

# **ARCHAEOLOGICAL DESKTOP STUDY**

**for the Application of a Prospecting Right  
on Several Portions of the Farm  
Roodepoort 504 JR, Bronkhorstspuit,  
Gauteng**

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October 2021**

Archaeological Desktop Study for the Application of a Prospecting Right on  
Several Portions of the Farm Roodepoort 504 JR, Bronkhorstspuit,  
Gauteng


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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 Isowel Tech Solutions 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: 20 October 2021

## Executive Summary

The author was appointed by Archean Resources (Pty) Ltd to undertake an Archaeological Desktop Study for Isowel Tech Solutions (Pty) Ltd on Farm Portions 9, 10, 11, 14, 23, 24, 210, 211 and 212 of the Farm Roodepoort 504 JR within the City of Tshwane Metropolitan Municipality in the Gauteng Province (**Table 1**). The study area is located roughly 2.6 km north of Bronkhorstspuit. The aim of this report is to contextualise the general study area in terms of heritage resources and will provide the developers with general information regarding potentially sensitive areas. This will also shed light on what is to be expected during a Phase 1 Archaeological Impact Assessment and aid in interpreting finds.

A total of 12 sites consisting of a combination of buildings and structures were noted on historical topographical maps and aerial imagery (**Table 2**). Based on contemporary satellite imagery, five of these sites are associated with surface remains, while seven appear to have been demolished as no surface remains are visible on satellite imagery. Although no surface remains are evident at the demolished sites, subsurface culturally significant material might still be present. Since these sites are likely to be associated with subsurface culturally sensitive material and buildings and structures exceeding 60 years of age, the sites might be protected by the National Heritage Resources Act (25 of 1999) and should preferably be avoided by the proposed prospecting activities. The 500 m River Buffer is considered potentially sensitive from a heritage perspective and care should be exercised when prospecting within the boundary. A full Phase 1 AIA (Archaeological Impact Assessment) must be done should any development that triggers an AIA result from the prospecting project, including if the cumulative impact of the proposed prospecting exceeds 0.5 ha.

## List of Abbreviations

**AIA** – Archaeological Impact Assessment

**CRM** – Cultural Resource Management

**DMR** – Department of Mineral Resources

**EIA** – Environmental Impact Assessment

**ESA** – Early Stone Age

**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

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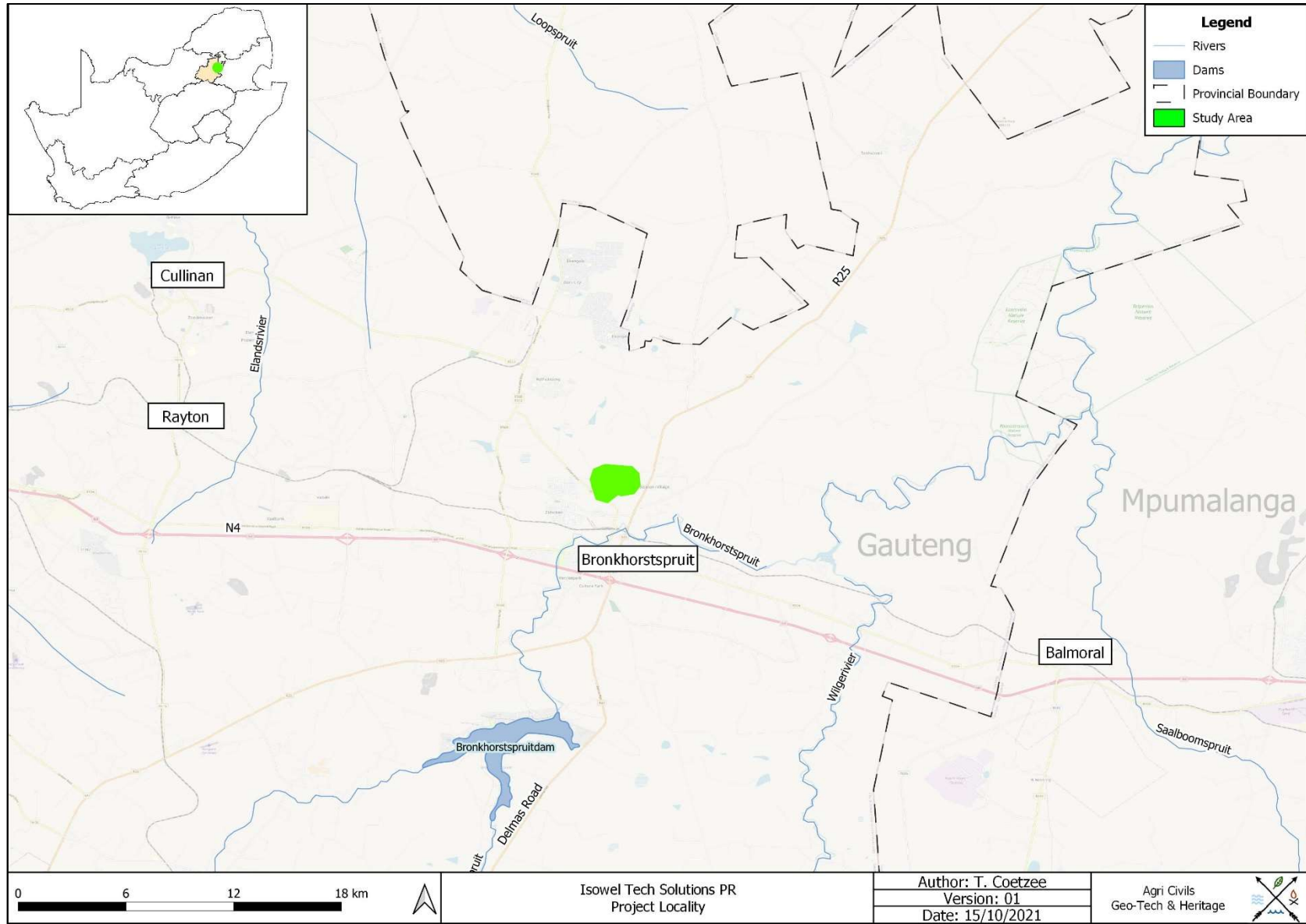
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# 1. Project Background

## 1.1 Introduction

Archean Resources (Pty) Ltd appointed the author to undertake an Archaeological Desktop Study for Isowel Tech Solutions (Pty) Ltd on Farm Portions 9, 10, 11, 14, 23, 24, 210, 211 and 212 of the Farm Roodepoort 504 JR within the City of Tshwane Metropolitan Municipality in the Gauteng Province. The study area is located roughly 2.6 km north of Bronkhorstspuit (**Figure 1**). The identified farm portions are listed in **Table 1**. The purpose of this study is to contextualise the demarcated study area in order to determine the scope of heritage resources that might be encountered during the proposed prospecting project and subsequent heritage studies, as well as to provide recommendations for the safeguarding of archaeological resources during the prospecting process. The aim of this report is to provide the developer with information regarding heritage resources in the vicinity of the study area based on results from previous studies, written historical information and historical topographical maps and aerial photographs.

In the following report, a broad overview of the proposed prospecting project is provided and the study area is contextualised in terms of heritage resources. The prospecting right application is for coal. 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 prospecting 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 if triggered.

Archaeological Impact Assessments (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.

### **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 Isowel Tech Solutions (Pty) Ltd project is situated on the properties listed in **Table 1**.

**Table 1:** Property name & coordinates.

Property	Portion	Map Reference (1:50 000)	Lat (y)	Lon (x)	Extent (ha)
Roodepoort 504 JR	9	2528DC	-25.768398	28.744501	19.6
Roodepoort 504 JR	10	2528DC & DD	-25.769949	28.747992	8.8
Roodepoort 504 JR	11	2528DC & DD	-25.772547	28.750069	6.5
Roodepoort 504 JR	14	2528DC & DD	-25.768100	28.752373	37.3
Roodepoort 504 JR	23	2528DD	-25.773210	28.755853	14.5
Roodepoort 504 JR	24	2528DD	-25.770992	28.754936	26.1
Roodepoort 504 JR	210	2528DC	-25.770603	28.742768	4.3
Roodepoort 504 JR	211	2528DC	-25.772183	28.744802	17.6
Roodepoort 504 JR	212	2528DC & DD	-25.775057	28.746244	28.3

Bronkhorstspuit is located roughly 2.6 km to the south of the proposed prospecting area, while Rayton is located 23 km to the west and Balmoral 26 km to the east-southeast. The demarcated farm portions fall within the City of Tshwane Metropolitan Municipality in the Gauteng Province. The R25 primary road runs northeast-southwest approximately 700 m to the east of the study area, while the R513 secondary road borders the southernmost point of the study area (**Figures 1 – 3**).

In terms of vegetation, the study area falls within the Grassland Biome and Mesic Highveld Grassland Bioregion. On a local scale, the proposed study area is classified as Rand Highveld Grassland. According to Mucina & Rutherford (2006) Rand Highveld Grassland has a conservation status of endangered. The conservation target for this vegetation type is 24% and only a small portion is conserved in statutory and private conservation areas. Rand Highveld Grassland consists of the areas between rocky ridges from Pretoria to eMalahleni, extending onto ridges in the Stofberg and Roossenekal regions. Other localities include the area west of Krugersdorp, as well as the Potchefstroom and Derby surroundings. Almost 50% of this vegetation unit has

been transformed by cultivation, plantations, urbanisation and the building of dams. Scattered alien invasive species are found in about 7% of the vegetation unit. Erosion in this area is moderate to high in only about 7% of the vegetation unit.

The average elevation for Rand Highveld Grassland varies between 1300 and 1635 metres above sea level (MASL) while the average elevation of the study area is 1410 MASL and slopes from the eastern and western borders to the lower mid-section where a non-perennial stream is found.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 677 mm. The average maximum temperature for the study area is recorded during January when an average of 21.3 °C is reached. The average minimum temperature is recorded during June when an average of 10 °C is reached (Climate-data.org 14/10/2021).

The study area falls within the B20D Quaternary Catchment within the Olifants Water Management Area. The closest perennial river to the study area is the Bronkhorstspuit River that flows approximately 2 km to the south of the proposed Isowel Tech Solutions (Pty) Ltd Prospecting Project. A non-perennial offshoot divides the study area into an eastern and western half.

Access to the demarcated study area appears to be through local roads turning from the R25 primary road and R513 secondary road. The majority of the study area appears to be associated with crop cultivation and agricultural activities, while a smaller section along the northern boundary is associated with open veldt. Buildings and infrastructure are visible on all of the Farm Portions.

## 2.2 Project description

The area demarcated for the prospecting of coal covers about 163 ha (**Figures 2 – 4**). The proposed prospecting programme will include non-invasive, as well as invasive activities. The proposed activities as mentioned in the Prospecting Work Programme are described below:

### Non-Invasive Activities

- Consultation with landowners:

Land Tenure Specialist will visit the respective land owners prior to the proposed prospecting and arrange all issues relating to the envisaged prospecting programme such as dates, access routes, availability of water, and rehabilitation of the drill sites and any other items of mutual concern. Official permission together with all agreed requirements will be in writing.

