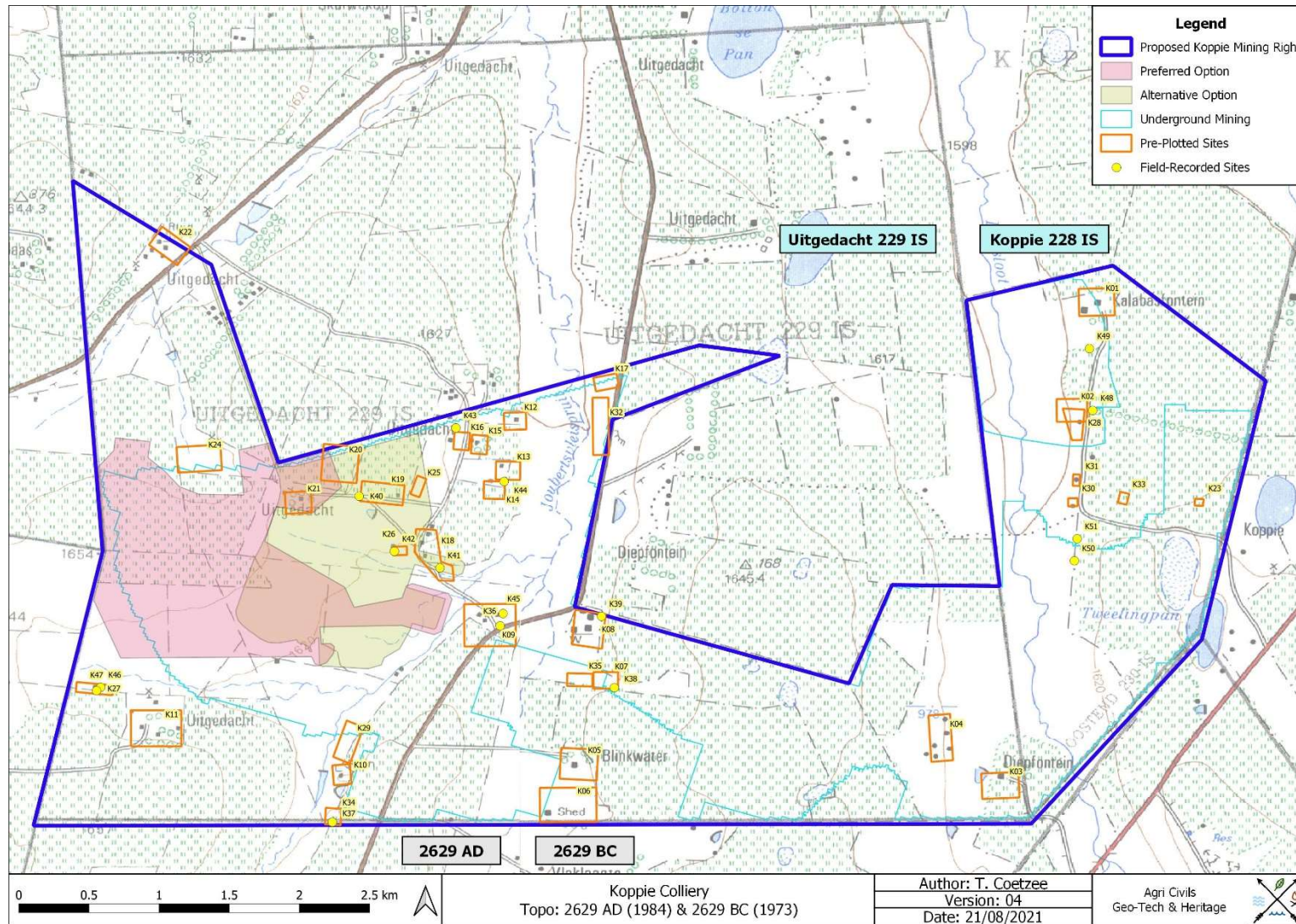


Figure 109: Study area superimposed on a 1973 and 1984 topographical map.

