

ARCHAEOLOGICAL SCOPING REPORT

**for the Application of a Prospecting Right
on Several Portions of the Farms
Krokodilkraal 426 JQ, Voorspoed 421 JQ
and Mamagalieskraal 420 JQ, Brits, North
West**

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December 2021**

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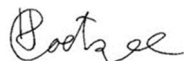
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- I, Tobias Coetzee, declare that –
- I act as the independent specialist;
- I am conducting any work and activity relating to the proposed NWV Prospecting Project in an objective manner, even if this results in views and findings that are not favourable 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: 21 December 2021

Executive Summary

The author was appointed by Archean Resources (Pty) Ltd to undertake an Archaeological Scoping Study for North West Vanadium (Pty) Ltd on 24 Farm Portions intersecting the Farms Krokodilkraal 426 JQ, Voorspoed 421 JQ and Mamagalieskraal 420 JQ within the Bojanala District Municipality in the North West Province (**Table 1**). The study area is located roughly 7 km northeast of Brits. 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 25 sites consisting of a combination of buildings and structures, building ruins and a cemetery were noted on historical topographical maps and historical aerial imagery (**Table 2**). Four sites, however, do not exceed 60 years of age, are not considered to be significant from a heritage perspective and have been demolished. Based on contemporary satellite imagery, nine of these sites are associated with surface remains, two with building ruins and one with a cemetery. Nine of the potentially historical sites 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 the identified 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 be avoided by the proposed prospecting activities. The cemetery is considered to be significant and sensitive from a heritage perspective. It is therefore recommended that no prospecting activities take place within 50 m of the cemetery or any other burial site.

Contemporary buildings associated with the demarcated study area, whether intact or demolished, are not regarded to be significant from a heritage perspective. However, the potential presence of graves at some of these sites should be considered.

Areas previously/currently associated with cultivated fields are indicated as well. Due to these areas being disturbed, they are considered to be less sensitive from a heritage perspective. The least sensitive areas are therefore areas that are located more than 500 m from a water source, fall within previously/currently cultivated fields and are not located within close proximity of potential heritage sites or contemporary infrastructure. From a heritage perspective these areas are considered to be more favourable for the proposed prospecting activities. Although the previously/currently cultivated areas that intersect the 500 m river buffer are also disturbed, the potential for subsurface cultural material is slightly higher compared to areas falling outside of the buffer zone.

Apart from the identified potential sites, open and undisturbed areas falling outside of the previously/currently cultivated areas are considered to be the most sensitive, especially due the presence of LIA stone-walled sites directly to the south and east of the demarcated study area. These areas should therefore be avoided by the proposed prospecting activities. The possibility also exists that culturally sensitive sites, such as burial sites, might have been created after some cultivated fields fell into disuse, meaning that burial sites might be located on disturbed areas as well.

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.

From a heritage point of view, prospecting may proceed on the demarcated portion, subject to the conditions and recommendations made in the report.

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

NWV – North West Vanadium

SAHRA – South African Heritage Resources Agency

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1. Project Background

1.1 Introduction

Archean Resources (Pty) Ltd appointed the author to undertake an Archaeological Scoping Study for North West Vanadium (Pty) Ltd on 24 Farm Portions intersecting the Farms Krokodilkraal 426 JQ, Voorspoed 421 JQ and Mamagalieskraal 420 JQ within the Bojanala District Municipality in the North West Province. The study area is located roughly 7 km northeast of Brits (**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. Photographs of the current condition of the land parcels that could be accessed, as well as the current infrastructure associated with the study area, are provided as well.

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 copper ore, gold ore, iron ore, manganese ore, nickel ore, niobium (columbium) ore, platinum group metals, rare earths, tantalum / niobium ore, titanium, vanadium ore and zinc ore. 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.