- Data processing and validation:

Data obtained during the drilling process needs to be processed and validated versus stratigraphic, structural and analytical data received and correlated with surrounding boreholes in the reserve area.

- Electronic procession of borehole data
- Validation of lithological data versus analytical data.
- Stratigraphic correlation of coal and dolerite horizons.
- Editing and correction of data on database.

- Lithofacies and coal quality modelling:

Variations in a stratigraphic unit across the reserve area are generated and illustrated by contoured maps showing lateral trends of most significant properties. This is done by the utilization of computerized geological software. Detailed in situ reserve and quality determinations will then be possible through computer based modelling, and qualitative and quantitative calculations.

- Compilation of geology report:

Information obtained during the exploration phase together with computer generated information is compiled into a geological report.

- Inspection/Consultation with landowner:

Land Tenure Specialist will visit the boreholes during and after prospecting has been completed. Once confirmation has been obtained that the area had been properly rehabilitated, sign off will be obtained from the landowners and compensation paid for any damages caused as a result of the prospecting.

## **Invasive Activities**

- **Diamond drilling:**

The drill rigs are truck-mounted and equipped with diesel driven engines to provide power to the drill. A truck fitted with a water tank is used to provide the water supply for the drilling process. The drill site is not larger than 30m x 30m (900m<sup>2</sup>) and consists of a drill rig, water pump, caravan and portable chemical toilets.

Except for the sump required by the drill rig, no excavations will be required. The sumps are normally 1 m<sup>2</sup> and 50 cm (0.5 m) deep. It is always necessary to separate top soil from the subsoils. This will be given in details on the EMPR. The dimension of the borehole is NQ ( $\pm 76$  mm) and the average depth of the coal reserve is estimated to be 100 m. On completion of the borehole, it is cemented from the bottom-up.

The only rehabilitation that will specifically be required is borehole capping and revegetation: Drill holes must be permanently capped as soon as is practicable.

- **Percussion drilling:**

The drill site is not larger than 30m x 30m (900m<sup>2</sup>) and consists of a diesel-powered truck mounted drill rig, a truck transporting drill rods and other equipment, a compressor and portable chemical toilets.

Rock fragments are blown out the top of the hole and are collected at 1m depth intervals and arranged on the ground to enable continuous detailed lithological descriptions of the stratigraphic horizons to be made.

Percussion holes will either be cemented if not further utilized, or will be fitted with a cap and be used for water levels and water quality monitoring.

- **Directional drilling:**

The drill site is not larger than 120 m x 120 m (14400 m<sup>2</sup>) and consists of a sump, a diesel-powered drill rig, a truck transporting drill rods and other equipment, a compressor, portable offices and chemical toilet. Rock fragments are blown out the top of the hole and are sampled at 10 m depth intervals and collected in small bottles and sent to the laboratory for coal analysis. All percussion holes are sealed with cement up to the depth of start of coal.

- **Geophysical down-hole surveys**

The down-hole geophysical survey is done at the borehole site after the hole has been completed. A range of specialized geophysical tools are lowered into the open borehole and a range of physical lithological characteristics of the rock mass or coal are gathered and sent digitally along the cable to a computer on surface. This data is used to produce a number of profiles reflecting rock strength, coal qualities and structural features for the total length of the borehole. A single truck is used which contains all equipment including a mobile generator.

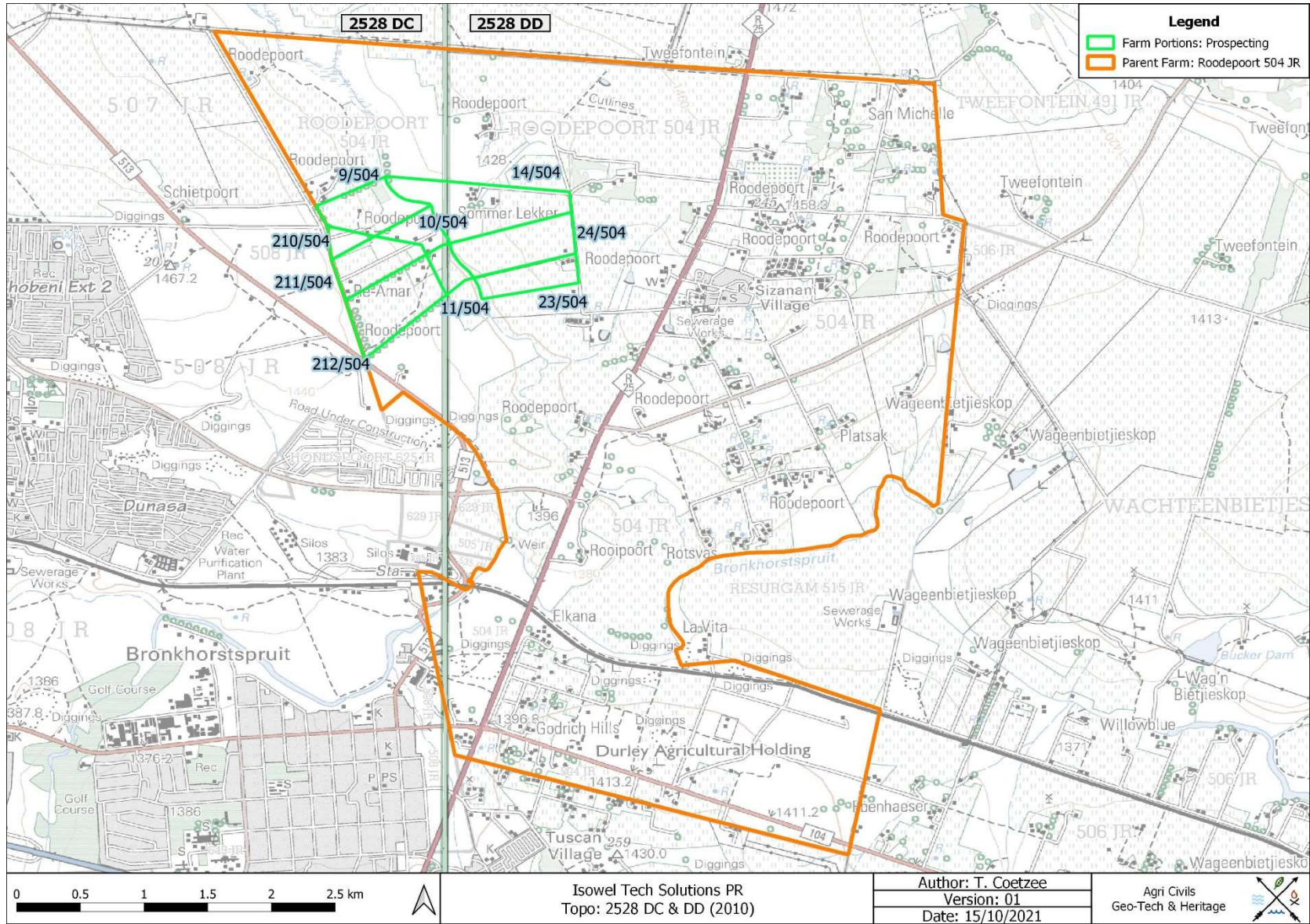
Geophysics is a subject of natural science concerned with the physical processes and physical properties of the Earth and its surrounding space environment, and the use of quantitative methods for their analysis. The term geophysics sometimes refers only to the geological applications.

- **Geohydrological survey**

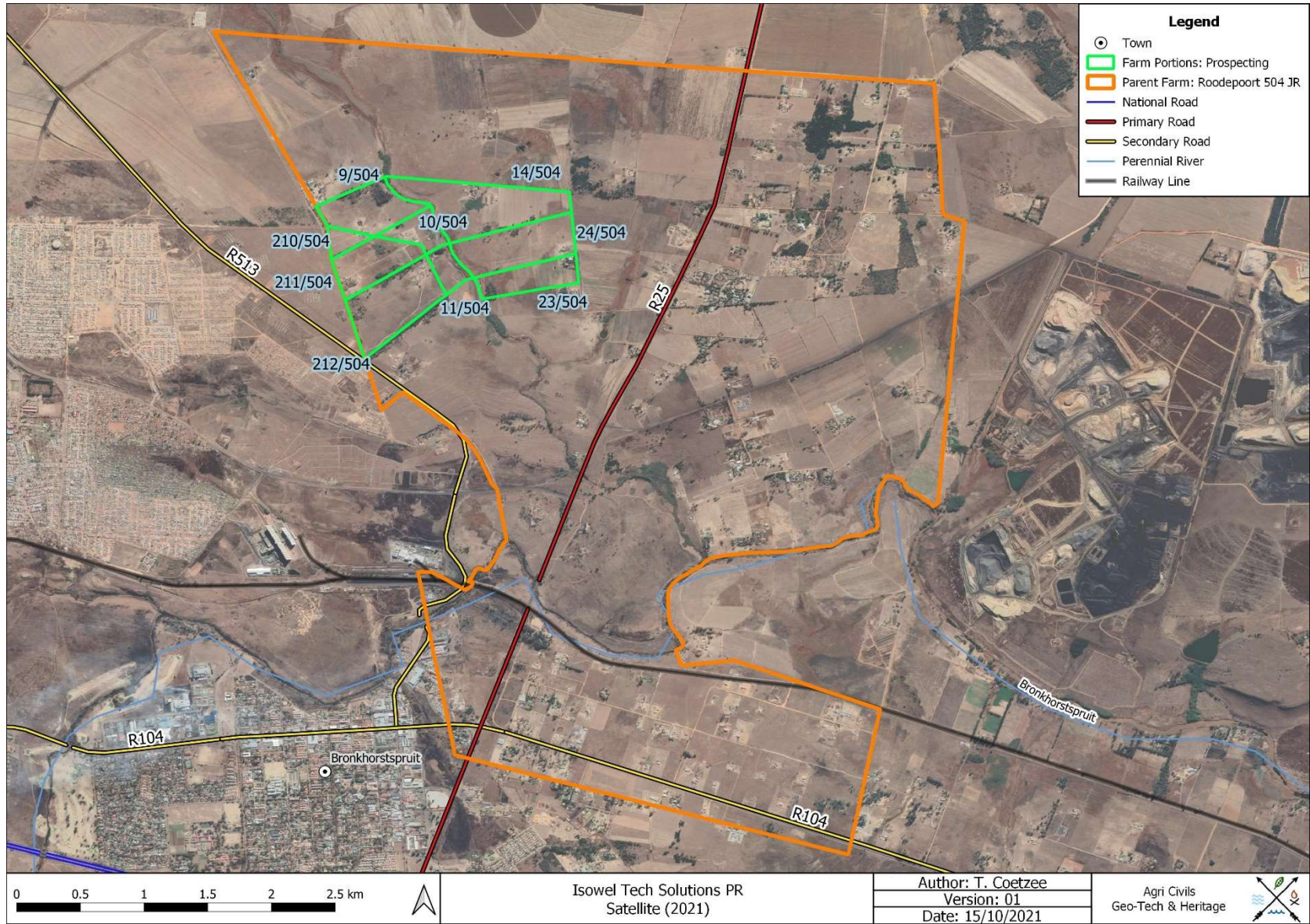
Percussion (open-hole) boreholes may be drilled to gather geohydrological information with specific reference to aquifer yield testing and gathering of water samples for analytical purposes.

