

PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT

**for the Proposed Kusile Invest 133 Giyani
Gold Mine Project on the demarcated
portions of Un-Surveyed State Land of
Greater Giyani 891 LT, Giyani, Limpopo**

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April 2021**

A Phase 1 Archaeological Impact Assessment for the Proposed Kusile Invest 133 Giyani Gold Mine Project on the demarcated portions of Un-Surveyed State Land of Greater Giyani 891 LT, Giyani, Limpopo

For: Archean Resources (Pty) Ltd

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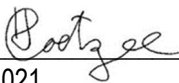
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Report No: Kusile_3103211

Version: 1

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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 Giyani Gold Mine 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: 12 April 2021

List of Abbreviations

AIA – Archaeological Impact Assessment

CRM – Cultural Resource Management

EIA – Environmental Impact Assessment

ESA – Early Stone Age

GGB – Giyani Greenstone Belt

GPS – Global Positioning System

ha – Hectare

HIA – Heritage Impact Assessment

km – Kilometre

LIA – Late Iron Age

LSA – Later Stone Age

m – Metre

MASL – Metres Above Sea Level

MEC – Member of the Executive Council

MSA – Middle Stone Age

NHRA – National Heritage Resources Act

SAHRA – South African Heritage Resources Agency

WMA – Water Management area

Executive Summary

The author was appointed by Archean Resources (Pty) Ltd to undertake a Phase 1 Archaeological Impact Assessment for Kusile Invest 133 (Pty) Ltd on six demarcated areas (**Table 1**) within the Greater Giyani Local Municipality and Mopani District Municipality in the Limpopo Province. The proposed project consists of six study areas falling on un-surveyed state land of Greater Giyani 891 LT. One area is demarcated for the mining plant and an associated opencast pit, while five additional areas are demarcated for opencast mining. The total proposed mining right area is approximately 13908 ha, while the proposed surface impacts amount to 14.25 ha. The study area is located approximately 9 km northeast of Giyani, 20 km south-southeast of Malamulele and 7 km west of the Kruger National Park border. The aim of the study is to determine the scope of archaeological resources that could be impacted by the proposed Giyani Gold Mine Project.

In terms of limitations, proposed Pits 02 and 03 could not be accessed due to dense vegetation, while access, free movement and visibility were also restricted at proposed Pits 04 and 05. The type of vegetation consisted of thick mopane tree cover, thorn bushes and grass cover.

The demarcated plant and Pit 01 area has been disturbed by contemporary mining activities and no sites of heritage importance were observed.

Sites of archaeological significance pertaining to historical mining activities were identified at proposed Pits 04, 05 and 06, while three graves and one potential grave were located to the west of the plant area.

Although proposed Pits 02 and 03 could not be accessed, it is likely that these areas are associated with historical mining activities. The vegetation at these areas should therefore be cleared and a qualified archaeologist must inspect the areas prior to any development.

Historical mining trenches were identified at proposed Pit 04, but determining the extent of these features were hampered by dense vegetation. The vegetation hampering site visibility should therefore be cleared and a qualified archaeologist must document and map the site prior to development.

Pit 05 is associated with vertical mining shafts and infrastructure dating to at least 1947. It is recommended that the dense vegetation hampering visibility and access be cleared and that a qualified archaeologist document and map the site. Also, the historical mining structures associated with this site should be fenced-off, avoided by development and must be monitored by the mine's ECO during the proposed mining development. If impact is observed or cannot be avoided, a destruction permit will have to be obtained from the relevant heritage authority.

The rehabilitated mining shafts associated with proposed Pit 06 might date to the 1980s, but some of the structures and features associated with this area most likely date to historical mining development and are considered significant from an archaeological perspective. Because this area has been disturbed by the rehabilitation process, the recording done during this study is regarded as sufficient. However, the historical mining structures associated with this site should be fenced-off, avoided by development and must be monitored by the mine's ECO during the proposed mining development. If impact is observed or cannot be avoided, a destruction permit will have to be obtained from the relevant heritage authority.

Three graves and one potential grave consisting of dilapidated stone cairns were observed during the site visit, but are located a significant distance from the plant area and are not at risk of being impacted by the proposed development (B01 – B04).

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1. Project Background

1.1 Introduction

Archean Resources (Pty) Ltd appointed the author to undertake a Phase 1 Archaeological Impact Assessment for Kusile Invest 133 (Pty) Ltd on six demarcated areas within the Greater Giyani Local Municipality and Mopani District Municipality in the Limpopo Province. The affected areas fall within un-surveyed state land of Greater Giyani 891 LT and are listed in **Table 1**. The proposed project consists of six areas: One plant area and an associated opencast pit, as well as five additional opencast pits. The study area is located approximately 9 km northeast of Giyani, 20 km south-southeast of Malamulele and 7 km west of the Kruger National Park border (**Figure 1**). The purpose of this study is to examine the demarcated portions in order to determine if any archaeological resources of heritage value will be impacted by the proposed Giyani Gold Mine Project, 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 portions.

The following report discusses the implication for the expansion of the Giyani Gold Mine Plant and Pit 01, as well as the mining of five additional opencast pits on un-surveyed state land of Greater Giyani 891 LT with regard to heritage resources. The plant area and one opencast pit is located along the northern boundary of the mining right area, while two opencast pits are proposed 4 km to the southeast and one along the eastern border. One of the remaining opencast pits is proposed towards the south-western corner of the mining right area, while the other is proposed approximately 4 km to northeast thereof. The legislation section included serves as a guide towards the effective identification and protection of heritage resources and will apply to any such material unearthed during the proposed mining project.

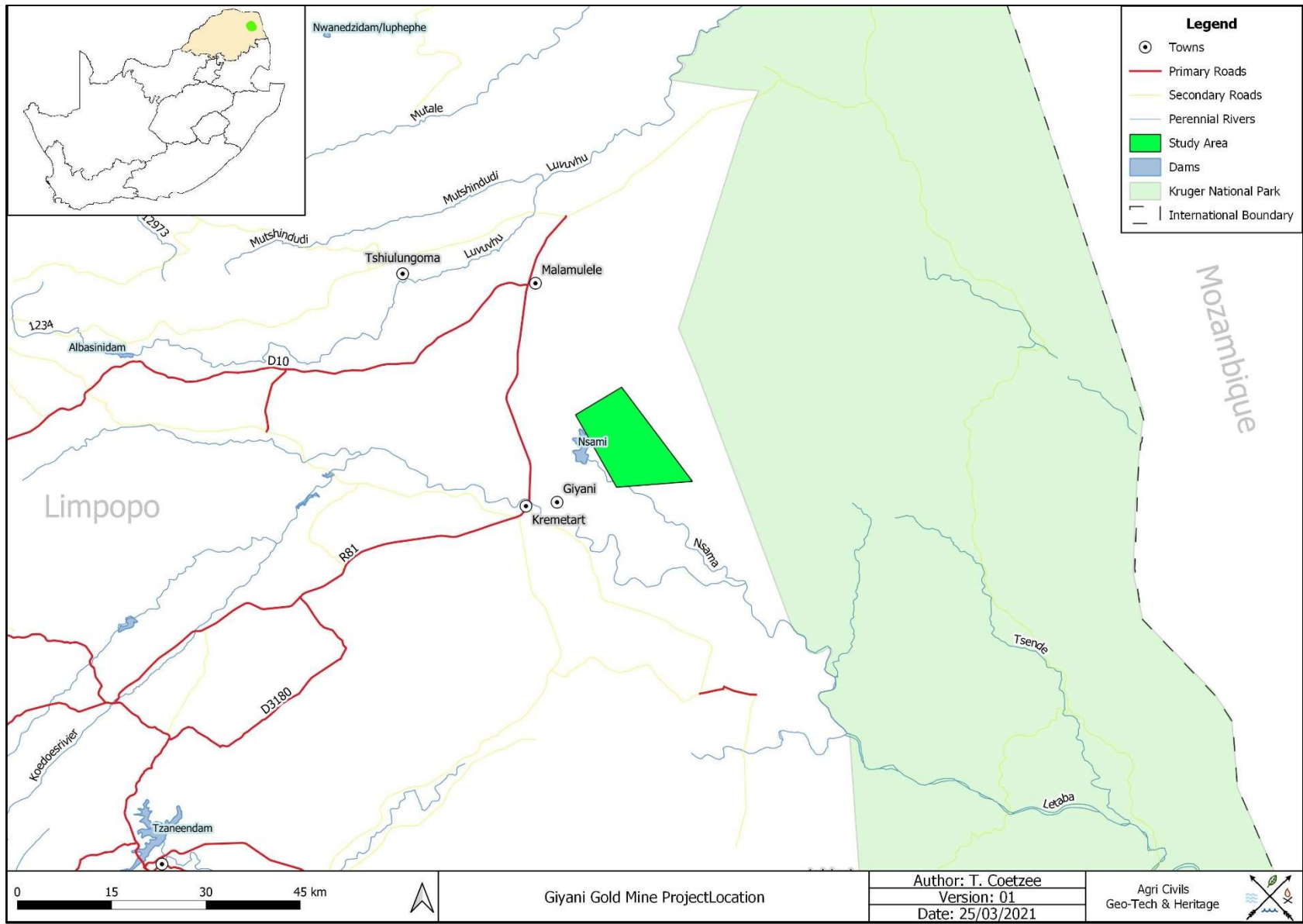


Figure 1: Regional and Provincial location of the study area.

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 (Archaeological Impact Assessment) if triggered.

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

1.2.1 The EIA (Environmental Impact Assessment) and AIA processes

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

All Archaeological Impact Assessment reports should include:

- a. Location of the sites that are found;
- b. Short descriptions of the characteristics of each site;
- c. Short assessments of how important each site is, indicating which should be conserved and which mitigated;
- d. Assessments of the potential impact of the development on the site(s);
- e. In some cases a shovel test, to establish the extent of a site, or collection of material, to identify the associations of the site, may be necessary (a pre-arranged SAHRA permit is required); and
- f. Recommendations for conservation or mitigation.

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

- a. Whether or not it has objections to a development;
- b. What the conditions are upon which such development might proceed;
- c. Which sites require permits for mitigation or destruction;

- d. Which sites require mitigation and what this should comprise;
- e. Whether sites must be conserved and what alternatives can be proposed to relocate the development in such a way as to conserve other sites; and
- f. What measures should or could be put in place to protect the sites which should be conserved.

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

1.2.2 Legislation regarding archaeology and heritage sites

National Heritage Resource Act No.25 of April 1999

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

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

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

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

and

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

- (a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;*
- (b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;*
- (c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or*
- (d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.* (35. [4] 1999:58)

and

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

- (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;*
- (b) destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority;*
- (c) bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) and excavation equipment, or any equipment which assists in the detection or recovery of metals."* (36. [3] 1999:60)

On the development of any area the gazette states that:

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

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- (b) the construction of a bridge or similar structure exceeding 50m in length;*
- (c) any development or other activity which will change the character of a site-*

- i. *exceeding 5000m² in extent; or*
 - ii. *involving three or more existing erven or subdivisions thereof; or*
 - iii. *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - iv. *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;*
- (d) *the re-zoning of a site exceeding 10000m² in extent; or*
- (e) *any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.”(38. [1] 1999:62-64)*

and

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

- (a) *The identification and mapping of all heritage resources in the area affected;*
- (b) *an assessment of the significance of such resources in terms of the heritage assessment criteria set out in section 6(2) or prescribed under section 7;*
- (c) *an assessment of the impact of the development on such heritage resources;*
- (d) *an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;*
- (e) *the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;*
- (f) *if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and*
- (g) *plans for mitigation of any adverse effects during and after the completion of the proposed development.”*
(38. [3] 1999:64)

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 (Member of the Executive Council) 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

Table 1 lists the demarcated project areas and intersecting land parcels.

Table 1: Property name & coordinates of the proposed study areas.

Development	Property	Map Reference (1:50 000)	Lat (y)	Lon (x)	Development Extent (ha)
Pit 01 & Plant	Greater Giyani 891 LT	2330 BB	-23.188625	30.766884	12
Pit 02	Greater Giyani 891 LT	2330 BB	-23.198572	30.801384	0.45
Pit 03	Greater Giyani 891 LT	2330 BB	-23.193576	30.808405	0.45
Pit 04	Greater Giyani 891 LT	2330 BD	-23.257804	30.839461	0.45
Pit 05	Greater Giyani 891 LT	2330 BD	-23.283369	30.816417	0.45
Pit 06	Greater Giyani 891 LT	2330 BD	-23.185126	30.839724	0.45
Total					14.25

The general study area is located 9 km northeast of Giyani, 20 km south-southeast of Malamulele and 7 km west of the Kruger National Park. The study area falls within the Greater Giyani Local Municipality and Mopani District Municipality in the Limpopo Province. Locally, the proposed mining right area is associated with five villages: Toma, Khakhala, Mininginisi, Mininginisi-2 and Mlhava. Toma intersects the western border of the proposed mining right, while Mininginisi intersects the north-eastern corner and Mininginisi-2 the eastern boundary. Mlhava is located further to the south along the eastern border, while Khakhala is located in the middle and towards the southern border of the proposed mining right. Pit 01 and the plant area is located 6 km north-northwest of Toma and 5.5 km west-southwest of Mininginisi. Pits 02 & 03 are located 5.7 km north-northeast of Toma and 3.7 km south-southwest of Mininginisi. Pit 04 is located 1.5 km northeast of Khakhala and 4 km east of Toma, while Pit 05 is located in the south-western corner of the mining right area and approximately 3 km from Khakhala in the northeast and 3 km from Toma in the north-northwest. Pit 06 is located on the outskirts of Mininginisi-2. The R81 primary road runs north-south through Giyani to the west, while the D3840 secondary road runs approximately 9.5 km to the southwest and in a northwest-southeast direction.

In terms of vegetation, the study area falls within the Savanna Biome and Lowveld Bioregion. On a local scale, Granite Lowveld covers the south-eastern corner of the proposed mining right while the rest of the mining right, and therefore the demarcated pit and plant areas, falls on Lowveld Rugged Mopaneveld (Mucina & Rutherford 2006).