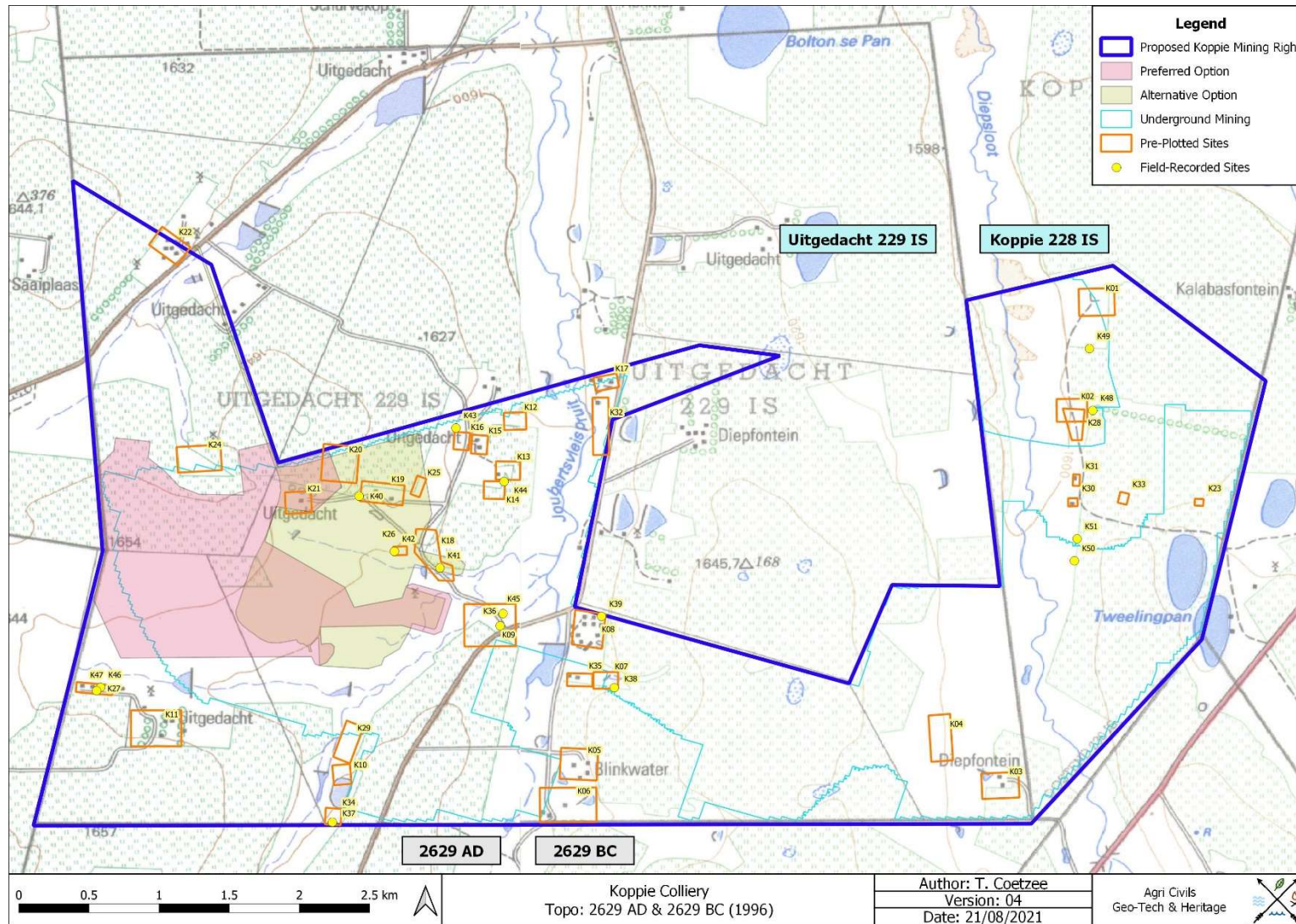


Figure 110: Study area superimposed on a 1996 topographical map.