Baseline preliminary conceptual groundwater flow model to estimate inflow rates into a probable underground mining operation using hydraulic aquifer parameters obtained during aquifer yield-testing. A single truck is used which contains all equipment including a mobile generator.





**Figure 2:** Segment of SA 1:50 000 2528 DC & DD indicating the area demarcated for mining.



**Figure 3:** Proposed prospecting area portrayed on a 2021 satellite image.

### 3. Methodology

Archaeological reconnaissance of the study area was conducted by means of inspecting historical aerial imagery and topographical maps in order to identify potential heritage remains (**Appendix A**). The historical topographical datasets dating to 1941, 1944, 1970, 1984, 1995, 2003 and 2010, as well as the historical aerial images dating to 1939, 1961, 1965 and 1976, proved useful in terms of providing an indication of potential heritage sites and past land uses associated with the study area. Twelve potential sites were observed within the demarcated boundary (**Table 2 & Figure 4**). Based on contemporary satellite imagery, seven of the sites appear to have been demolished as no surface remains are visible, while the remaining five sites are associated with building/structures. The exact state of the sites, however, can only be verified during a site visit. The total area inspected was roughly 163 ha. Because heritage resources are often associated with perennial and non-perennial rivers/streams, the non-perennial stream intersecting the study area was buffered by a distance of 500 m, indicating a potentially sensitive area. The area previously/currently associated with cultivated land was traced and plotted, indicating an area less sensitive from a heritage perspective.

**Table 2:** Potential site location.

Site No	Type	Parent Farm	Farm Portion	Current Status	Estimated Extent (ha)	Lat (y)	Lon (x)
K01	Building	Roodepoort 504 JR	10	Demolished	0.5	-25.770151	28.745992
K02	Building	Roodepoort 504 JR	14	Demolished	2.3	-25.768406	28.756850
K03	Building	Roodepoort 504 JR	14	Demolished	0.6	-25.767973	28.753306
K04	Building	Roodepoort 504 JR	14	Surface Remains	1.9	-25.767312	28.751926
K05	Building	Roodepoort 504 JR	14 & 24	Demolished	1.4	-25.770111	28.752634
K06	Building	Roodepoort 504 JR	211	Demolished	0.6	-25.771558	28.746744
K07	Building	Roodepoort 504 JR	211	Surface Remains	1.6	-25.773661	28.743444
K08	Building	Roodepoort 504 JR	211	Demolished	0.2	-25.770859	28.745048
K09	Building	Roodepoort 504 JR	212	Surface Remains	14.5	-25.775248	28.745219
K10	Building	Roodepoort 504 JR	212	Surface Remains	1.6	-25.773118	28.748097
K11	Building	Roodepoort 504 JR	23	Demolished	1.1	-25.773243	28.754727
K12	Building	Roodepoort 504 JR	23	Surface Remains	1.1	-25.772083	28.758421

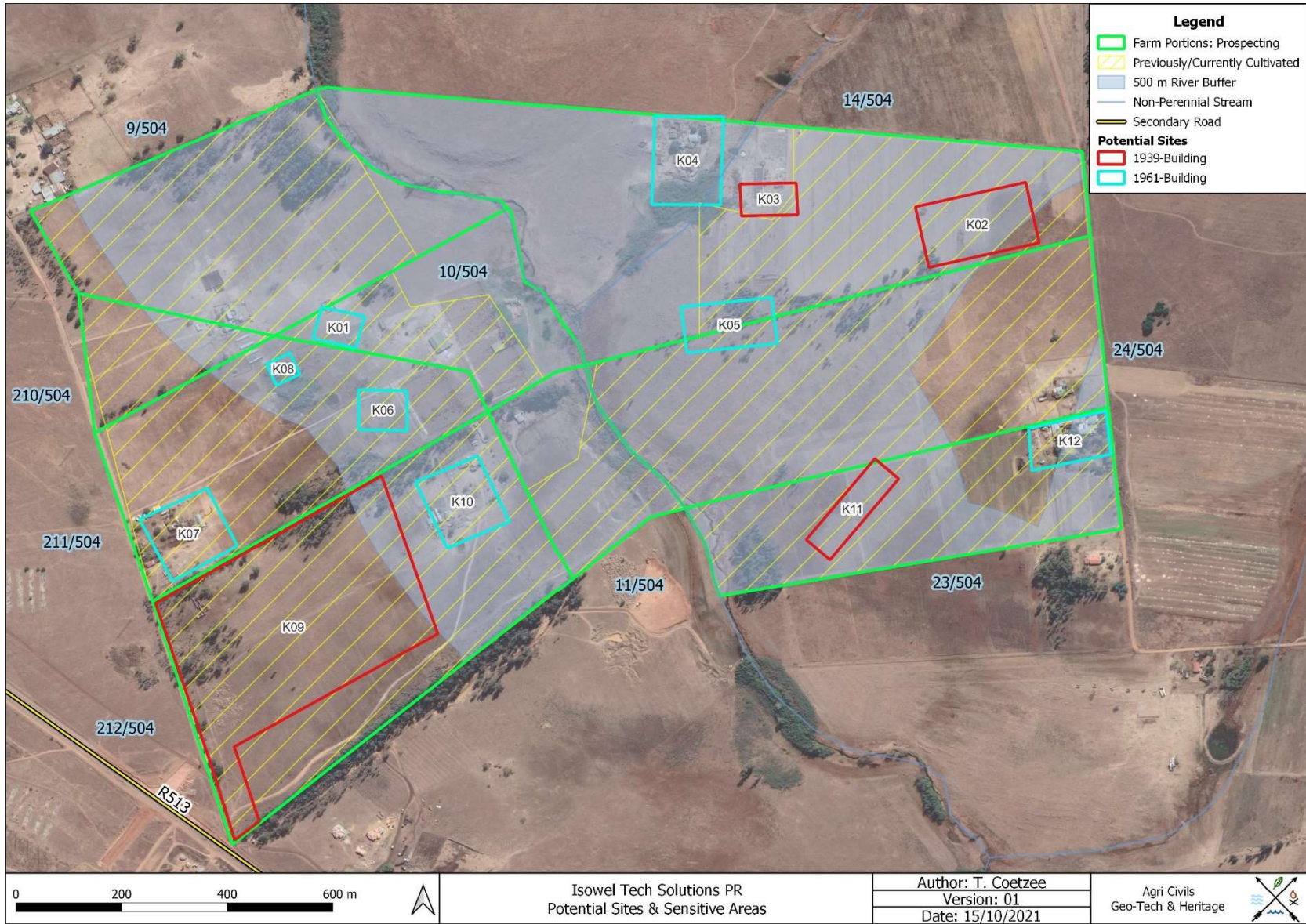


Figure 4: Potential Sites & Sensitive Areas.

## 4. 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.

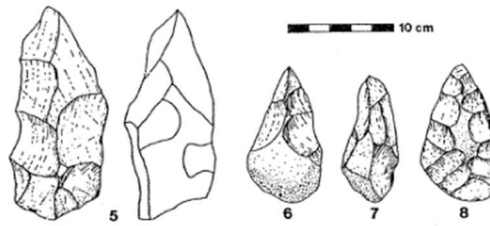
### 4.1 The Stone Age

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).

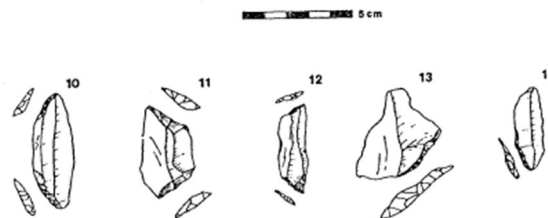
The Acheulean industry completely replaced the Oldowan industry. The Acheulian industry was first developed by *Homo ergaster* between 1.8 to 1.65 million years ago and lasted until around 300 000 years ago. Archaeological evidence from this period is also found at Swartkrans, Kromdraai and Sterkfontein. 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. The LSA site, Fort Troje, is located just north of Cullinan and approximately 37 km northwest of the proposed Isowel Tech Solutions (Pty) Ltd Project (Korsman et al. 1998: 95). **Figures 5 – 7** below illustrate stone tools often associated with the ESA, MSA and LSA of southern Africa.



**Figure 5:** ESA artefacts from Sterkfontein (Volman 1984).



**Figure 6:** MSA artefacts from Howiesons Poort (Volman 1984).



**Figure 7:** LSA scrapers (Klein 1984).

## 4.2 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.

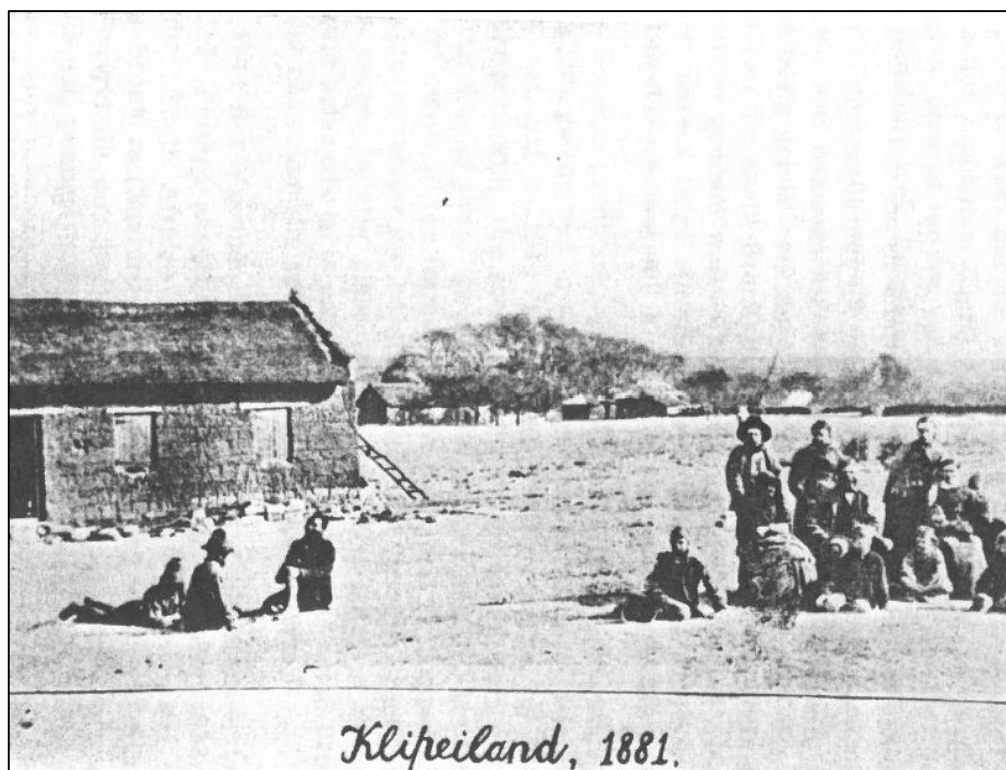
The Historical period mainly deals with Europe's discovery, settlement and impact on southern Africa. Some topics covered by the Historical period include Dutch settlement in the Western Cape, early mission stations, Voortrekker routes and the Anglo Boer War. This time period also saw the compilation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