The distribution of Granite Lowveld is described by Mucina & Rutherford (2006) as:

“Limpopo and Mpumalanga Provinces, Swaziland and marginally also KwaZulu-Natal: A north-south belt on the plains east of the escarpment from Thohoyandou in the north, interrupted in the Bolobedu area, continued in the Bitavi area, with an eastward extension on the plains around the Murchison Range and southwards to Abel Erasmus Pass, Mica and Hoedspruit areas to the area east of Bushbuckridge. Substantial parts are found in the Kruger National Park spanning areas east of Orpen Camp southwards through Skukuza and Mkuhlu, including undulating terrain west of Skukuza to the basin of the Mbyamiti River. It continues further southward to the Hectorspruit area with a narrow westward extension up the Crocodile River Valley past Malelane, Kaapmuiden and the Kaap River Valley, entering Swaziland between Jeppe’s Reef in the west and the Komati River in the east, through to the area between Manzini and Siphofaneni, including the Grand Valley, narrowing irregularly and marginally entering KwaZulu-Natal near Pongola”

Granite Lowveld is considered vulnerable with a conservation target of 19%. About 17% is statutorily conserved in the Kruger National Park and roughly the same amount in private reserves. More than 20% has already been transformed, mainly by cultivation and settlement development. Erosion is considered very low to moderate (Mucina & Rutherford 2006).

Lowveld Rugged Mopaneveld is associated with the Limpopo and Mpumalanga Provinces and is distributed from the area southeast of Giyani in the west to Shimwini and Boulders Camps in the east. The rugged area of the Olifants River Valley south of Phalaborwa and from Grietjieberg in the west to Maveni River tributary in the east is associated with Lowveld Rugged Mopaneveld as well. In terms of conservation, Lowveld Rugged Mopaneveld is considered least threatened with a conservation target of 19%. About 34% is statutorily conserved in the Kruger National Park and roughly 5% in private reserves such as Klaserie, Letaba Ranch and Selati. About 20% has been transformed mostly by cultivation and urban built-up areas. The parts of this vegetation unit falling outside of protected reserves are under pressure from high-density rural human population and the associated urban sprawl and agricultural activities (Mucina & Rutherford 2006).

The average elevation for Granite Lowveld varies between 250 and 700 MASL (metres above sea level), while Lowveld Rugged Mopaneveld varies between 250 and 550 MASL (Mucina & Rutherford 2006). The average elevation for the proposed mining right is 470 MASL and slopes from the low-lying river areas near the eastern and western borders to the higher surrounding ground.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 481 mm per year. The average maximum temperature for the study area is recorded during December when an average of 25.2 °C is reached. The average minimum temperature is recorded during July when an average of 16.9 °C is reached (Climate-data.org 29/03/2021).

The majority of the study area falls within the B82H Quaternary Catchment of the Letaba Water Management Area (WMA), while a small section of the north-eastern corner of the proposed mining right falls within the B90F Quaternary Catchment of the same WMA. The closest perennial river to the study area is the Nsama River that intersects the south-western corner of the proposed mining right area. Several non-perennial streams are located within the demarcated study area as well.

2.2 Project description

The proposed Kusile Invest 133 Giyani Gold Mine Project proposes to mine gold on the demarcated portions as indicated on **Figures 2 & 3**. The total extent for the plant and proposed opencast pits is approximately 14.25 ha. It should be noted that the five pits were initially identified as mentioned in the extract from the Project Scoping Report below, but another pit was subsequently identified. According to Mr Mzamani Mdaka from Kusile Invest 133, all the pit locations are based on previous mining activities dating the 1950s and 1980s. Surface indications of these early mining activities are generally indicated by trenches that are roughly 0.5 m wide and between one and two metres deep.

The following description was adapted from the Project Scoping Report (Archean Resources 2020):

“Kusile Invest 133 (Pty) Ltd has appointed Archean Resources (Pty) Ltd, an independent consulting company, to conduct an Environmental Impact Assessment (EIA) process to evaluate the potential environmental and social impacts of the proposed project. The project is referred to as the Giyani Gold Mine Project. The applicant Kusile Invest has lodged a mining right on Un-Surveyed State land of Greater Giyani 891 LT and a portion of portion 0 of the farm 246 located within the town of Giyani, Limpopo Province and intends to establish an underground and open cast mine.

The mine development activities will commence by establishing and installing the required mining infrastructure such as pit establishment, shaft headgear and winders, service water, compressed air and power supply, processing plant and installation of surface ventilations fans. The type and size of the mining infrastructure to be installed will be designed to support the proposed Life of Mine (LOM) production rate of 12 000 tons per month of Run of Mine material (ROM) for 30 (thirty) years.

Mining operations will commence from five open cast pits which will later be developed into underground workings and expand into four working levels to reach the steady state production of 12 000 tons per month. Additional working areas will be established for sustainability and to replace the depletion of ore reserves being mined from the start-up working areas.

The open pit mine design shows the orebody being located centrally to the pit outer walls or pit shell. The waste surrounding the orebody will be stripped, with topsoil stored separately from waste rock for re-use during rehabilitation of the pit at closure of mining operations. The stripping will include the removal of surrounding topsoil and waste rock to fully expose the orebody and have enough area for movement of machinery inside the pit.

The sidewalls of the excavation, surrounding the orebody, referred to as Benches, will be excavated at intervals to a maximum depth 12 metres and must be slanted to ensure slope stability as per specifications determined by the project's Rock Engineering expert. The pit development will include the creation of Berms, representing the flat area or horizontal distance of approximately 5 metres in width, when measured from the bottom of the preceding or top bench to the edge of the next bench as the pit goes dipper. An access ramp and haul road will also be created from the top bench on the outer limits of the pit, traversing the lower benches in order to have mining equipment and personnel accessing the pit floor where excavating or blasting of the ore bearing rock will be conducted.

The pit will be excavated to an optimal operating final depth of 400 metres below surface level, thereafter, the conversion of the mining operation from open pit to underground mining operation will be affected. The timing for the development of the underground mining infrastructure will be scheduled to reach its completion such that the commencement of underground operations will overlap with the final phase of the open pit mining operation for a period of 6 months. The basic design or layout for the underground mining operation, entails the conventional use of shafts and declines, with the development of footwall haulages, cross-cuts and raise-lines to establish conventional steep stoping and cut and fill mining panels."

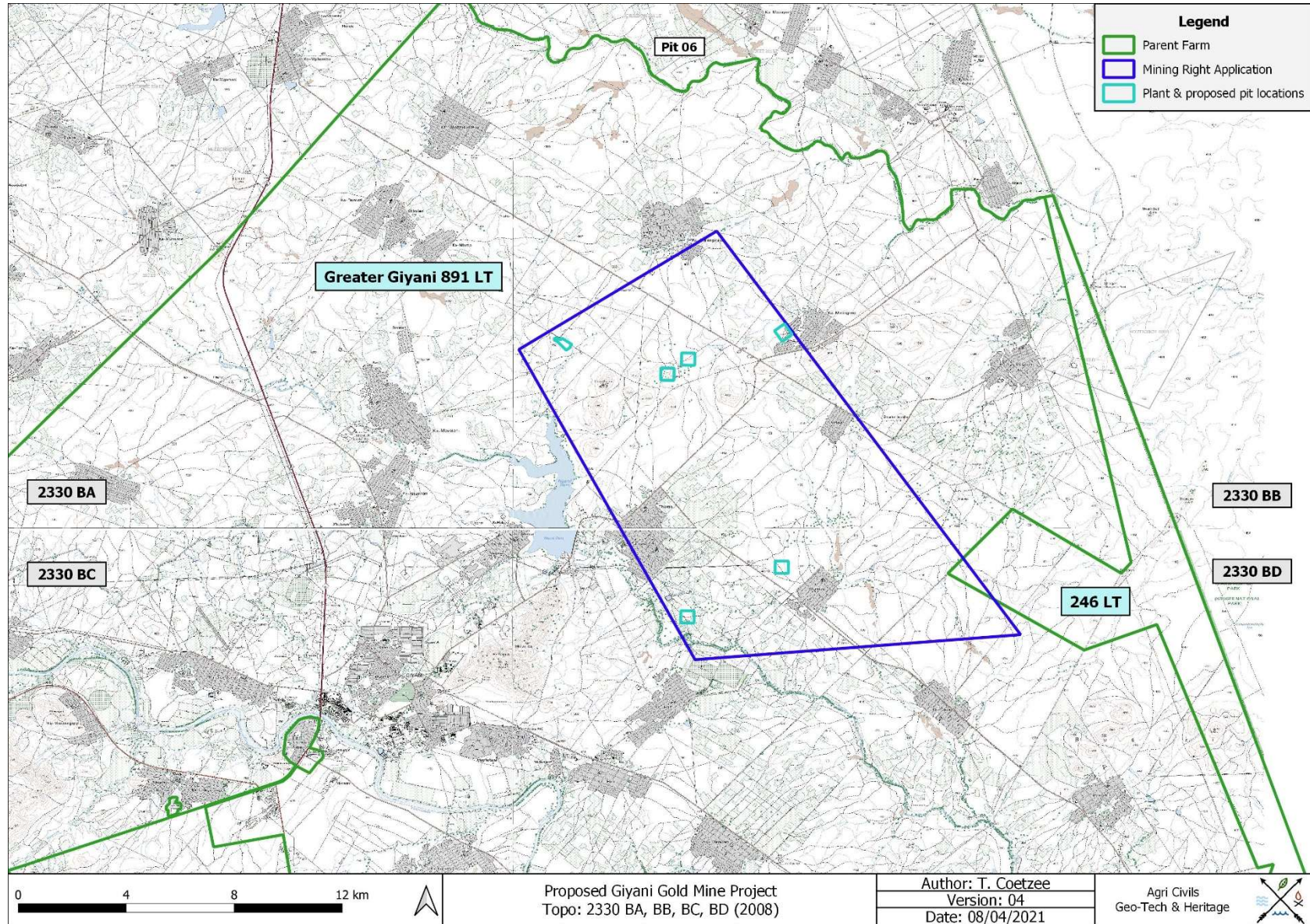


Figure 2: Segments of SA 1: 50 000 2330 BA, BB, BC & BD indicating the study area.

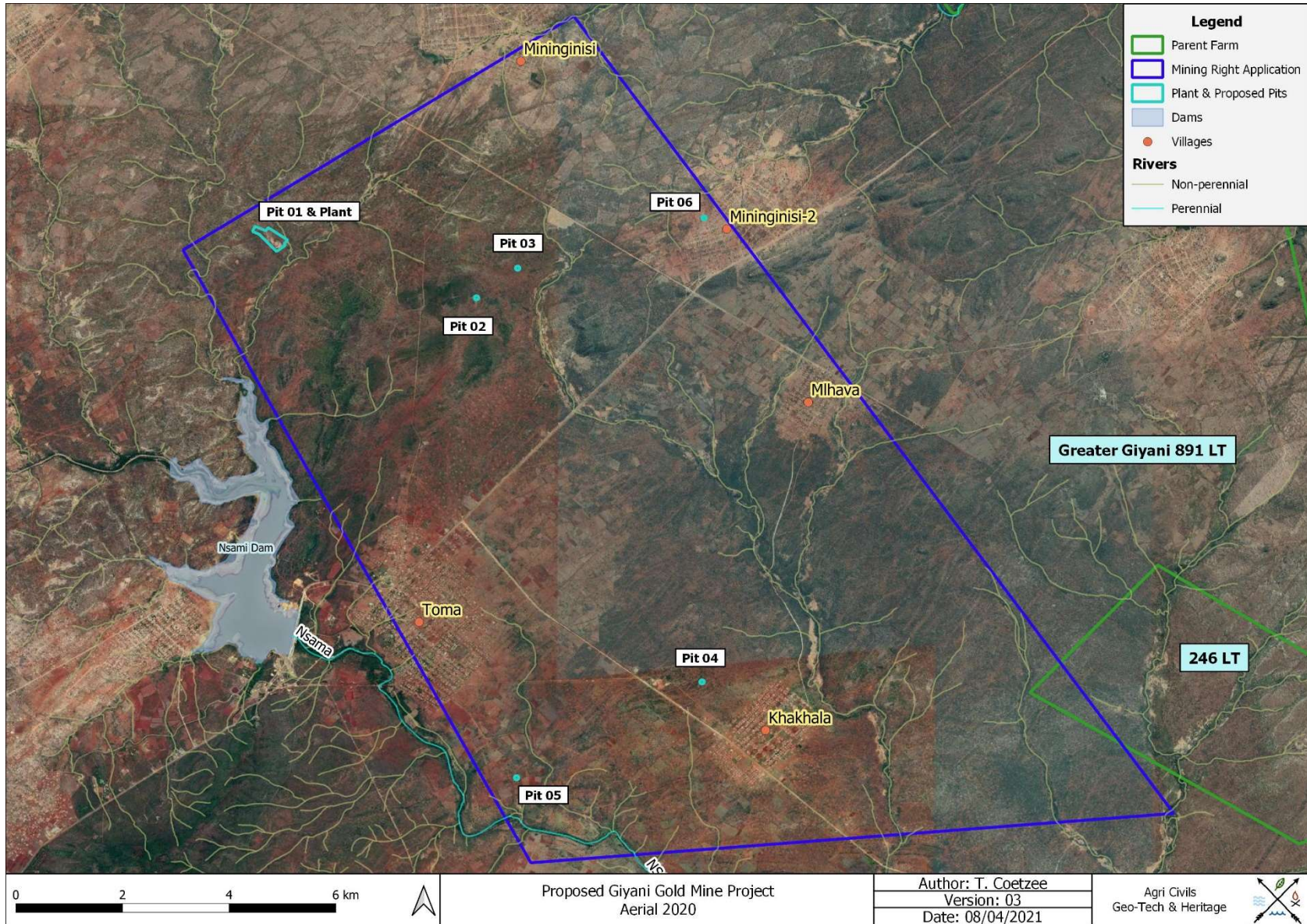


Figure 3: The proposed mining right, plant and pits indicated on a 2020 aerial backdrop.

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.

3.1 The Stone Age

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

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

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

Although the transition from the Middle Stone Age to the Later Stone Age (LSA) did not occur simultaneously across the whole of southern Africa, the Later Stone Age ranges from about 20 000 to 2000 years ago. Stone tools from this period are generally smaller, but were used to do the same job as those from previous periods; only in a different, more efficient way. The Later Stone Age is associated with: rock art, smaller stone tools (microliths), bows and arrows, bored stones, grooved stones, polished bone tools, earthenware pottery and beads. Examples of Later Stone Age sites are Nelson Bay Cave, Rose Cottage Cave and Boomplaas Cave (Deacon & Deacon 1999). These artefacts are often associated with rocky outcrops or water sources. **Figures 4 – 6** below shows examples of stone tools often associated with the ESA, MSA and LSA of southern Africa.

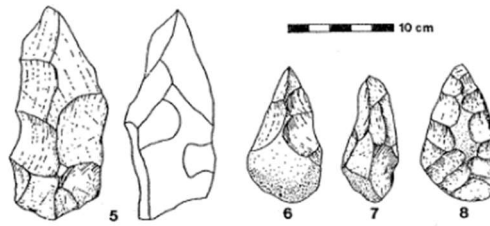


Figure 4: ESA artefacts from Sterkfontein (Volman 1984).