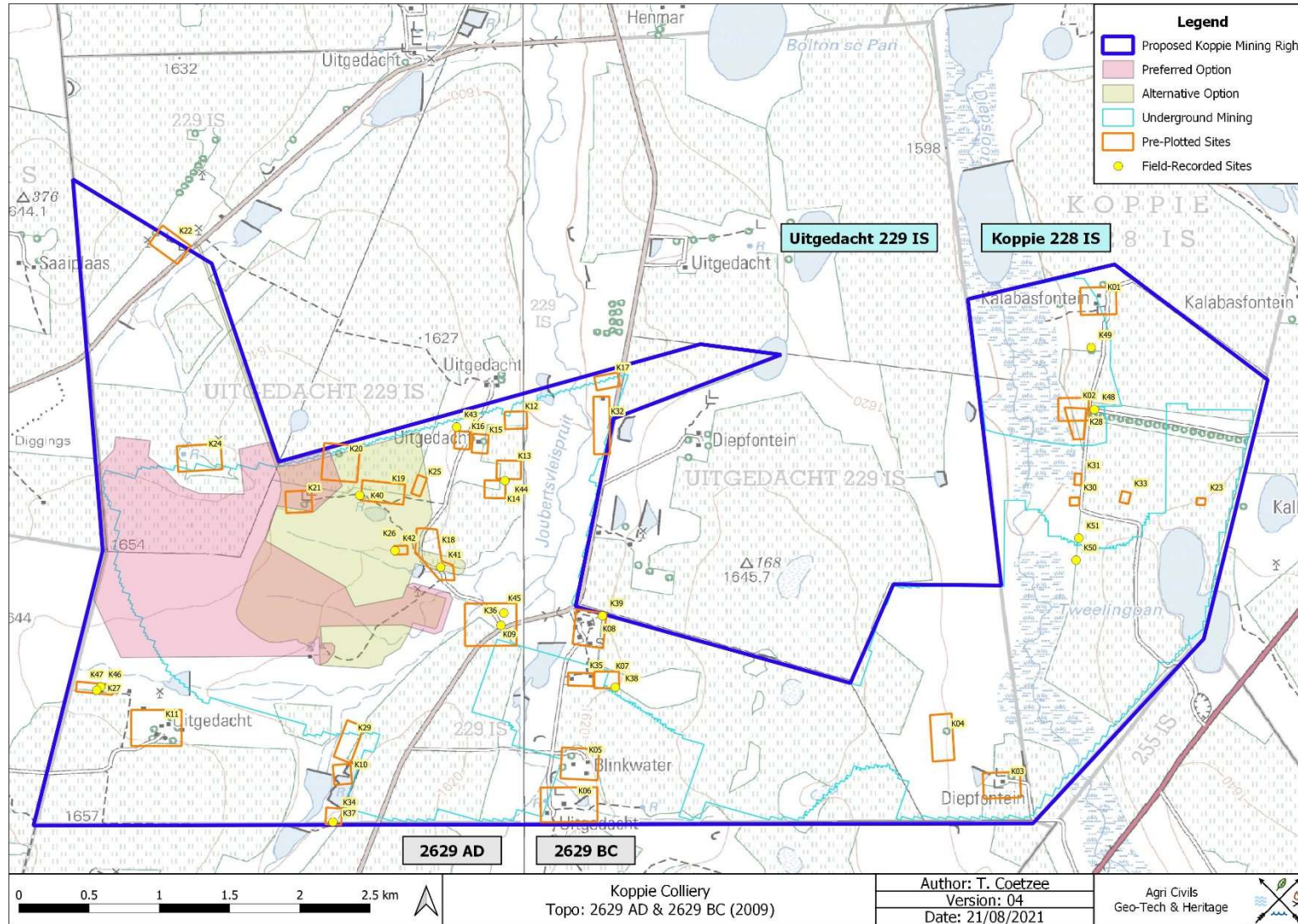


Figure 111: Study area superimposed on a 2009 topographical map.