#### **4.2.1 The 1<sup>st</sup> Anglo-Boer War - The Battle of Bronkhorstspuit**

In 1874 Lord Carnarvon, the Colonial State Secretary, wished to unite British territory and the two Republics under the British flag. Because none of these states were in favour of uniting, Carnarvon reasoned that through uniting with the Transvaal, the others would follow. Due to poor relations, the only option left was annexation. In 1877 Shepstone was sent from Natal to Pretoria with a police force of 25 with the goal to annex the Transvaal. On 12 April 1877, Shepstone raised the British flag and the Transvaal was annexed without firing a single shot. Several deputations were sent to England to regain independence, but both failed. Consequently S. P. J. Kruger, P. Joubert and M. W. Pretorius decided to gather the nation at Paardekraal to discuss the future of the Transvaal. During the meeting, which lasted from 12 to 16 December 1880, it was decided that Heidelberg would serve as the seat of the government. British forces were stationed in most of the towns, but were too weak to launch attacks on the Boer forces. British forces were therefore ordered from Lydenburg to support forces in Pretoria. Upon receiving this news, Frans Joubert was sent from Heidelberg to Pretoria with a force consisting of between 200 and 300 men to intercept and stop these reinforcements. According to the historian, Theal, the British forces under Col. Anstruther consisted of 257 men and 34 wagons. On 20 December 1880 they arrived at the place known today as Bronkhorstspuit. A brief exchange of words in which Joubert requested Anstruther to discontinue his mission resulted in a 10 to 20-minute battle over open field. After a significant number of casualties on the British side, Col. Anstruther, who was mortally wounded, requested that the white flag be raised. According to Theal, 66 on the British side were killed and 72 wounded.

Ten of the wounded eventually succumbed to their wounds as well. On the Boers' side, one commando member was killed in action and another five wounded. Later, another succumbed to his wounds. The captives were transported to Heidelberg and from there to the Vaal River. From there they were allowed to go to the Free State. This was the first open battle of the First Boer War (Roodt 1949: 7-9).

The photo below (**Figure 8**) depicts the settlement of Paul Grobler on the farm Klippeiland, where the Battle of Bronkhorstspuit took place. Grobler bought the farm from Salomon Prinsloo in the 1850's and renamed it from Kalkoenkrans to Klippeiland. One of the wounded commando members was treated in this homestead. In the background the homesteads of Marthinus Johannes Grobler can be observed (Rex 1969: 14). The Battle of Bronkhorstspuit took place approximately 7 km south of the proposed Isowel Tech Solutions study area.



**Figure 8:** Grobler residence on Klippeiland (adapted from Rex 1969).

#### 4.2.2 Historical aerial Imagery and topographical maps

Historical images and topographical maps dating to 1939, 1941, 1944, 1961, 1965, 1970, 1976, 1984, 1995, 2003 and 2010 (**Appendix A**) were used to determine the location and relative age of the structures associated with the demarcated portions, as well as the historical land uses.

The aerial image dating to 1939 (**Appendix A: Figure 18**) indicates the presence of four areas associated with buildings or structures (Sites K02, K03, K09, K11), a road bordering the southern extremity of the study area, as well as several cultivated fields. Only one of these sites (K09) still appears to be associated with buildings or



structures. Should these buildings / structures, or parts thereof, form part of the original structure, it would at least be 82 years old. Sites K02, K03 and K09 are also indicated on the 1941/1944 topographical map (**Appendix A: Figure 19**). Sites K02 and K03 were demolished between 1939 and 1961 (**Appendix A: Figure 20**), while Site K11 was demolished between 1939 and 1944 (**Appendix A: Figure 19**).

The 1941 and 1944 topographical map (**Appendix A: Figure 19**) indicates a hut at Site K02, a kraal at Site K03 and several huts at Site K09. No building or structure, however, is indicated at Site K11. The roads to the south and east of the study area, as well as some of the cultivated fields are indicated too.

The remaining sites (K01, K04 – K08, K10, K12) were identified as buildings on the 1961 aerial image (**Appendix A: Figure 20**). Of the eight sites identified on the 1961 aerial image, four of the sites still appear to be associated with buildings or structures (Sites K04, K07, K10, K12). Should these buildings / structures, or parts thereof, form part of the original structure, it would at least be 60 years old. Sites K01 and K08 appear to have been demolished by 1984 (**Appendix A: Figure 24**), while Site K05 appears to have been demolished by 1995 (**Appendix A: Figure 25**) and Site K06 by 2003 (**Appendix A: Figure 26**). It should be noted that between 1976 and 1984, several buildings were erected. These buildings, however, are of contemporary origin and do not exceed 60 years of age.

The eastern half of the demarcated study area saw the greatest expansion of cultivated fields between 1995 and 2003, while the western half appears to have extensively been cultivated since at least 1961.

### 4.3 Examples of Heritage Sites

Figures 9 – 16 are examples of heritage sites sometimes encountered – such areas should be avoided.



Figure 9: Example of undecorated potsherds.



Figure 10: Example of a decorated potsherd.



**Figure 11:** Example of a potential granary base.



**Figure 12:** Example of a stone-walled site.



**Figure 13 :** Example of a broken lower grinding stone.



**Figure 14:** Example of a dilapidated stone-walled site.



**Figure 15:** Example of a historical building.



**Figure 16:** Example of a potential informal grave.

## 4.4 Previous Heritage Studies

### **Clover Hill Development, Bronkhorstspuit Dam**

A phase 1 HIA (Heritage Impact Assessment) was conducted for the Clover Hill Housing Estate, which is located about 14 km southwest of the demarcated study area. The Housing Estate is located on the banks of the Bronkhorstspuit Dam. The HIA revealed several stone-walled enclosures belonging to the Late Iron Age, as well as potsherds and middens. Several structures with a square layout were also located, but probably do not exceed 60 years of age (National Cultural History Museum 2003).

### **Nooitgedacht 525JR**

The HIA survey conducted for the development of a housing estate on Portion 9 of the Farm Nooitgedacht 525 JR, located 6.6 km south of the proposed development, revealed two heritage sites. It is in the same area where the Battle of Bronkhorstspuit took place. These sites date to the Historic period (Van Schalkwyk 2007).

### **Ekangala Borrow Pit Extension**

Van Schalkwyk (2013) conducted a Heritage Impact Assessment for the extension of the Ekangala Borrow Pit located approximately 11 km northwest of the proposed Isowel Tech Solutions project area. The HIA did not record any heritage sites in close proximity of the borrow pit, but noted that farmsteads and cemeteries occur in the general vicinity.

## 5. 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. Statement of Significance & Recommendations

### 6.1 Statement of significance

**The study area: Portions 9, 10, 11, 14, 23, 24, 210, 211 and 212 of the Farm Roodepoort 504 JR, Gauteng.** As can be seen from previous research done in the area, the general region is significant from a heritage perspective. Heritage sites are likely to include LSA sites, LIA sites, cemeteries and historical structures. Since heritage sites, such as graves, are not always clearly identifiable as it might consist of disturbed surface indications, care must be exercised when prospecting.

**Figure 17** indicates the areas that are potentially sensitive from a heritage perspective, as well as the areas historically and currently associated with cultivated fields.

#### **Portions 9, 11 and 210 of the Farm Roodepoort 504 JR**

No sites of potential heritage remains were observed on historical aerial imagery and topographical maps. Contemporary buildings and structures, however, are visible on recent satellite imagery.

#### **Portion 10 of the Farm Roodepoort 504 JR**

Demolished Site K01, located in the western corner of the farm portion, was identified as a building on the 1961 aerial image. A possibility, however, exists that subsurface culturally significant material might be associated with the site. Contemporary buildings that appear not to exceed 60 years of age are also associated with the farm portion. These buildings and structures do not exceed 60 years of age and are therefore not protected under the NHRA (25 of 1999).

#### **Portion 14 of the Farm Roodepoort 504 JR**

Portion 14 is associated with two sites dating to 1939 (Sites K02 & K03) and two sites dating to 1961 (Sites K04 & K05). Sites K02, K03 and K05 consisted of buildings, but appear to have been demolished. Site K03 is indicated as a kraal on a topographical map, but seems to have been replaced by modern infrastructure. The possibility, however, exists that subsurface culturally significant material might be associated with the sites. Site K05 intersects Portions 14 and 25.

Site K04 was identified as a building on the 1961 aerial image and appears still to be associated with intact buildings and structures. Should the buildings and structures associated with this site form part of the original structures, it would exceed 60 years of age and would therefore be protected under the NHRA (25 of 1999).

### **Portion 23 of the Farm Roodepoort 504 JR**

Portion 23 is associated with two sites: K11 and K12. Site K11 was associated with several buildings as observed on the 1939 aerial image, but the buildings were subsequently demolished. Later topographical maps also indicate the area to be cultivated. The possibility, however, exists that subsurface culturally significant material are associated with the site.

Site K12, located in the north-eastern corner of the farm portion, was identified on the 1961 aerial image and consisted of buildings. Since buildings are still associated with the site, the possibility exists that the buildings and structures, or parts thereof, exceed 60 years of age. Should this be the case, these buildings and structures would be protected under the NHRA (25 of 1999).

### **Portion 24 of the Farm Roodepoort 504 JR**

Only one sites, K05, partially intersects portion 24. This site is discussed under portion 14. It should also be noted that modern buildings are observed in the south-eastern corner of the study area. These buildings and structures do not exceed 60 years of age and are therefore not protected under the NHRA (25 of 1999).

### **Portion 211 of the Farm Roodepoort 504 JR**

Portion 211 is associated with three sites: K06, K07 and K08. All three sites were identified as buildings on the 1961 aerial image. Sites K06 and K08 have been demolished, but subsurface culturally significant material might still be associated with the sites. Sit K07, however, is still associated with buildings. Should the buildings and structures associated with Site K07 form part of the original structures, it would exceed 60 years of age and would therefore be protected under the NHRA (25 of 1999).

### **Portion 212 of the Farm Roodepoort 504 JR**

Two sites are located on Portion 212 (Sites K09 & K10). Both sites are still associated with surface remains. Site K09 was identified as an area associated with buildings on the 1939 aerial image and a subsequent topographical map indicates the presence of huts. Although some infrastructure are still visible on contemporary satellite imagery, the site appears to have been disturbed by agricultural activities. Site K10 was identified as buildings on the 1961 aerial image and still appears to be associated with intact buildings. Should the buildings and structures associated with these sites form part of the original structures, it would exceed 60 years of age and would therefore be protected under the NHRA (25 of 1999).

Since heritage sites are often associated with water sources, the 500 m river buffer area should also be considered sensitive from a heritage perspective.