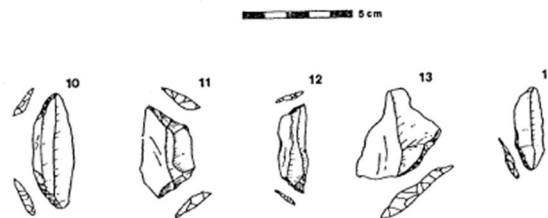


Figure 5: MSA artefacts from Howiesons Poort (Volman 1984).



Figure 6: LSA scrapers (Klein 1984).

3.2 The Iron Age & Historical Period

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

The Middle Iron Age roughly stretches from AD 900 to 1300 and marks the origins of the Zimbabwe culture. During this period cattle herding appeared to play an increasingly important role in society. However, it was proved that cattle remained an important source of wealth throughout the Iron Age. An important shift in the Iron Age of southern Africa took place in the Shashe-Limpopo basin during this period, namely the development of

class distinction and sacred leadership. The Zimbabwe culture can be divided into three periods based on certain capitals. Mapungubwe, the first period, dates from AD 1220 to 1300, Great Zimbabwe from AD 1300 to 1450, and Khami from AD 1450 to 1820 (Huffman 2007: 361, 362).

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

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 Mining history in the Giyani area

The Giyani Greenstone Belt (GGB), formerly known as the Sutherland Greenstone Belt, is known to host shallow economic sized gold deposits. The GGB is a north-eastern trending belt of approximately 70 km long and up to 17 km wide in some places. The northern-most portion of the GGB falls within the Kruger National Park, while the southern section divides into the Khavagari and Lwaji Limbs. The gold mineralization in the GGB occur in four settings: quartz veins with sulphide developments, banded iron formations, quartz and sulphide replacement veins, and carbonate veins. Free- and refractory gold are found in the area. Free gold refers to gold found in native form and is recovered using conventional gravity methods, while refractory gold is bound in sulphide gains and can be extracted using specialised metallurgical methods (Steenkamp & Clark-Mostert (2012).

The Sutherland Greenstone Belt goldfield was discovered by the prospectors Button and Sutherland in the 1870. The first gold was recovered from the Letaba- and Shingwedzi Rivers, but the gold rush in this area only started in 1886. Gold mining in the area was interrupted by the Anglo-Boer War and afterwards the rich goldfields of the Witwatersrand had surpassed the smaller deposits of the Eastern Transvaal. The gold ore in the GGB was found to be refractory and by 1928 most of the mines in the area had seized operations (Steenkamp & Clark-Mostert 2012).

According to Steenkamp & Clark-Mostert (2012), the historic workings were focused around outcrops of quartz veins, the most often encountered veins being Banded Ironstone Formation and schist. Exploration trenches were dug either parallel or into to the outcrop. Trenches that yielded encouraging results were further developed via opencast or underground operations. Minor opencast operations can be found along the general trend of the quartz veins, while underground operations developed along the dip of the quartz veins. Basic timber support is occasionally observed. A ball-mill seems to have been used to treat the ore on-site, while the fines were dumped on-site as well. Since smelting related infrastructure are not generally associated with these mines, it is suggested that the concentrate was sold or removed for further beneficiation elsewhere.

One of the main contributing factors to the decline of the Sutherland (Giyani) goldfield is ascribed to the discovery of the Witwatersrand goldfields around the same time. Another is the lack of technology to process and treat the ore. It should also be noted that the Limpopo is a dry area with limited water supply. Since both recovery of free gold by gravity separation methods and of refractory gold by milling and leaching require a significant amount of water, water availability is a major constraint (Steenkamp & Clark-Mostert (2012).

4. Methodology

Archaeological reconnaissance of the study area was conducted during April 2021 through a combination of unsystematic vehicular and pedestrian surveys of the proposed plant expansion and opencast pit areas. One area consists of the plant that is currently being expanded and an associated opencast pit, the remaining demarcated pit areas have not yet been mined. The project area was inspected beforehand on Google Earth, historical aerial imagery and topographical maps in order to identify potentially sensitive areas and heritage remains (**Figure 7 & Appendix A**). A sensitivity map indicating the hills associated with the study area, as well as a 500 m buffer area around perennial and non-perennial streams, were compiled (**Figure 7**). Significant sections of the study area also appear to have been disturbed by past cultivation and are indicated on **Figure 8**. The current layout of the demarcated plant and pit areas intersecting the sensitive areas are listed in **Table 2**. General site conditions were recorded via photographic record (**Figures 9 – 16**). Four sites were identified during the site visit through personal communication with Mr Mzamani Mdaka (**Table 3 & Figures 37**), while past mining infrastructure were observed at proposed Pits 04, 05 & 06. It should be noted that the prefix '2330BB' is not used when referring to the site names due to the length of the name, but are recorded as such in **Tables 3 & 7**. The historical topographical datasets dating to 1967 and 1980, as well as the historical aerial photographs dating to 1963 and 1971 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 mining right area inspected on historical topographical maps was roughly 13908 ha while the total proposed impact area inspected during the site visit was 13.45 ha. Two of the propped pits, 02 & 03, were not accessible due to dense vegetation. Dense vegetation also generally hampered free movement and visibility at the remaining sites.

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 (Global Positioning System) during the site visit, as well as by plotting the boundaries from aerial imagery and topographical maps.

Table 2: Development areas intersecting sensitive areas.

Area	Gradient buffer	500 m River buffer	Historical Building / Hut / Mine	Disturbed by past cultivation
Pit 01 & Plant	No	Yes	No	No
Pit 02	Yes	No	No	No
Pit 03	No	No	No	No
Pit 04	No	No	No	No
Pit 05	No	Yes	Yes	Yes
Pit 06	No	Yes	No	Partially

Table 3: Site coordinates & description

Abbreviated name	Site / Survey Point Name	Longitude	Latitude	Description	Current Status	Identification Source
B01	2330BB-B01	30.762321	-23.193135	Grave	Intact	Site visit
B02	2330BB-B02	30.762245	-23.193901	Grave	Intact	Site visit
B03	2330BB-B03	30.762404	-23.193272	Grave	Intact	Site visit
B04	2330BB-B04	30.762290	-23.192485	Potential Grave	Intact	Site visit

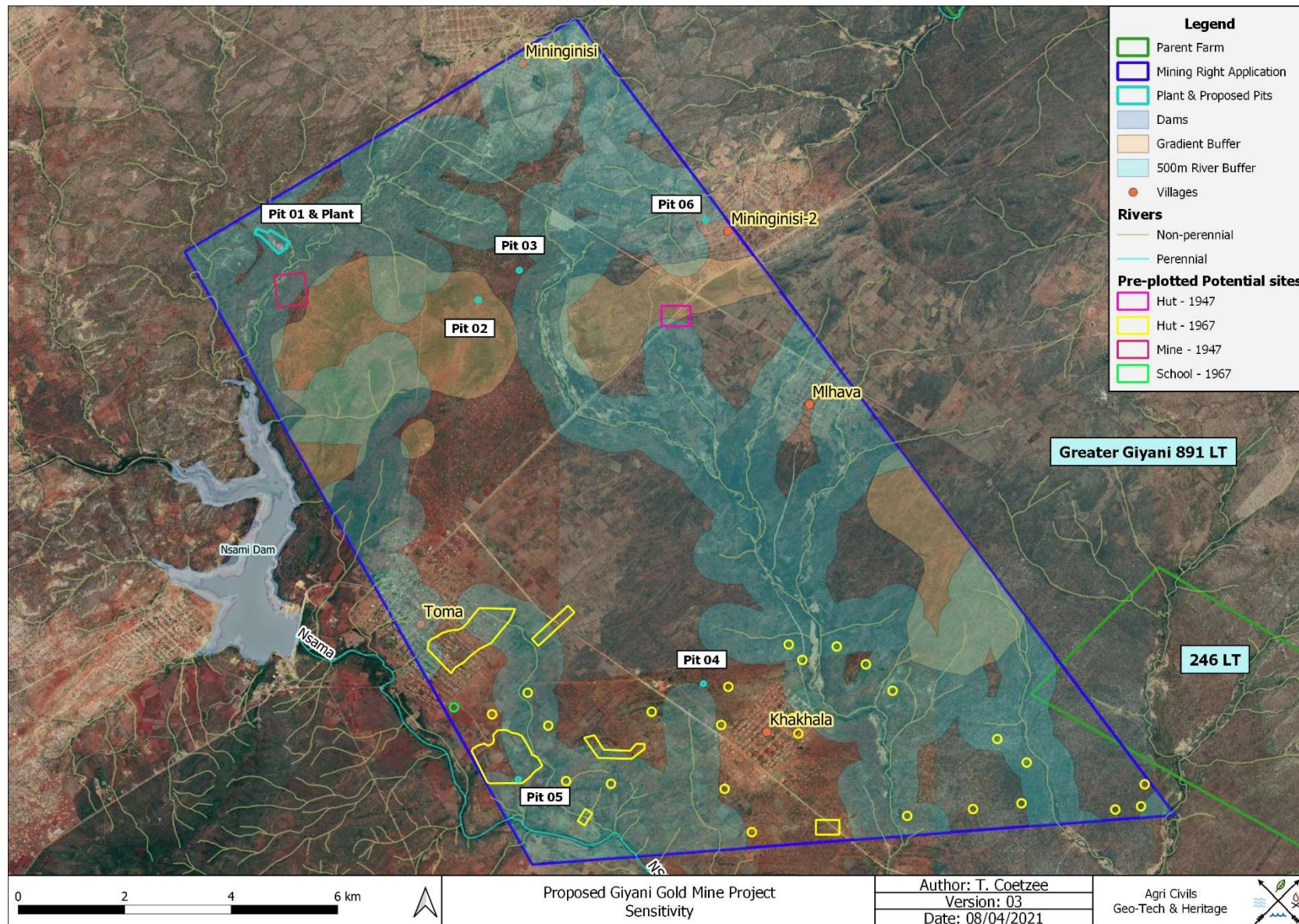


Figure 7: Heritage Sensitivity Map.

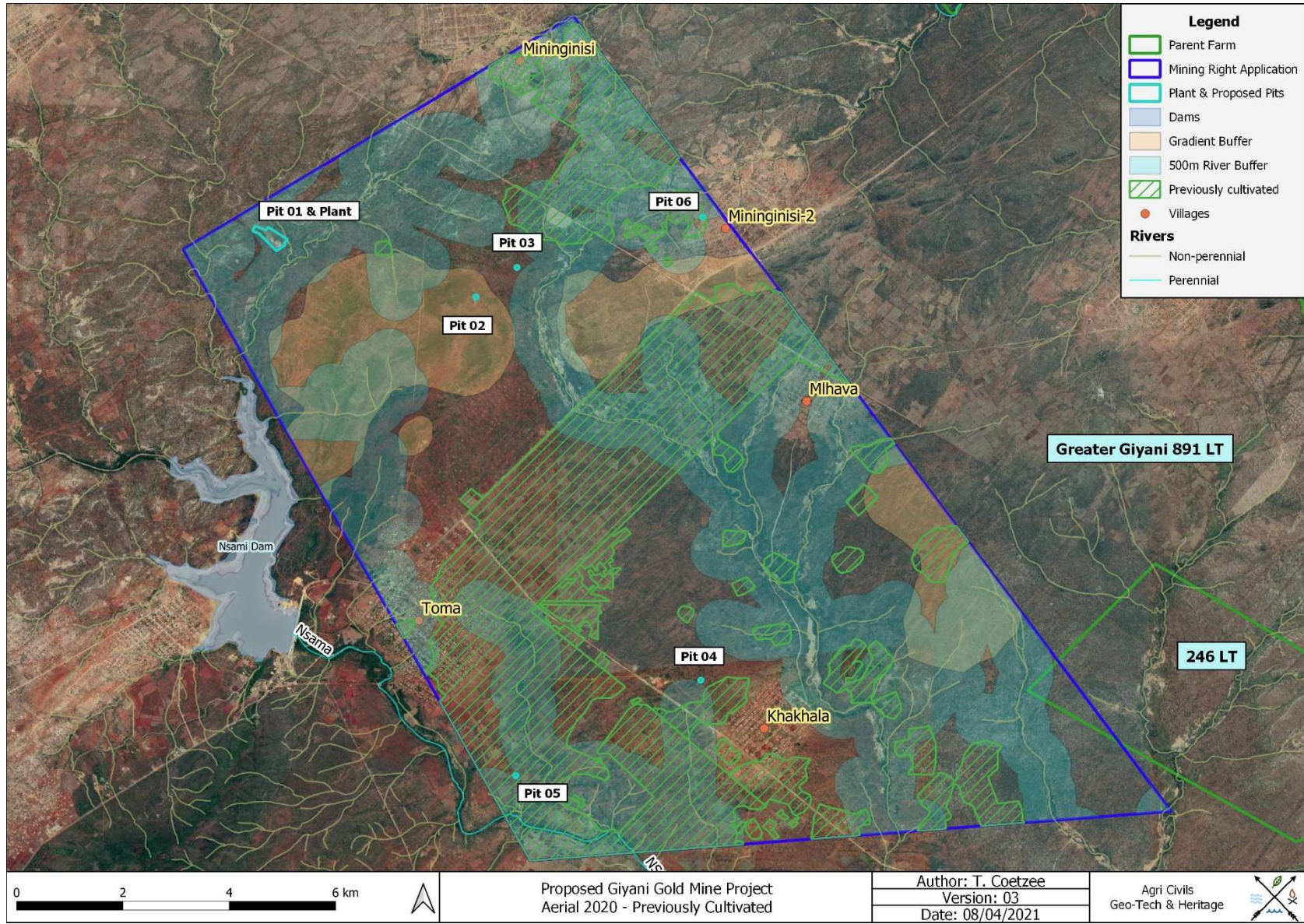


Figure 8: Proposed development and previously cultivated areas.



Figure 9: Undisturbed northern section demarcated for the proposed plant expansion.



Figure 10: Undisturbed southern section demarcated for the proposed plant expansion



Figure 11: Pit 01.



Figure 12: Plant area.



Figure 13: Environment Associated with proposed Pit 04.