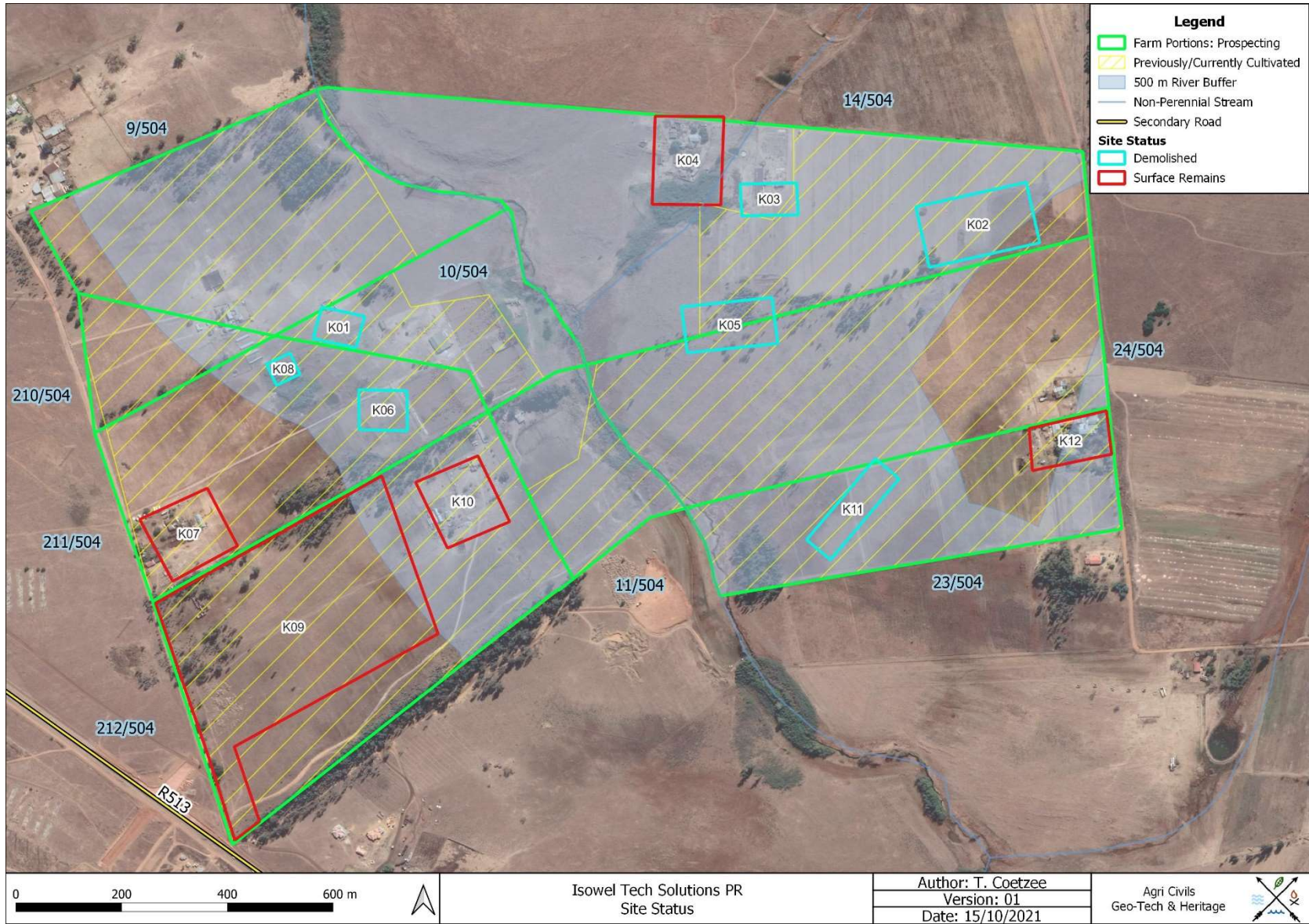


Figure 17: Site Status.



## 6.2 Recommendations

The following recommendations are made in order to avoid the destruction of heritage remains within the area demarcated for prospecting:

- Although the 7 demolished sites dating to 1939 and 1961 appear not to be associated with surface remains, subsurface culturally significant material might be present (Sites K01 – K03, K05, K06, K08, K11). Therefore, it is recommended that these areas be avoided by the proposed prospecting activities.
- The five sites associated with surface remains might date to 1939 and 1961 (K04, K07, K09, K10, K12). The possibility therefore exists that the associated buildings and structures exceed 60 years of age. It is therefore recommended that these areas be avoided by the proposed prospecting activities.
- The remaining buildings and infrastructure associated with the demarcated study area appear to be of contemporary origin and are therefore not regarded to be significant from a heritage perspective.
- The 500 m buffer zone surrounding the non-perennial stream is potentially sensitive from a heritage perspective. Care should be exercised when prospecting within this boundary.
- Except for the sites falling within the area associated with current/historical cultivation, this area is less sensitive from a heritage perspective. It is therefore recommended that this area be considered when deciding on prospecting locations.
- It should also be noted that the identified sites can only be rated once inspected.
- It is advised that a qualified archaeologist be contacted whenever uncertainty regarding potential heritage remains exists.
- Prospecting should not take place in the vicinity of stone cairns, potential burial sites, stone-walling, building ruins or any other heritage material or structures.
- Should the prospecting outcome result in further development or construction, a full Phase 1 Archaeological Impact Assessment must be conducted on the affected area if triggered. Also, a full Phase 1 AIA must be done should the cumulative impact of the proposed prospecting exceed 0.5 ha.

- Because archaeological artefacts generally occur below surface, the possibility exists that culturally significant material may be exposed during the prospecting phase, in which case all activities must be suspended pending further archaeological investigations by a qualified archaeologist. Also, should skeletal remains be exposed, 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, prospecting may proceed on the demarcated portions, subject to the abovementioned conditions and recommendations.

## 7. 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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*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

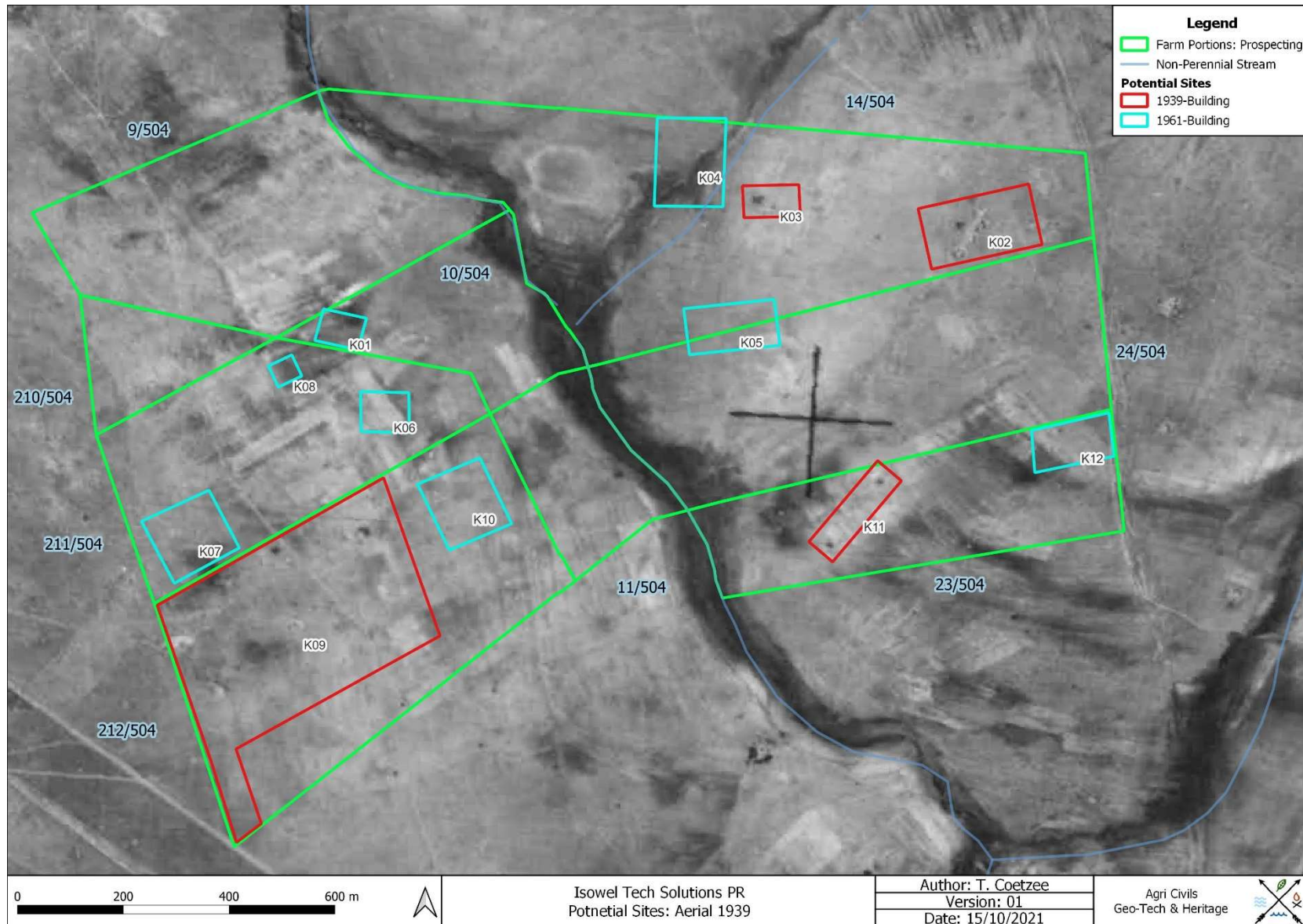


Figure 18: 1939 aerial image of the study area.

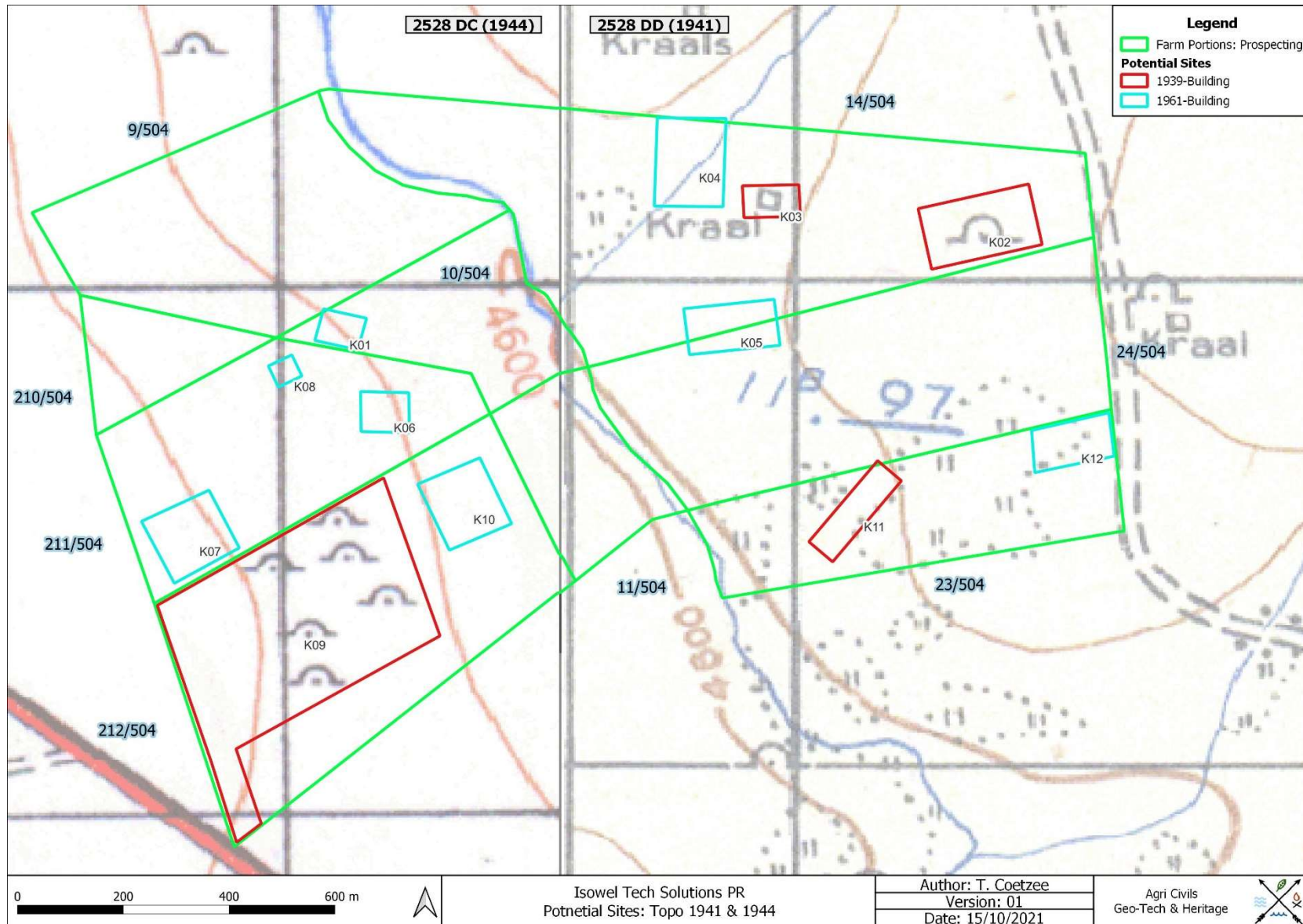
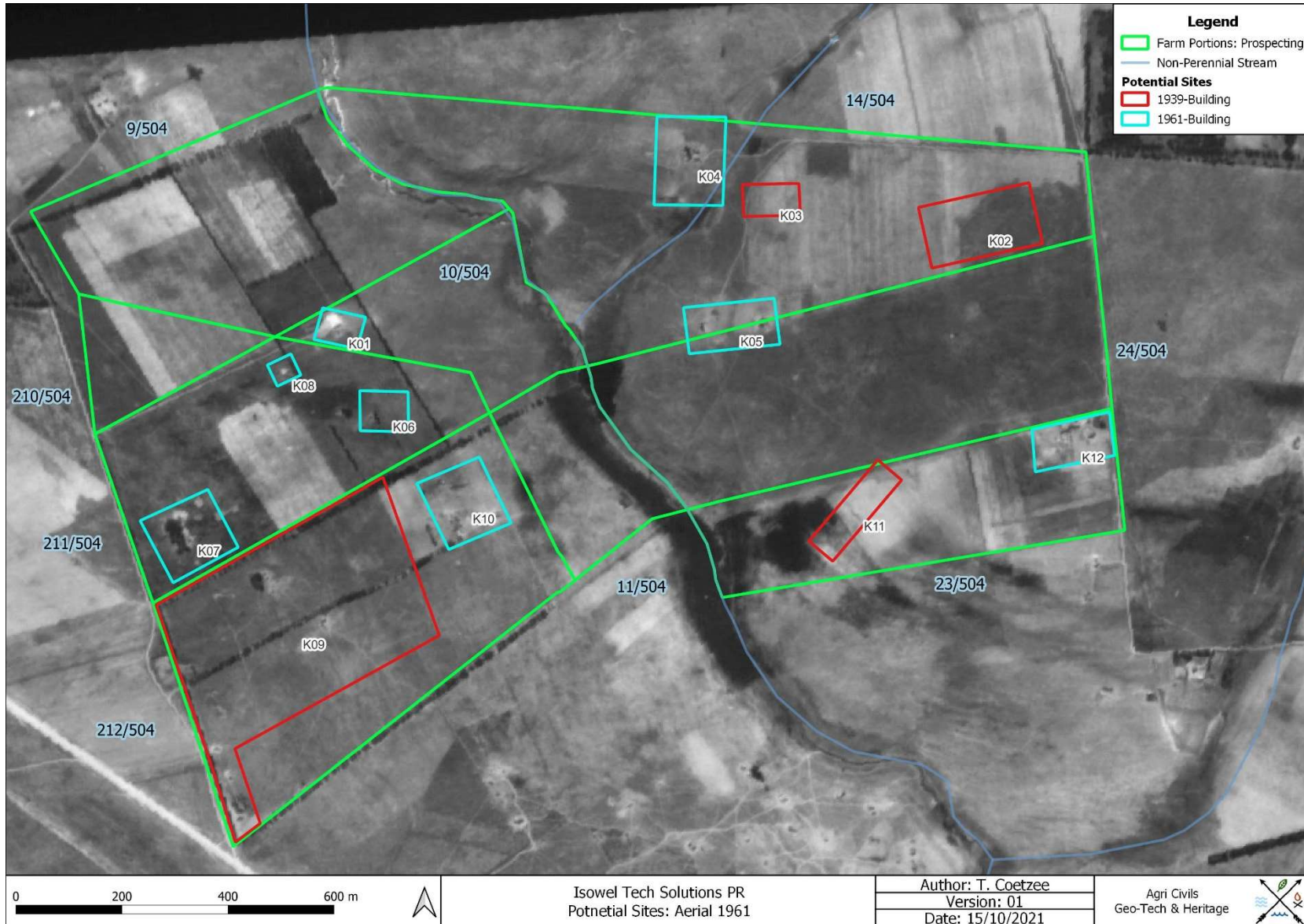


Figure 19: Segments of 1941 and 1944 1:50 000 2528 DC & DD topographical map indicating the study area.





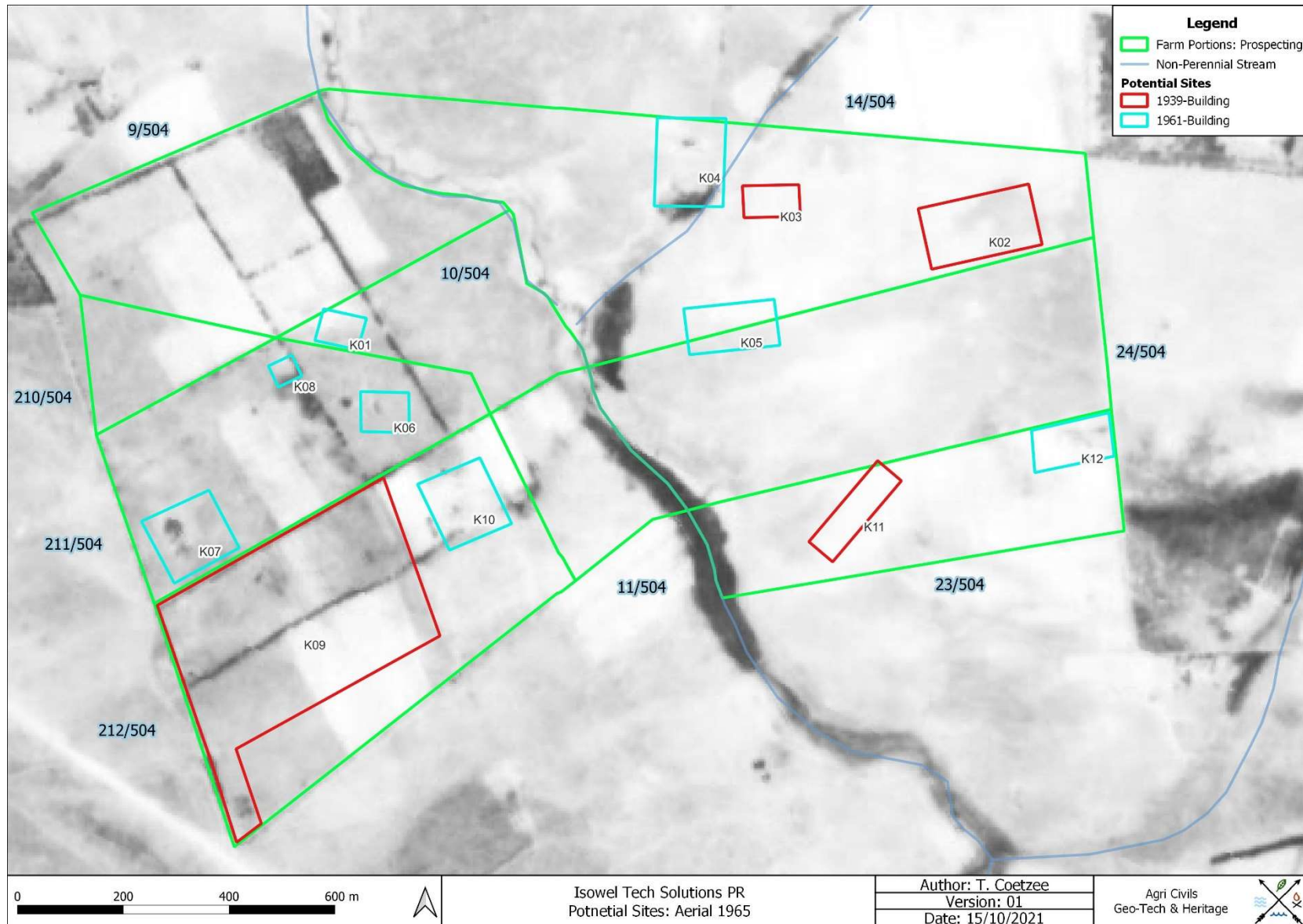


Figure 21: 1965 aerial image of the study area.