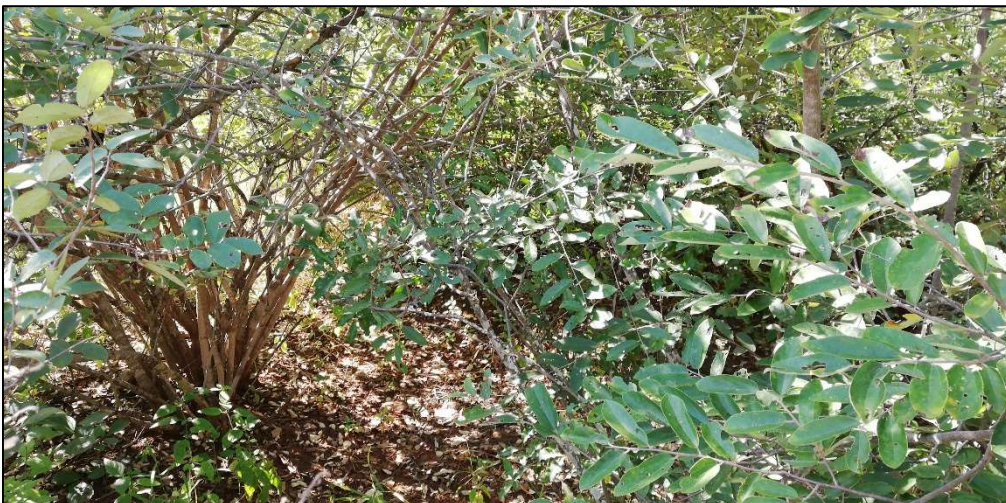


Figure 14: Environment Associated with proposed Pit 05.



Figure 15: Environment Associated with proposed Pit 06.



Figure 16: Nearby houses at proposed Pit 06.

4.1 Sources of Information

At all times during the survey, standard archaeological procedures for the observation of heritage resources were followed. As most archaeological material occur in single or multiple stratified layers beneath the soil surface, special attention was paid to disturbances; both man-made such as roads and clearings, and those made by natural agents such as burrowing animals and erosion. Locations of archaeological material remains were recorded by means of a Garmin Oregon 750 GPS. These sites, as well as general conditions, were photographed with a Samsung S7 mobile phone.

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

Personal communication with Mr Mzamani Mdaka from Kusile Invest 133 proved useful in locating potential heritage sites.

4.1.1 Previous Heritage Studies

Ngove village, Limpopo

A Heritage Impact Assessment (HIA) was done for a development on a small hill to the south of Ngove village, which is located south of Giyane. The study area is located about 12 km southwest of the proposed Kusile Invest 133 Giyani Gold Mine Project study area. The HIA recorded rudimentary stone-walling on a small plateau and suggested that the site was used for initiation. Accordingly, oral traditions are also associated with the hill (Van Schalkwyk 2006).

Nsami Dam upgrade

The HIA for the proposed upgrades of the Nsami Dam was done by eThembeni Cultural Heritage (2006). No specific details are mentioned regarding the upgrades of the dam, but it was noted that no sites of heritage significance were observed. The Nsami Dam is located approximately 300 m west of the Kusile Invest 133 Giyani Gold Mine Project study area.

McKechnie Vodacom Mast - Giyani

Archaeo-Info (2000) conducted an Archaeological Impact Assessment for the construction of a Vodacom mast at McKechnie, located approximately 11 km northwest of the Kusile Invest 133 Giyani Gold Mine Project study area. The study investigated a hill with a flat top and steep descending slopes. The hill measured approximately 100 m X 30 m and the majority of the hill was characterised by archaeological deposits, features and structures. Scattered concentrations of potsherds and slag were located along the top of the hill, while artefacts that include daga, animal bone and fresh water mollusca shells were identified between terrace walls on the slopes.

The terrace walling consisted of a single line of packed stones and it was noted that the terracing might be more extensive, but visibility was hampered by dense vegetation. Two vertically erected stones indicating the entrance to the site were also noted. According to the author, the potsherds belonged to the *Letaba* facies of the Kalundu tradition. The age of this facies is estimated to range between AD 1600 to 1840.

4.2 Limitations

The area associated with the plant that has already been developed was accessed without any constraints. The undeveloped sections of the plant area and Pit 01, as well as the remaining proposed Pits, are characterised by extremely dense vegetation that severely restricted free movement and visibility during the time of surveying (April 2021). The type of vegetation consisted of thick mopane tree cover, thorn bushes and grass cover (**Figures 17 & 18**). The access road to proposed Pits 02 & 03 was completely inaccessible due to extremely dense vegetation (**Figure 19**). These proposed pits could therefore not be visited.



Figure 17: Thick tree cover.



Figure 18: Thorn trees and dense grass cover.



Figure 19: Closed access road to Pits 02 & 03.

5. Archaeological and Historical Remains

5.1 Stone Age Remains

No Stone Age archaeological remains were located within the demarcated study areas.

Although no Stone Age archaeological remains were located, such artefacts might occur in the area. These artefacts are often associated with rocky outcrops or water sources. **Figures 20 – 22** 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 – 6), no major Stone Age archaeological sites are located in the direct vicinity of the study area, but rock art sites are found approximately 33 km to the northwest.

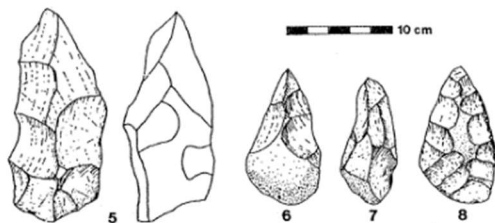


Figure 20: ESA artefacts from Sterkfontein (Volman 1984).

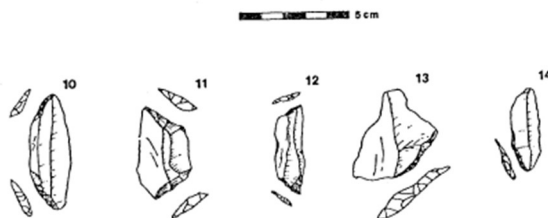


Figure 21: MSA artefacts from Howiesons Poort (Volman 1984).



Figure 22: LSA scrapers (Klein 1984).

5.2 Iron Age Farmer Remains

No Iron Age Farmer archaeological remains were located within the demarcated study areas.

The heritage study done for the construction of the Vodacom Mast at McKechnie recorded archaeological deposits, features and structures that include potsherds, slag, daga, animal bone, fresh water mollusca and stone-walling on or near a hill (Archaeo-Info 2000).

5.3 Historical

Historical mining activity was observed at proposed Pits 04, 05 and 06 (**Figure 39 & Table 4**). Proposed Pit 04 is associated with at least three trenches that vary in length, but are generally one metre wide and 1.2 m deep (**Figure 23**). Dense vegetation, however, hampered determining the extent of these trenches. Also, no infrastructure or artefacts were observed at proposed Pit 04. It should be noted that the mine is not indicated on the topographical maps (**Appendix A: Figures 42, 46, 50 & 51**).

Proposed Pit 05 is associated with historical mining infrastructure that include a ball-mill mounting block, pieces of concrete and two very deep vertical shafts that pose a serious threat to people and animals (**Figures 24 – 27**). According to Mr Mzamani Mdaka (pers comm. 2021), the date '1947' was observed on one of the structures. During the site visit, however, this date could not be located. The mine is not indicated on the topographical maps, but the Boltmans Beauty Mine is indicated on the 1947 topographical map approximately 1 km to the northwest (**Appendix A: Figures 42, 46, 50 & 51**). Steenkamp & Clark-Mostert (2012), however, notes that Boltmans Beauty was operated prior to and around 1936.

Proposed Pit 06 consists of a relatively disturbed area close to Mininginisi-2 village. The infrastructure associated with this area include a ball-mill mounting block, two building foundations, and two rehabilitated mine shafts (**Figures 28 – 32**). The granite tops of the rehabilitated shafts, however, have been removed from the pedestals. The date of the mining infrastructure is unknown, but according to Mr Mzamani Mdaka (pers comm. 2021) this site dates to the 1980s. The mine is also not indicated on the topographical maps (**Appendix A: Figures 42, 46, 50 & 51**).

Table 4: Historical sites.

Name	Type	Source	Year	Status	Age	Estimated extent (ha)	Parcel
Pit 04	Historical mine	Survey	Unknown	Ruin	Historical	0.5	Greater Giyani 891 LT
Pit 05	Historical mine	Survey	1947	Ruin	Historical	0.5	Greater Giyani 891 LT
Pit 06	Historical mine	Survey	Unknown	Ruin	Historical	0.5	Greater Giyani 891 LT

The heritage study done by Van Schalkwyk (2006) for a development on a hill to the south of Ngove village recorded rudimentary stone-walling and noted a potential initiation site. The age of the site is unknown, but might date to historical times.



Figure 23: Historical mining activity at proposed Pit 04.



Figure 24: Ball-mill mounting block at proposed Pit 05.



Figure 25: Pieces of concrete at proposed Pit 05.



Figure 26: Vertical shaft at proposed Pit 05.



Figure 27: A second vertical shaft at proposed Pit 05.



Figure 28: Ball-mill mounting block at proposed Pit 06.



Figure 29: Building foundations at proposed Pit 06.



Figure 30: Granite top of rehabilitated shaft No 4.



Figure 31: Pedestal of rehabilitated shaft.

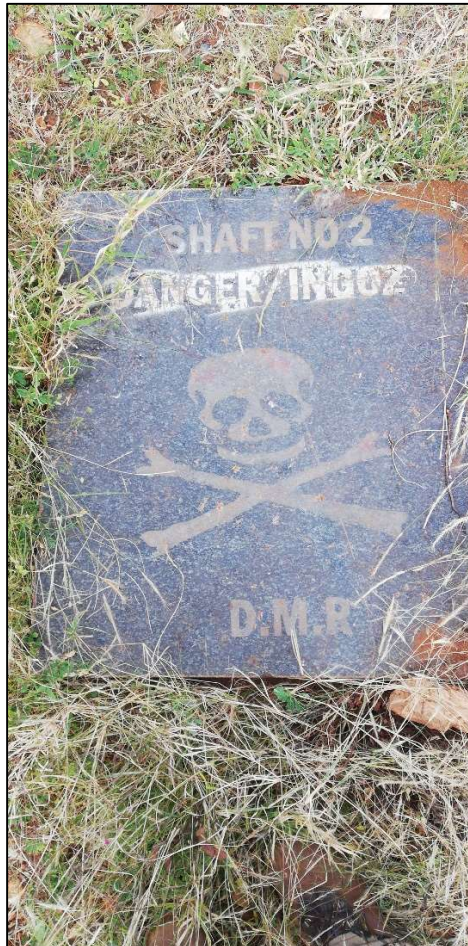


Figure 32: Granite top of rehabilitated shaft No 2.

5.4 Contemporary Remains

Some of the structures associated with proposed Pit 06, such as the rehabilitated mine shafts, might date to contemporary times.

Heritage studies done in the surrounding area did not record buildings or structures dating to contemporary times. See Archaeo-Info (2000), eThembeni Cultural Heritage (2006) and Van Schalkwyk (2006).

5.5 Graves

No graves or burial sites were located within the demarcated study areas. However, Mr Mzamani Mdaka pointed out three graves and one potential grave approximately 600 m to the southwest of the plant area (**Table 5 & Figures 33 – 36**). The graves consist of heavily overgrown stone cairns of which the orientation is unknown. The graves are not fenced-off and no inscriptions or grave goods were observed. A painted stone is associated with Site B04, but it is unclear whether the site is associated with a burial site. Such painted stones are often used to indicate property and the stone cairn might have been used for this purpose.

Table 5: Graves.

Name	Type	Source	Year	Status	Age	Parcel
B01	Grave	Survey	Unknown	Intact	Unknown	Greater Giyani 891 LT
B02	Grave	Survey	Unknown	Intact	Unknown	Greater Giyani 891 LT
B03	Grave	Survey	Unknown	Intact	Unknown	Greater Giyani 891 LT
B04	Potential Grave	Survey	Unknown	Intact	Unknown	Greater Giyani 891 LT



Figure 33: Overgrown grave at B01.



Figure 34: Overgrown grave at B02.



Figure 35: Overgrown grave at B02.



Figure 36:Potential grave at B04.

Heritage studies done in the surrounding area did not record graves or burial sites. See Archaeo-Info (2000), eThembeni Cultural Heritage (2006) and Van Schalkwyk (2006).

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 6: 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 7: Individual site ratings.

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
Plant & Pit 01	Plant & opencast pit	General Protection C	4 C	Low	No recording necessary
Pit 04	Historical mining	General Protection B	4 B	Medium	Record site
Pit 05	Historical mining	General Protection B	4 B	Medium	Record site
Pit 06	Historical mining	General Protection B	4 B	Medium	Record site
2330BB-B01	Grave	Local	Grade 3 A	High	Mitigation not advised
2330BB-B02	Grave	Local	Grade 3 A	High	Mitigation not advised
2330BB-B03	Grave	Local	Grade 3 A	High	Mitigation not advised
2330BB-B04	Potential grave	Local	Grade 3 A	High	Mitigation not advised

7. Statement of Significance & Recommendations

7.1 Statement of significance

The study area: The six demarcated portions on un-surveyed state land of Greater Giyani 891 LT, Giyani, Limpopo

The proposed opencast pit areas (Pits 01 – 06) are based on the location of previous mining activity. In terms of mining, the general area has been exposed to mining activities since 1870. Mining activities appear to have continued until the 1980s, but were constantly interrupted, abandoned and reinvestigated over the years.

Given the significance of the larger cultural landscape and heritage sites located during previous heritage studies, the general area is considered sensitive from a heritage perspective. However, significant sections of the study area has been cultivated in past years that most likely disturbed the archaeological context. Also, due to extremely dense vegetation cover, the identification of culturally significant heritage sites was significantly hampered. The demarcated impact areas are indicated on **Figures 37 – 41**.

The demarcated plant area and Pit 01 has been disturbed by recent mining activity and no sites of heritage significance were observed within the demarcated boundary (**Figure 37**).

The area associated with proposed Pit 04 does not intersect the gradient or 500 m river buffer and no buildings or huts are indicated at this location on historical topographical maps (**Figure 39**). However, historical mining trenches of which the date is unknown, were located. No surface remains or infrastructure were noted at this site. Due to the potential age of the diggings, the site might be significant from an archaeological perspective and falls under the National Heritage Resources Act 25 of 1999.

Proposed Pit 05 intersects an area associated with huts as indicated on the 1967 topographical map (**Appendix A: Figure 46**), but has subsequently been disturbed by cultivation (**Figure 40**). The site is also located within the 500 m river buffer. Historical mining infrastructure associated with Pit 05 date to at least 1947 and are considered significant from an archaeological perspective. The site also falls under the protection of the National Heritage Resources Act 25 of 1999.