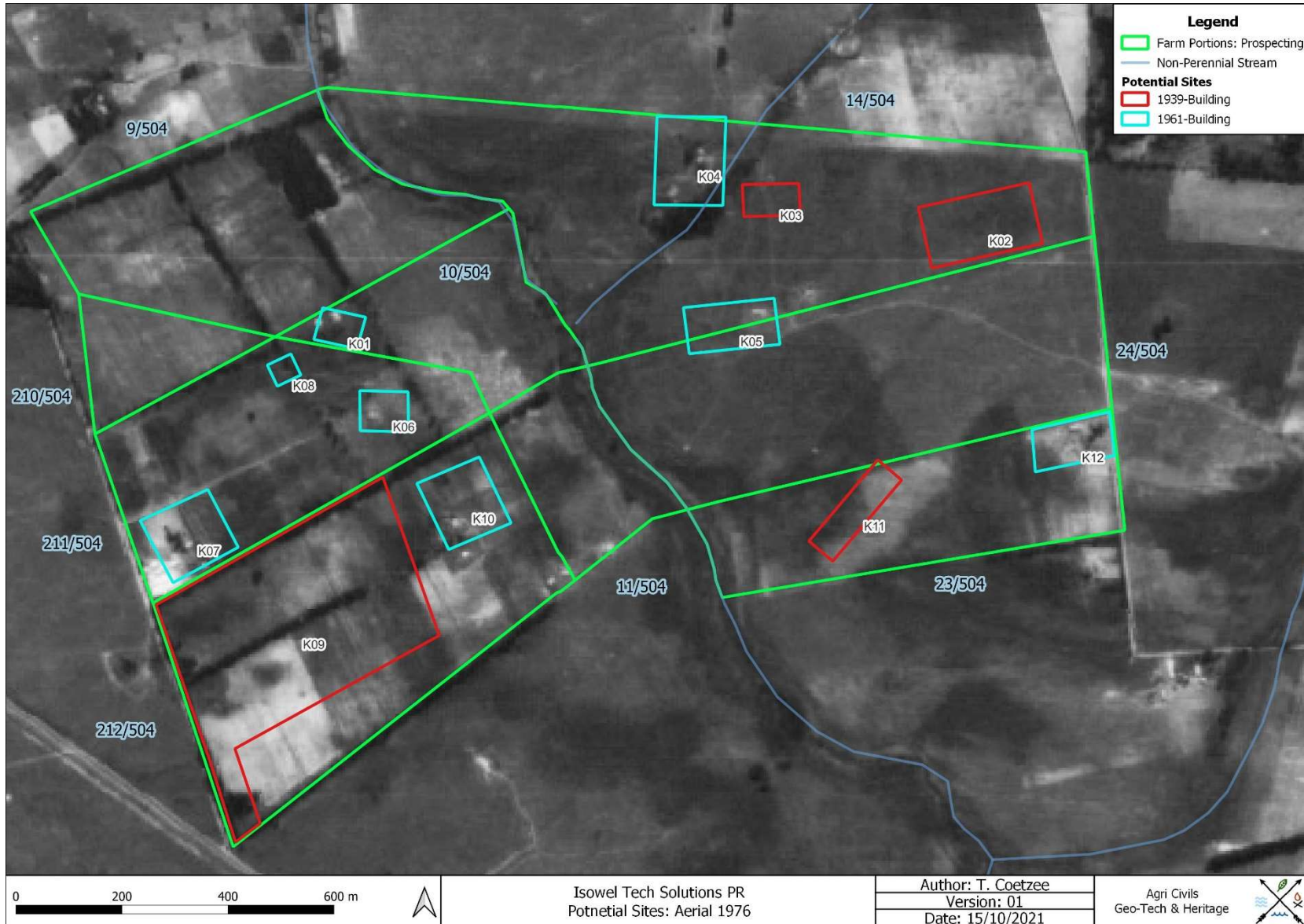
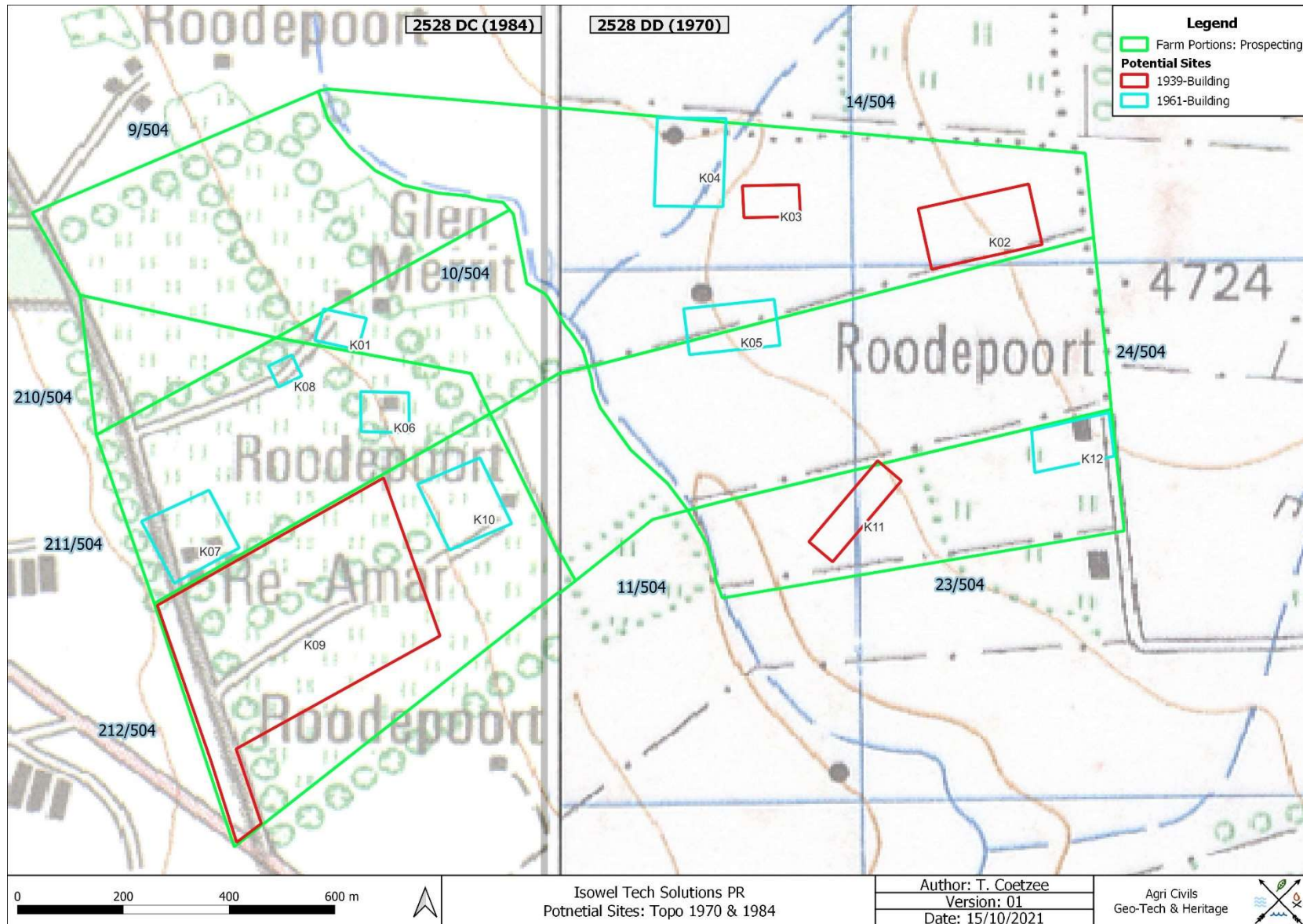
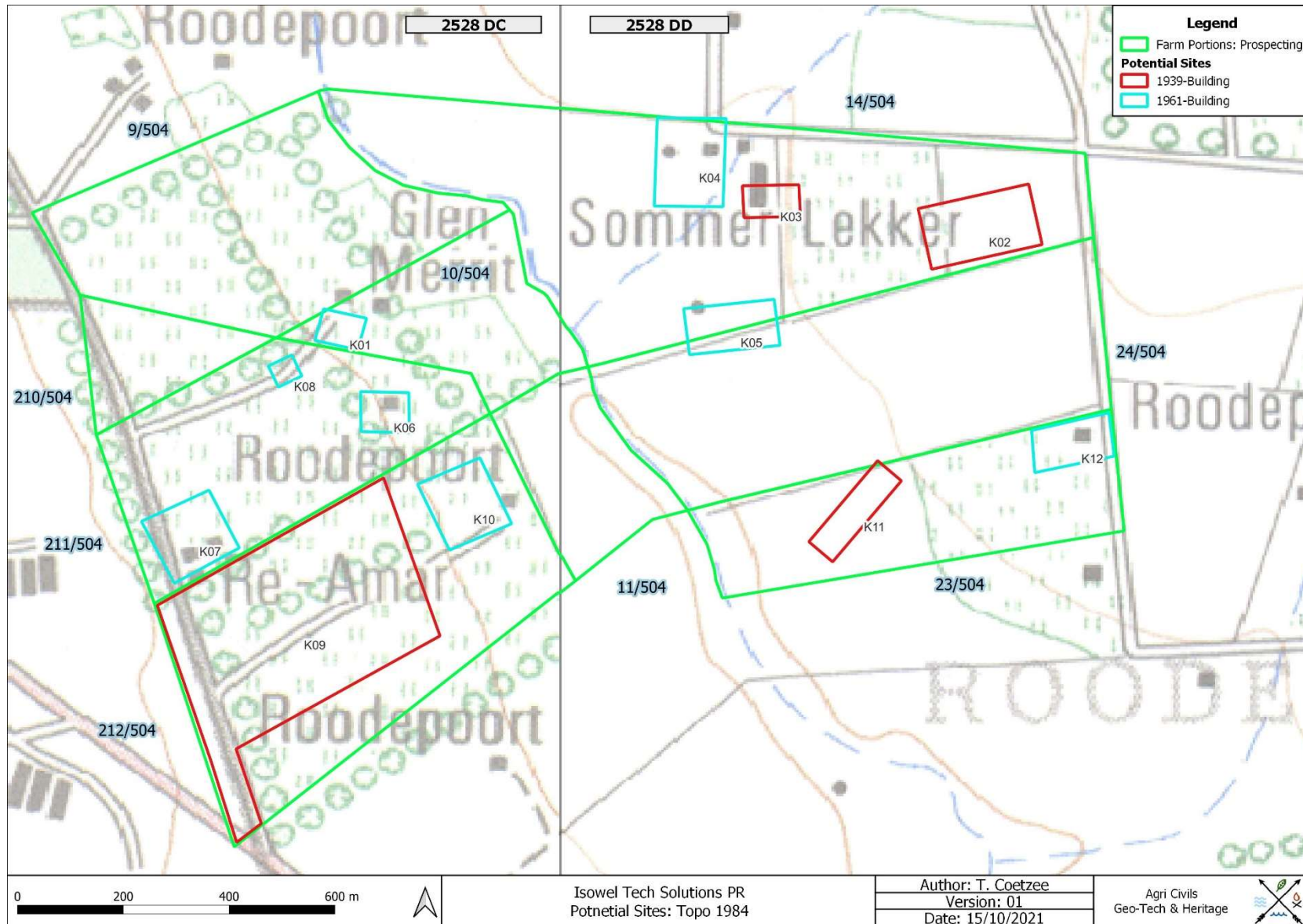


Figure 22: 1976 aerial image of the study area.