Proposed Pit 06 partially intersects an area marked to as previously cultivated, but mining remains found at the site might date to historical times (**Figure 41**). The rehabilitated shafts located at proposed Pit 06 might date to contemporary times, but it is likely that the initial mining activity and remaining infrastructure are much older and are considered significant from an archaeological perspective. Therefore, this site falls under the protection of the National Heritage Resources Act 25 of 1999 as well.

Although Pits 02 & 03 (**Figure 38**) could not be accessed as a result of dense vegetation, it is likely that these sites are associated with similar features and infrastructure as observed at proposed Pits 04, 05 and 06. A strong possibility, therefore, exists that these sites are significant from an archaeological perspective as well.

The graves and potential grave associated with Sites B01 – B04 consist of overgrown and dilapidated stone cairns without inscriptions or visible grave goods. These sites are located approximately 600 m southwest of the plant and Pit 01 area and fall within the 500 m river buffer. Although significant from a heritage perspective, no impact on the sites is envisaged.

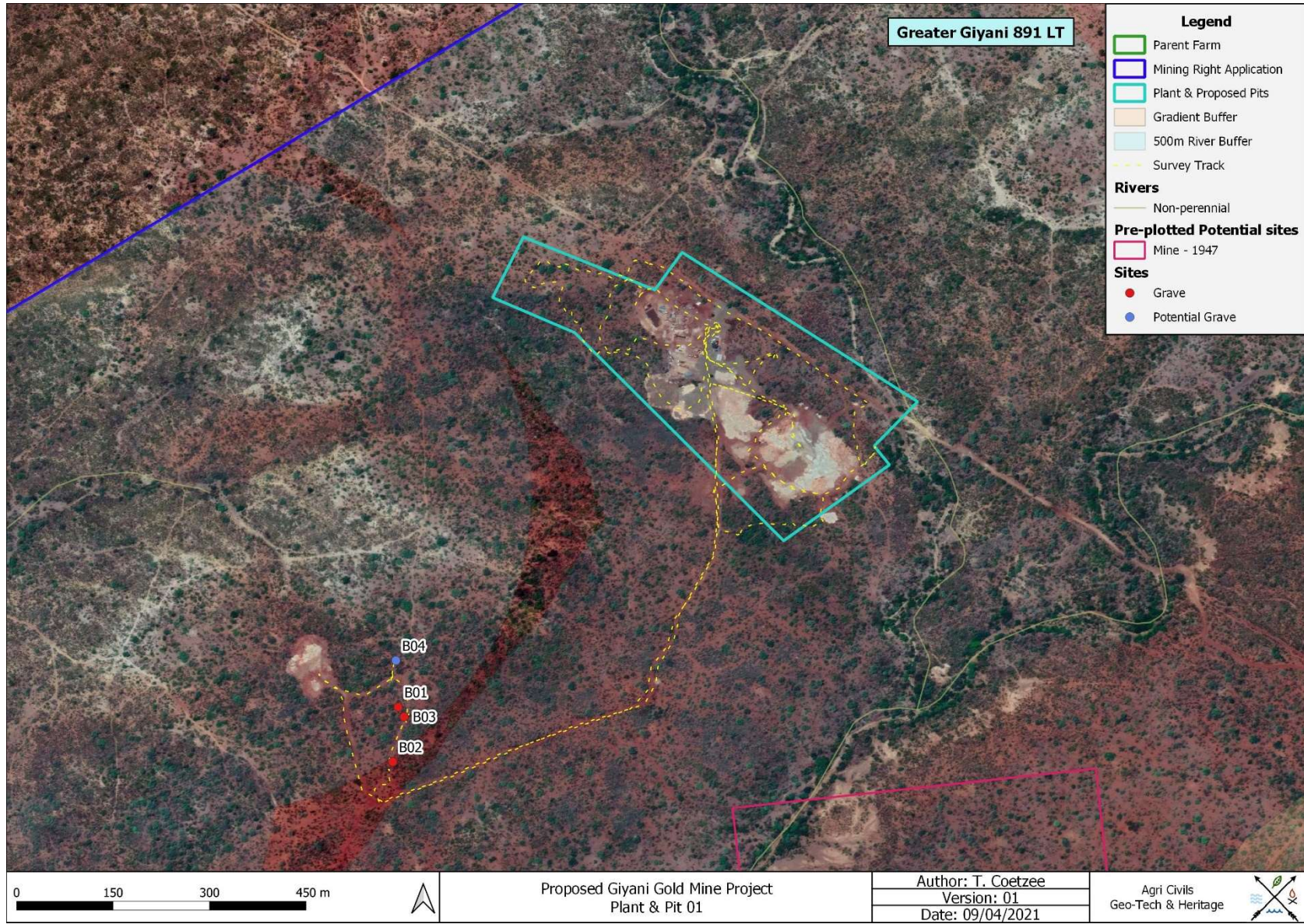


Figure 37: Plant and Pit 01 superimposed on a 2020 aerial backdrop.

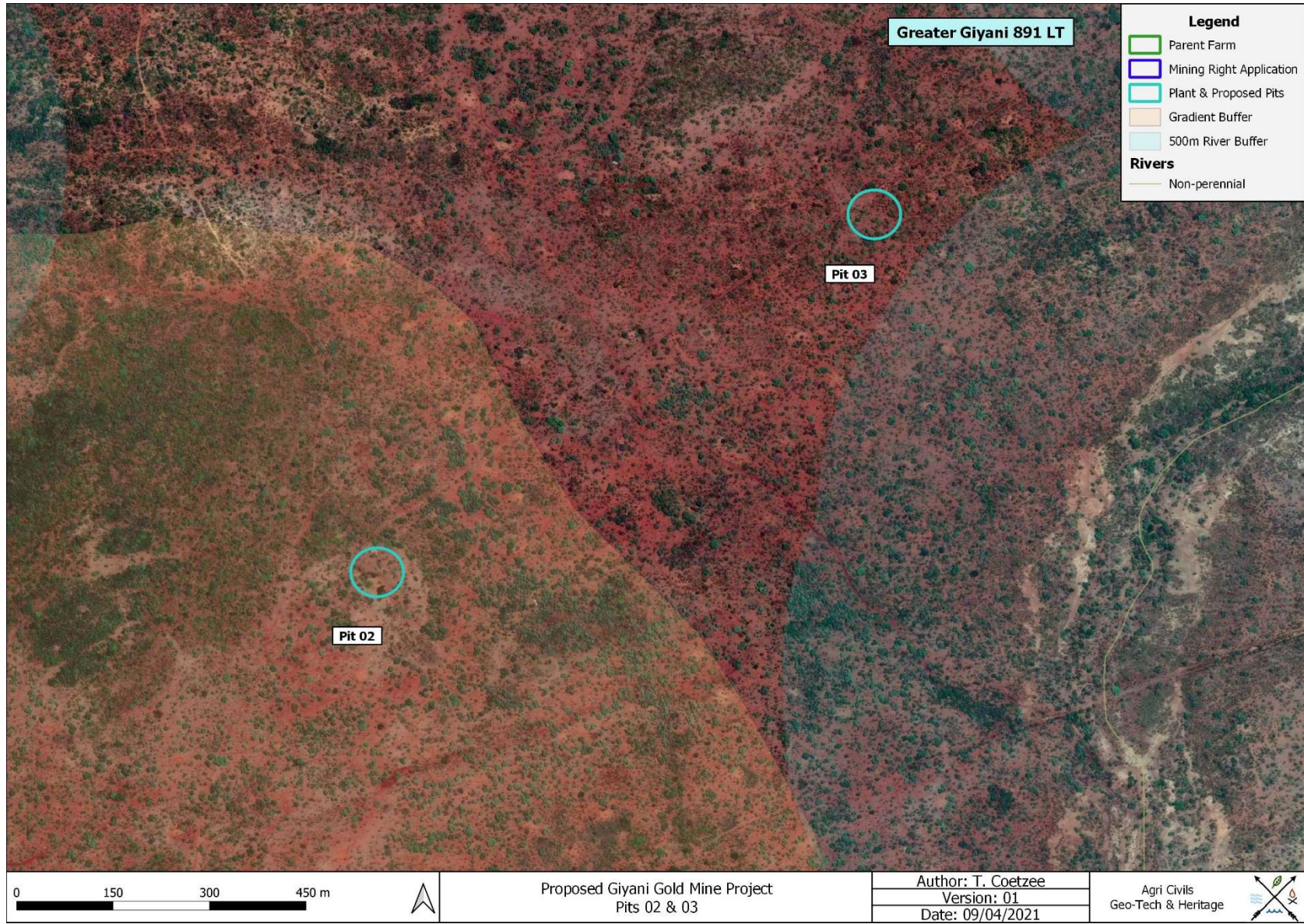


Figure 38: Proposed Pits 02 & 03 superimposed on a 2020 aerial backdrop.

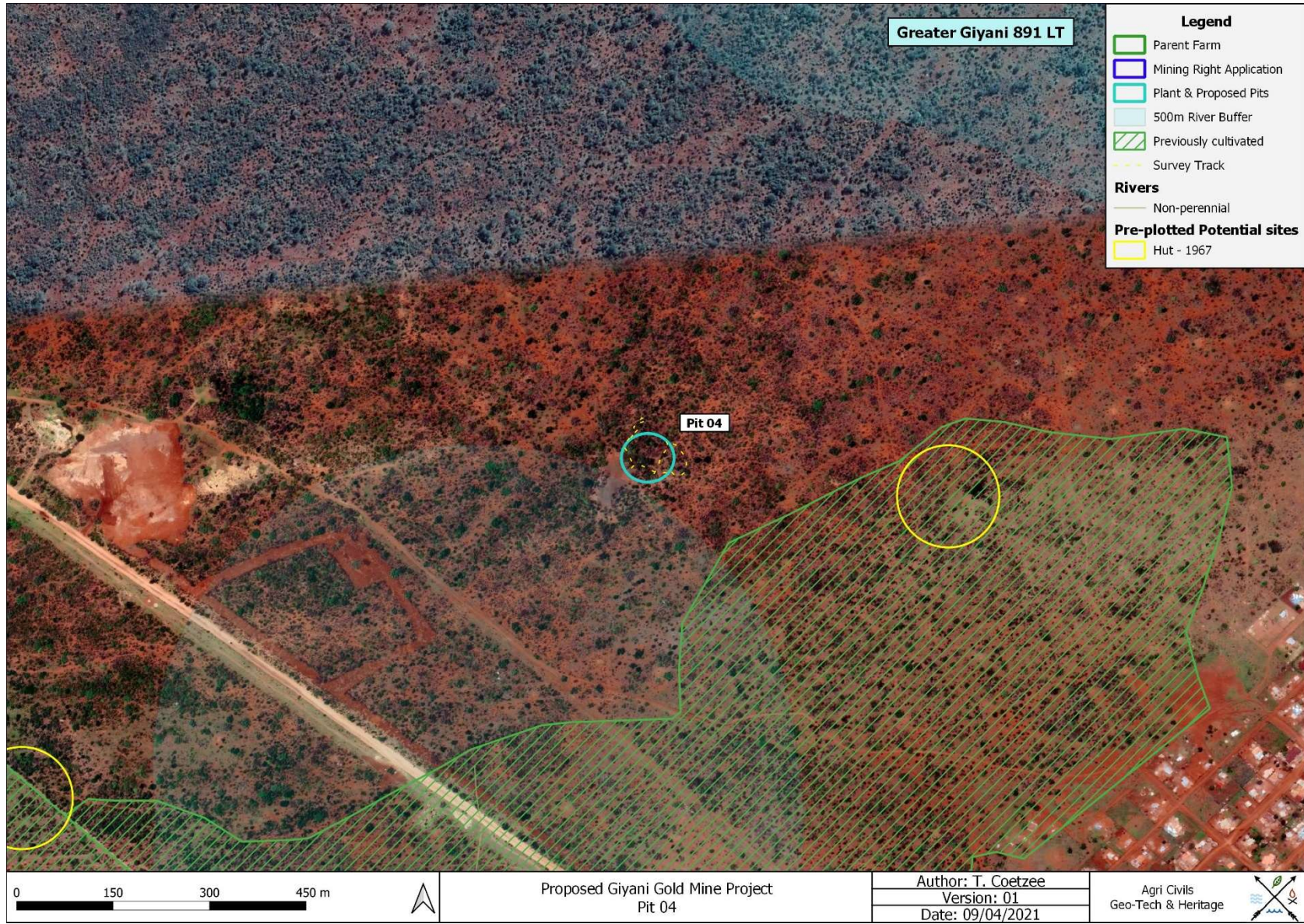


Figure 39: Proposed Pit 04 superimposed on a 2020 aerial backdrop.

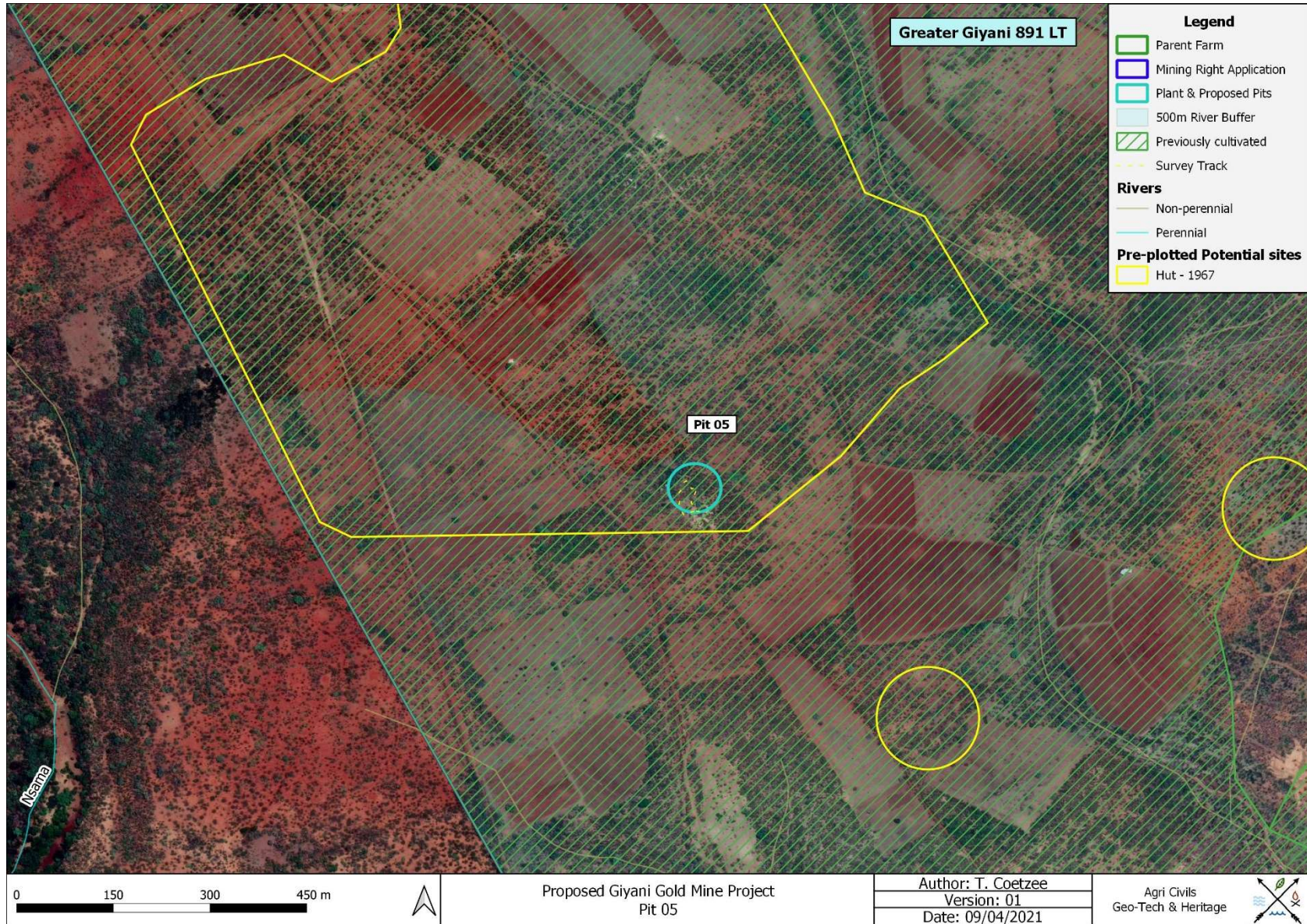


Figure 40: Proposed Pit 05 superimposed on a 2020 aerial backdrop.

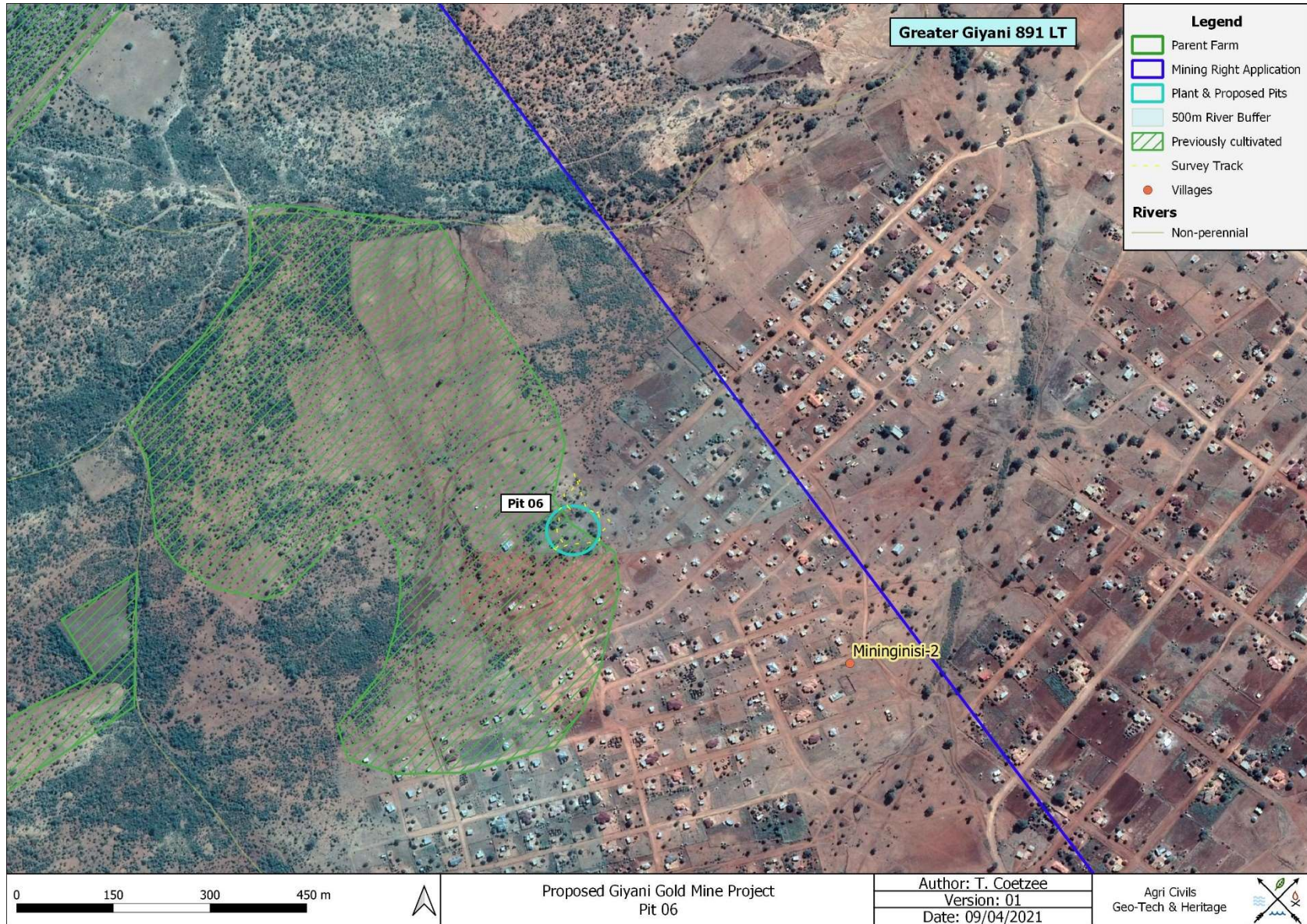


Figure 41: Proposed Pit 06 superimposed on a 2020 aerial backdrop.

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:

Plant and Pit 01

- The area demarcated for the expansion of the plant and Pit 01 has to a large extent been disturbed by contemporary mining activity and no sites of heritage significance were noted within the demarcated boundary. No further action is required.

Proposed Pits 02 & 03

- Pits 02 & 03 could not be accessed due to dense vegetation cover. Because the Giyani Gold Mining Project is based on the location of previous mining activity, a strong possibility exists that proposed Pits 02 & 03 are associated with historical mining activity. Therefore, it is recommended that the vegetation at these sites be cleared and a qualified archaeologist inspect the areas prior to any development to prevent the accidental damage and destruction of heritage resources. Care, however, must be exercised not to disturb any potential shafts, structures or any other archaeological features when clearing the vegetation.

Proposed Pit 04

- Due to the potential archaeological significance of the mining activity at proposed Pit 04, it is recommended that the vegetation hampering visibility and access to the trenches be cleared and that a qualified archaeologist document and map the site prior to any development. Care must be exercised not to disturb the trenches or any other archaeological features when clearing the vegetation.

Proposed Pit 05

- The historical mining activity associated with proposed Pit 05 is significant from an archaeological perspective since the site is associated with infrastructure that date to at least 1947. Dense vegetation, however, hampered determining the extent and location of all the features and structures. Therefore, it is recommended that the vegetation hampering access and visibility be cleared and that a qualified archaeologist document and map the site prior to any development. Care must be exercised not to disturb the shafts, structures or any other archaeological features when clearing the vegetation. It is also recommended that the historical mining structures associated with this site be fenced-off and avoided by development. The mine's ECO should inspect the structures during the proposed mining development and should any impact be observed, or if impact cannot be avoided, a destruction permit will have to be obtained from the relevant heritage authority.

Pit 06

- Although the rehabilitated mining shafts associated with proposed Pit 06 might date to the 1980s, the associated buildings and structures likely date to earlier times and are considered significant from an archaeological perspective. Due to the rehabilitated and disturbed nature of the site, the recording done during this study is regarded as sufficient. However, it is also recommended that the historical mining structures associated with this site be fenced-off and avoided by development. The mine's ECO should inspect the structures during the proposed mining development and should any impact be observed, or if impact cannot be avoided, a destruction permit will have to be obtained from the relevant heritage authority.

Graves

- Grave sites 2330BB-B01 – B04 are located approximately 600 m southwest of the pant and Pit 01 area. No impact is envisaged and no further action is required.

General Recommendations

- The recommendations made are based on the specific project activities, as well as surface boundaries as indicated in this report. Should the proposed surface impact areas be altered, a qualified archaeologist must survey the altered areas 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. A systematic survey by comparison is less subjective and involves a grid system, such that the survey area is divided into sectors and these are walked ally, thus making the recording of finds more accurate.

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

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

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

Appendix A: Historical Aerial Imagery & Topographical Maps

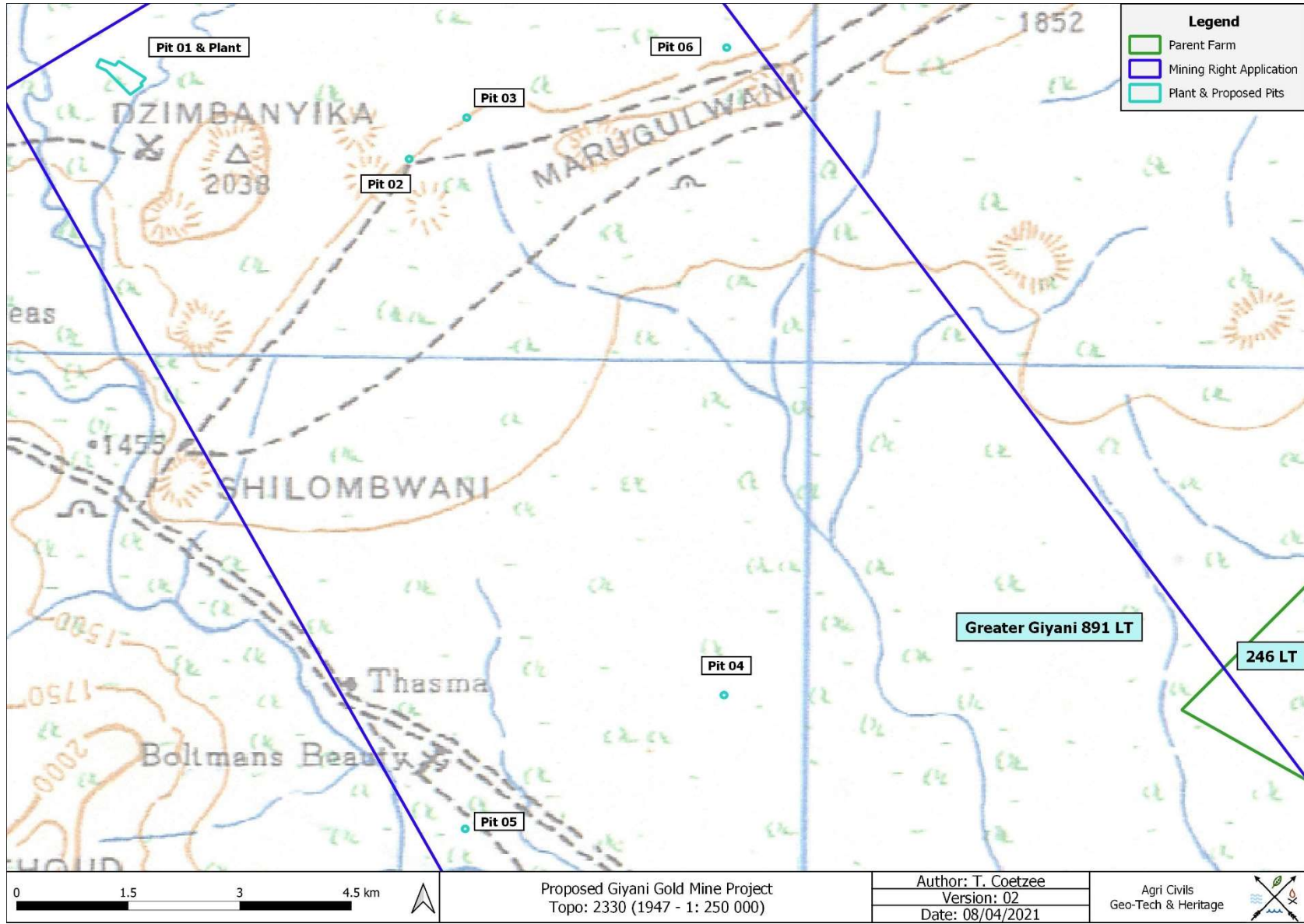


Figure 42: Segment of 1947 SA 1: 250 000 2330 indicating the demarcated study areas.

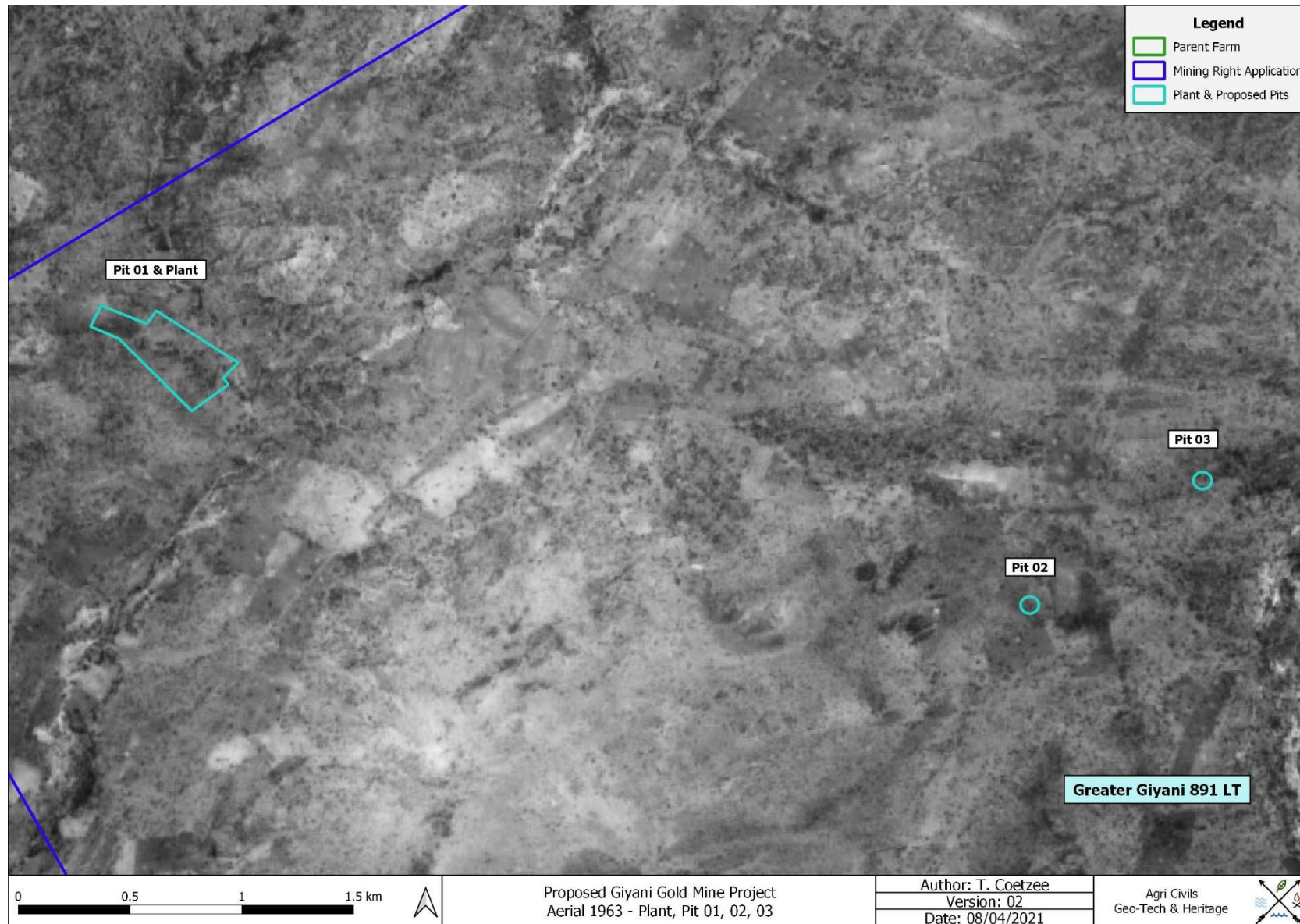


Figure 43: Proposed plant expansion, Pits 01, 02 and 03 on a 1963 aerial backdrop.