**Figure 23:** Segments of 1970 and 1984 1:50 000 2528 DC & DD topographical map indicating the study area.



**Figure 24:** Segments of 1984 1:50 000 2528 DC & DD topographical map indicating the study area.

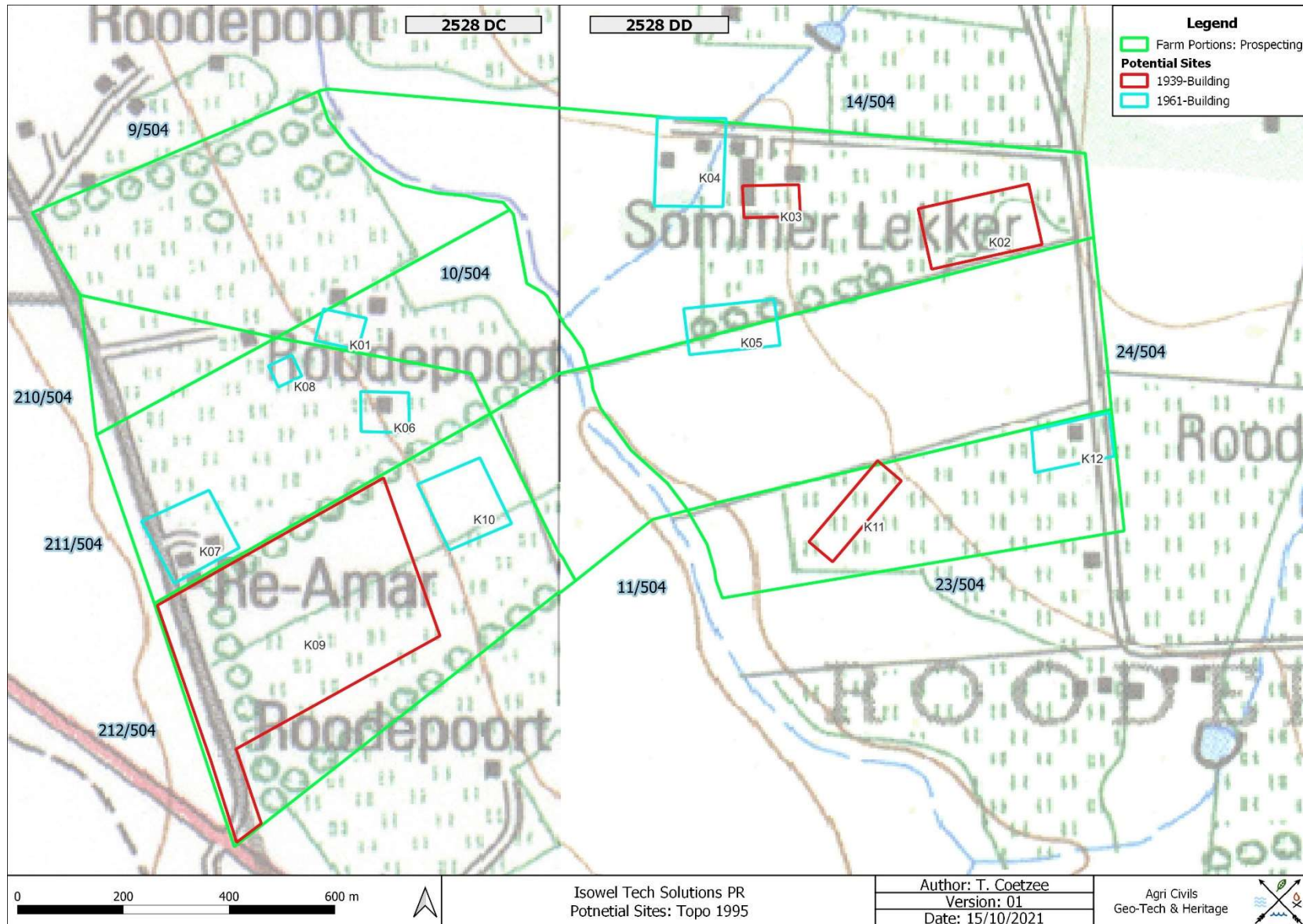


Figure 25: Segments of 1995 1:50 000 2528 DC & DD topographical map indicating the study area.

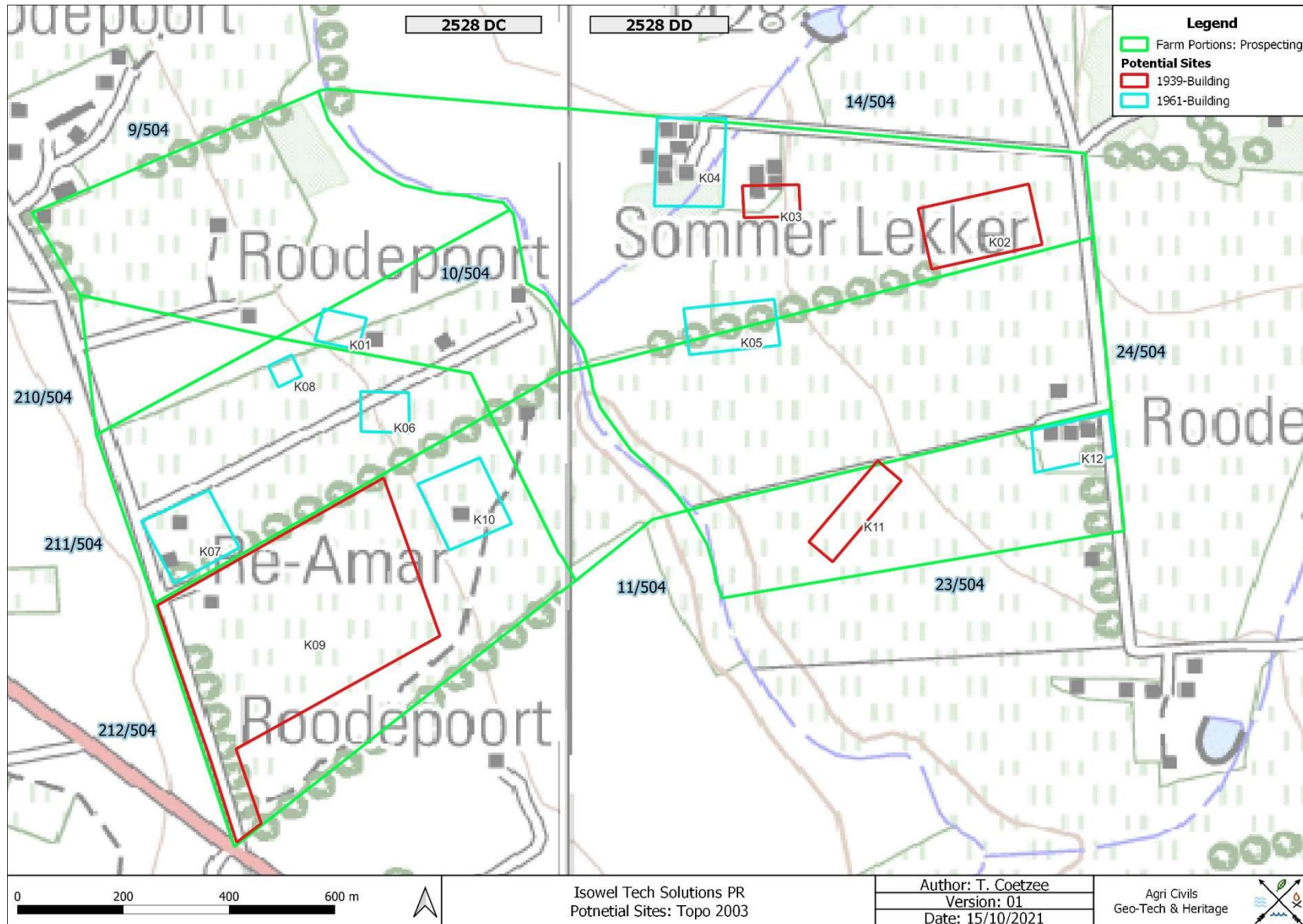


Figure 26: Segments of 2003 1:50 000 2528 DC & DD topographical map indicating the study area.

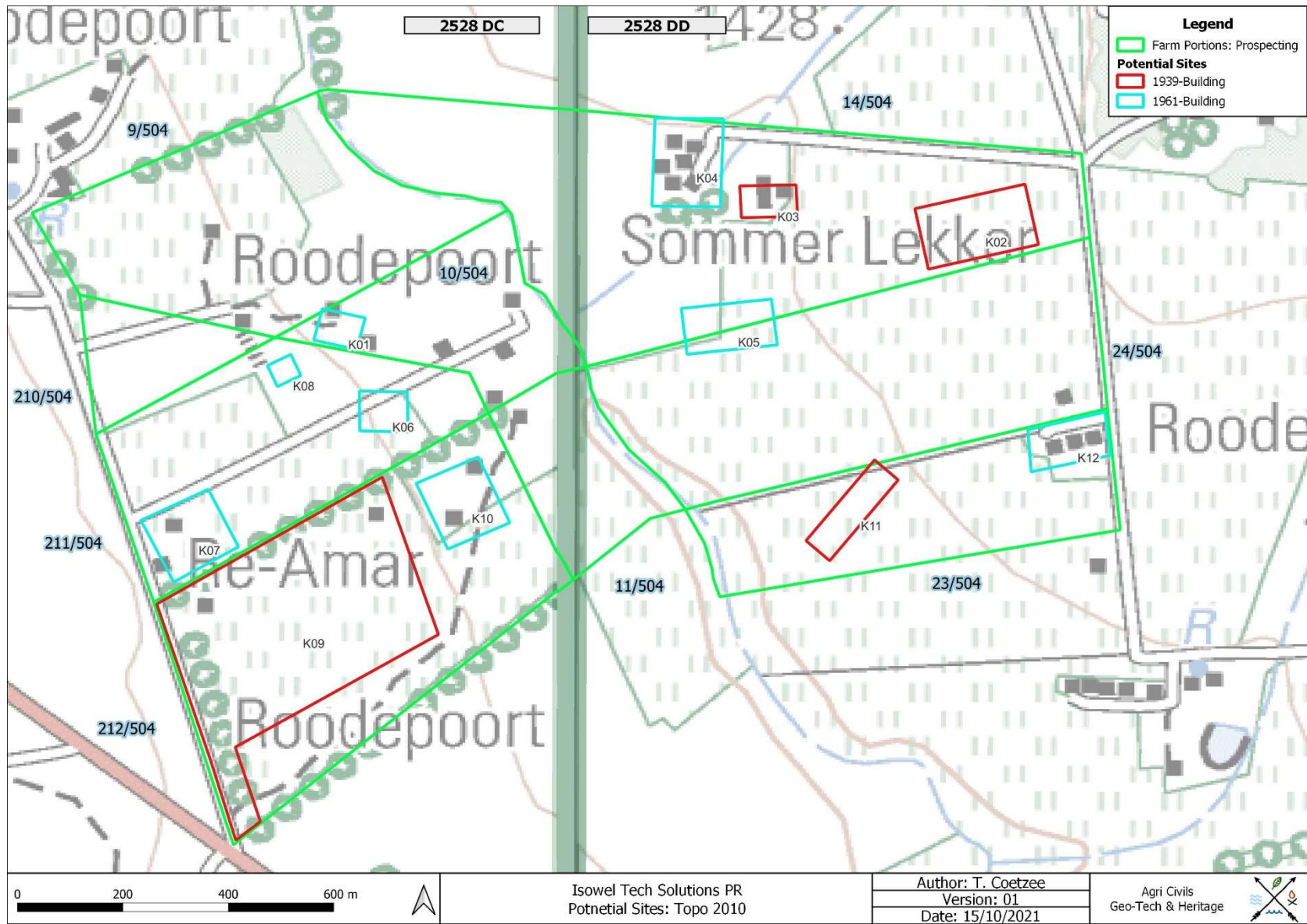


Figure 27: Segments of 2010 1:50 000 2528 DC & DD topographical map indicating the study area.