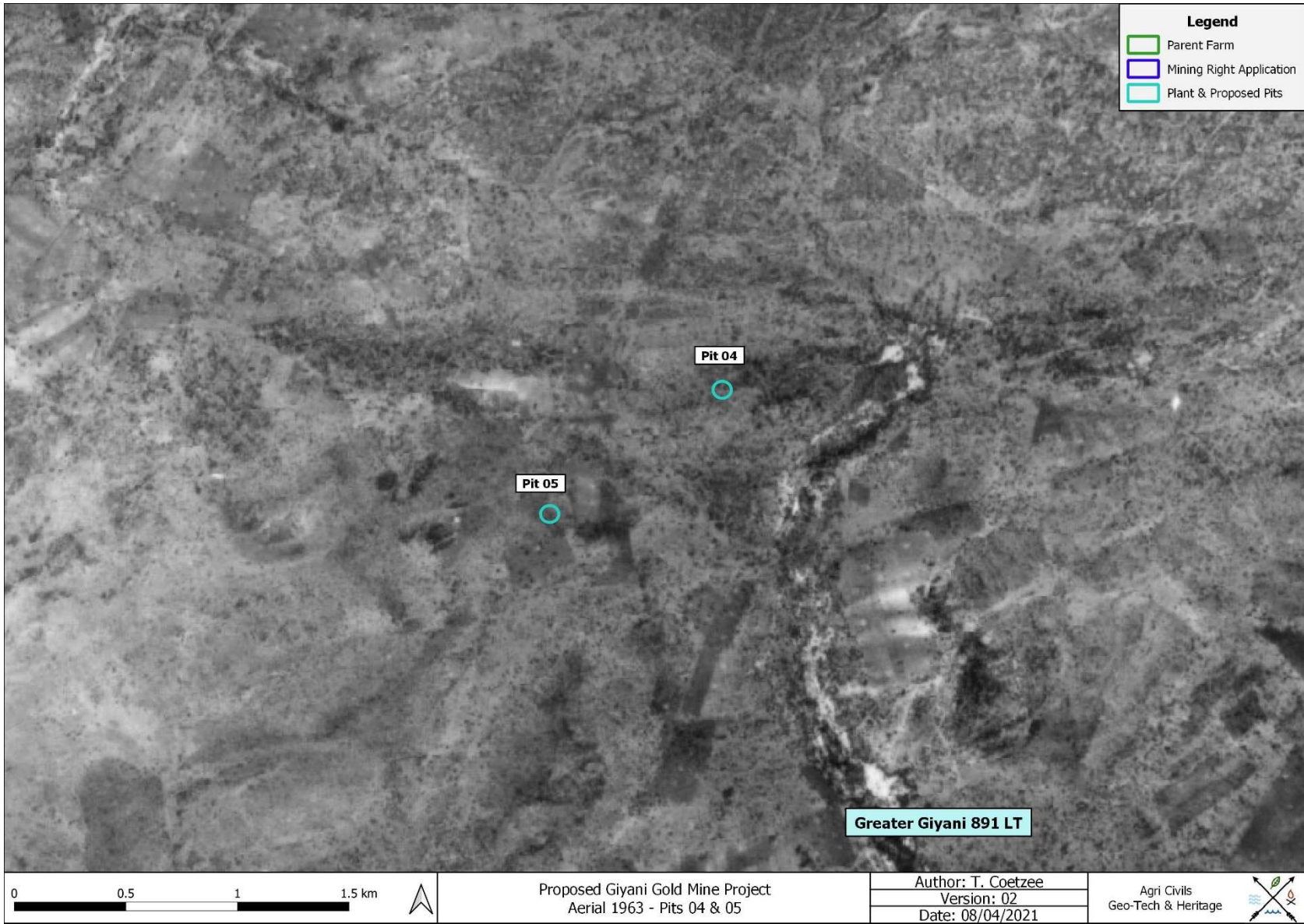


Figure 44: Proposed Pits 04 & 05 on a 1963 aerial backdrop.

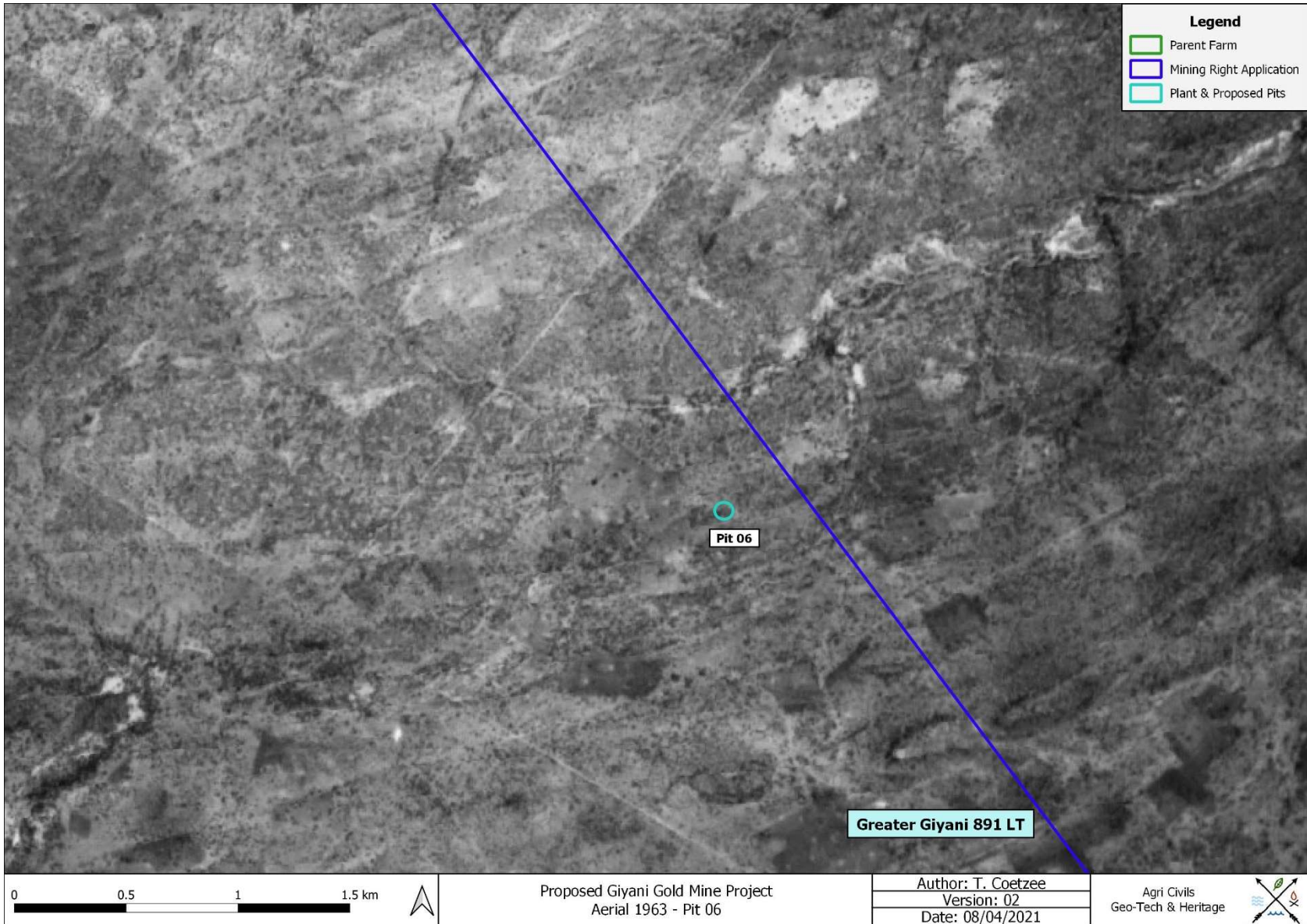


Figure 45: Proposed Pit 06 on a 1963 aerial backdrop.

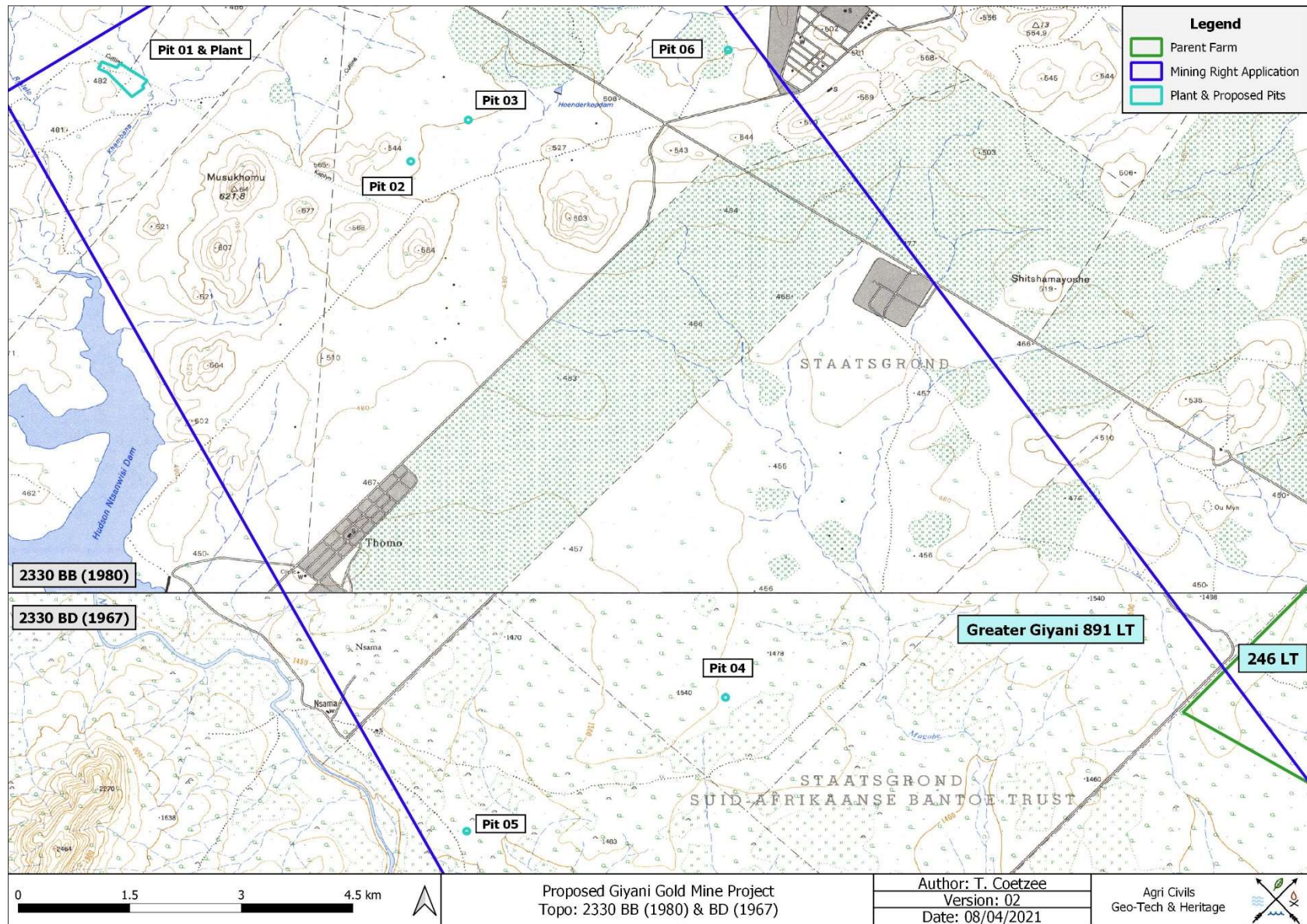


Figure 46: Segments of 1967 & 1980 SA 1: 50 000 2330 BB & BD indicating the study areas.

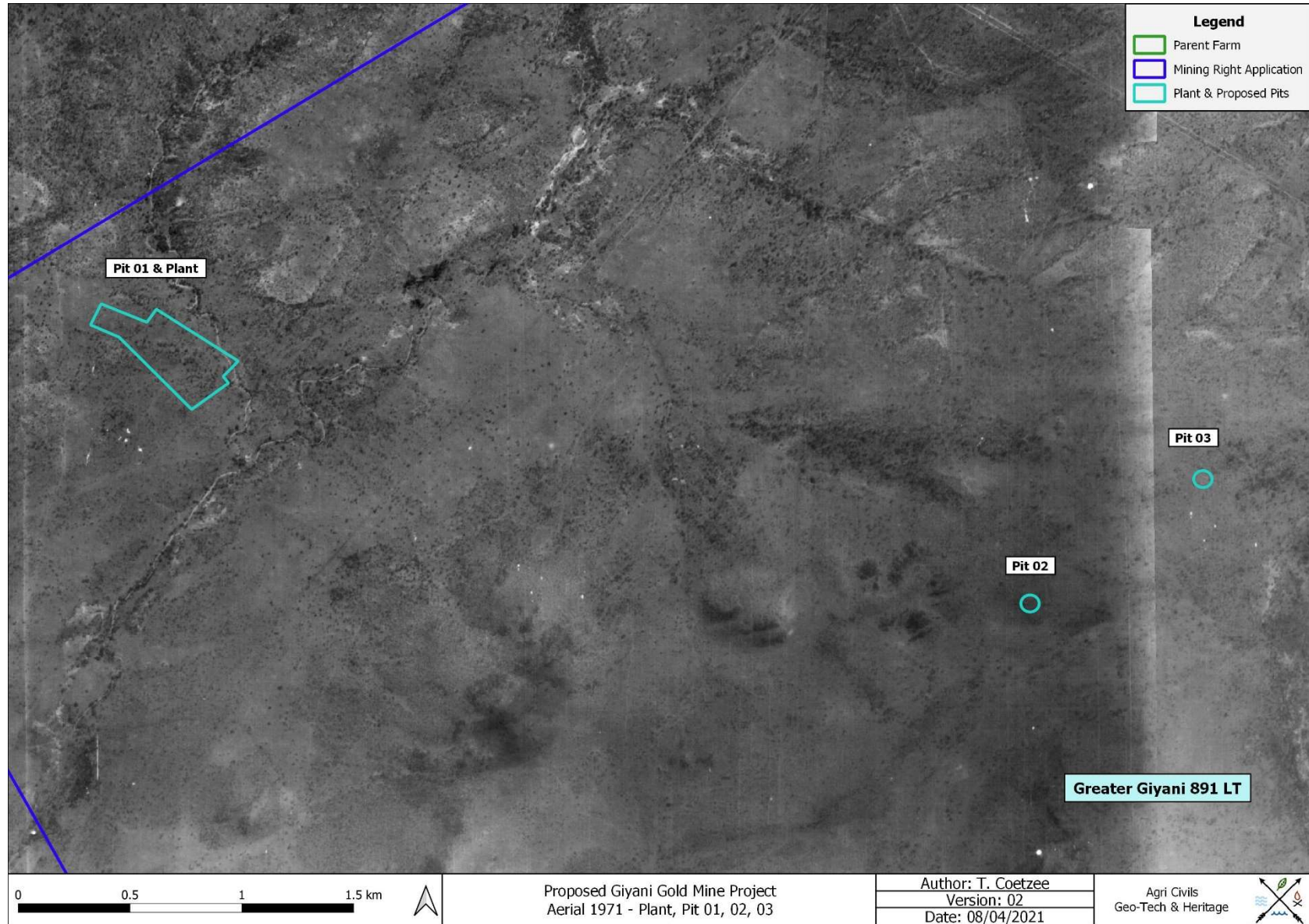


Figure 47: Proposed plant, Pit 01, 02 and 03 on a 1971 aerial backdrop.



Figure 48: Proposed Pits 04 & 05 on a 1971 aerial backdrop.

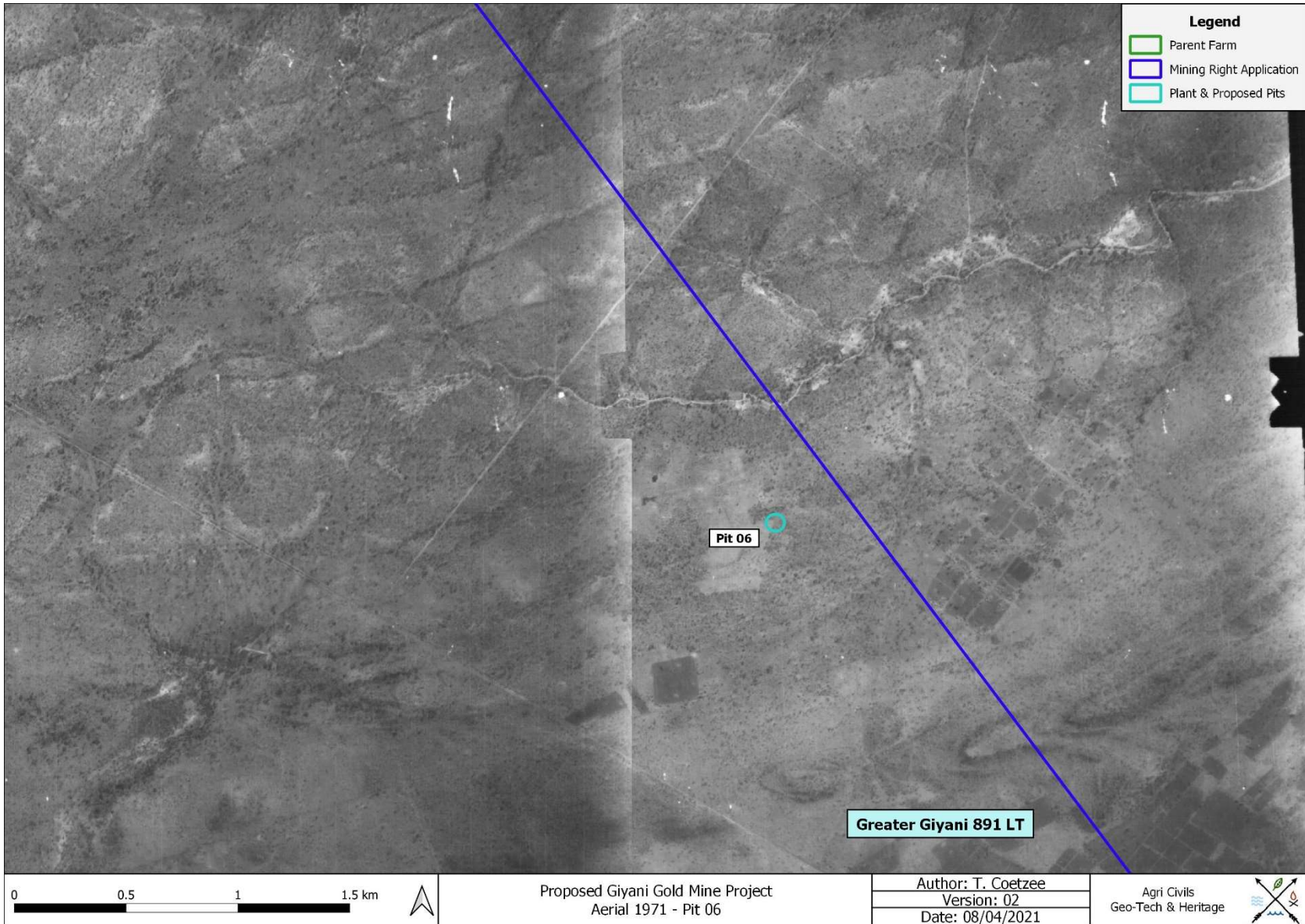


Figure 49: Proposed Pit 06 on a 1971 aerial backdrop.

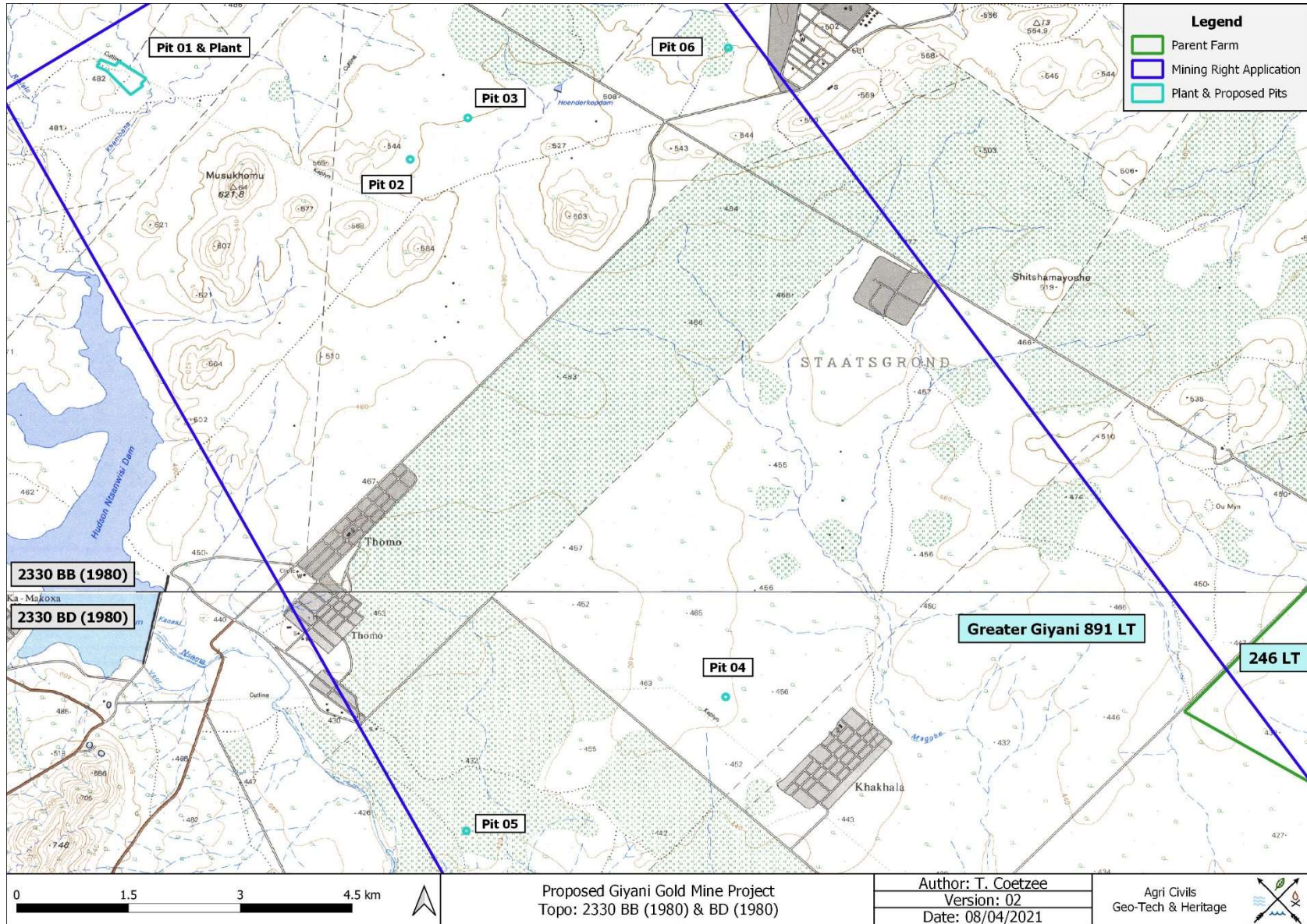


Figure 50: Segments of 1980 SA 1: 50 000 2330 BB & BD indicating the study area.

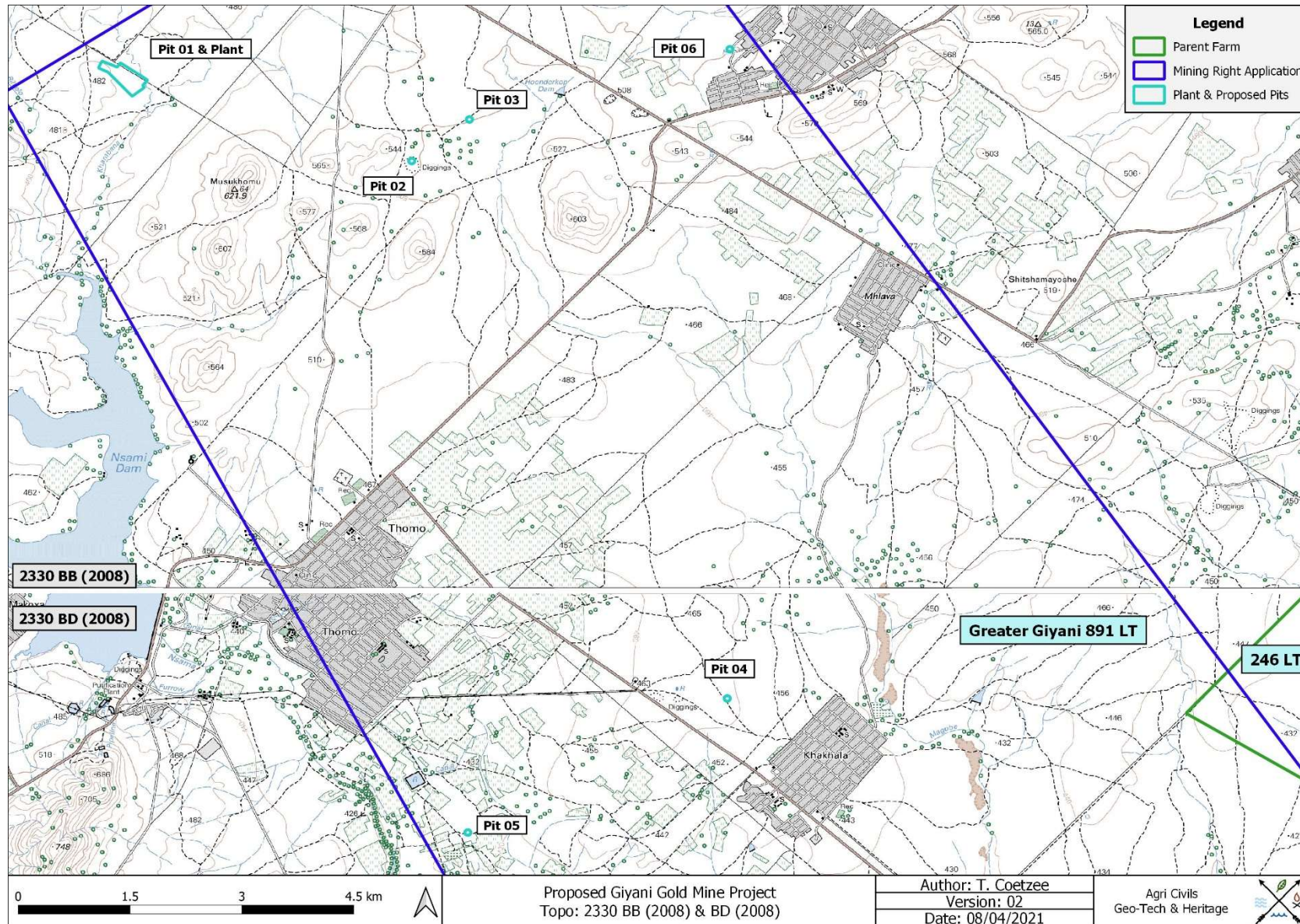


Figure 51: Segments of 2008 SA 1: 50 000 2330 BB & BD indicating the study area.