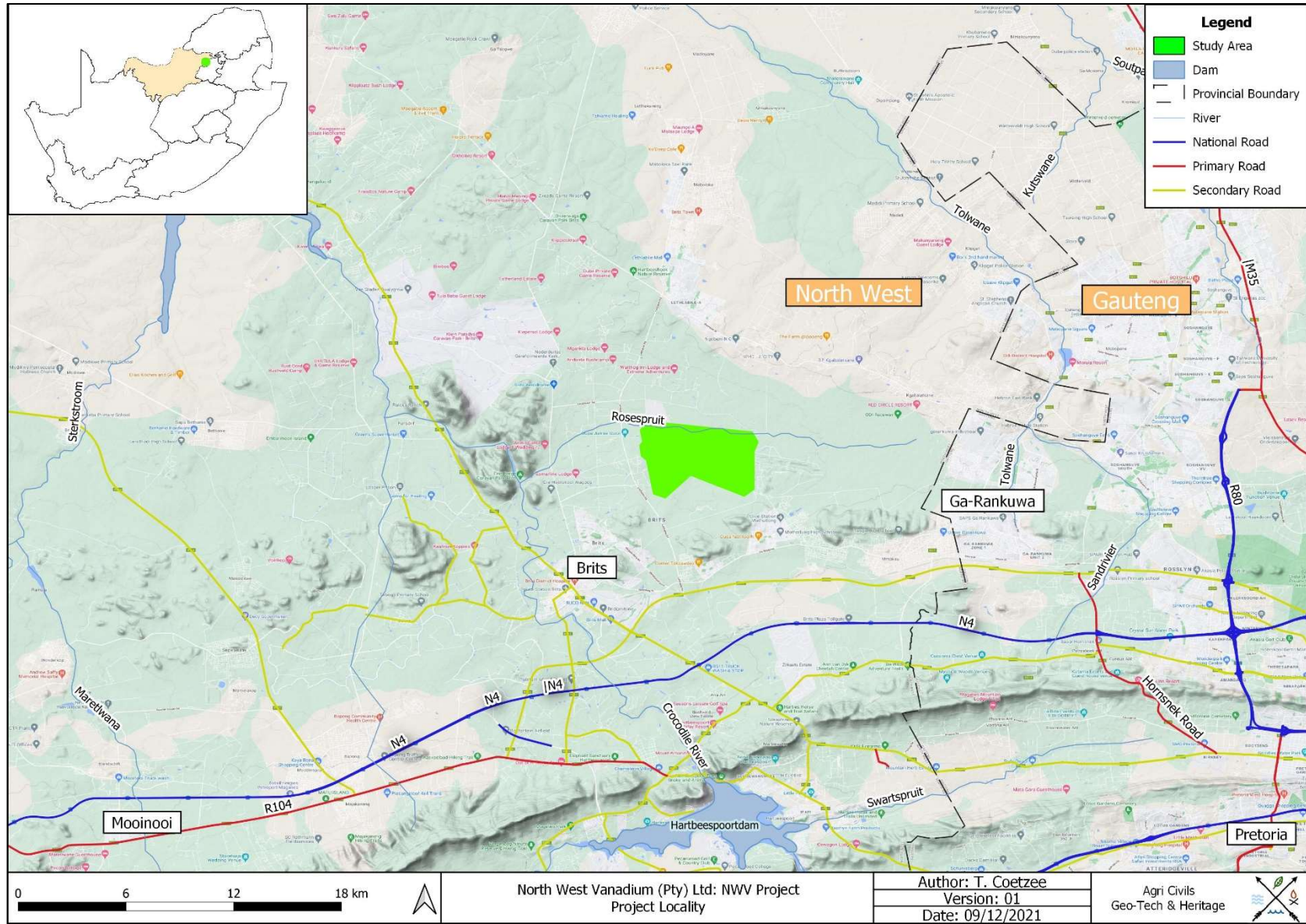


Figure 1: Regional and provincial location of the study area.

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 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 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 North West Vanadium (Pty) Ltd project is situated on the 24 land parcels listed in **Table 1**.

Table 1: Property name & coordinates.

No	Parent Farm	Portion	Map Reference (1:50 000)	Lat (y)	Lon (x)	Farm Portion Extent (ha)	Prospecting extent (ha)
1	Mamagalieskraal 420 JQ	RE/14	2527DB	-25.566849	27.832458	11.88	Entire Portion
2	Mamagalieskraal 420 JQ	839	2527DB	-25.554019	27.824818	44.84	31.34
3	Mamagalieskraal 420 JQ	840	2527DB	-25.554905	27.831812	35.97	24.83
4	Mamagalieskraal 420 JQ	841	2527DB	-25.557499	27.825839	19.45	Entire Portion
5	Mamagalieskraal 420 JQ	842	2527DB	-25.559419	27.826679	18.90	Entire Portion
6	Mamagalieskraal 420 JQ	RE/843	2527DB	-25.562247	27.827482	30.21	Entire Portion
7	Mamagalieskraal 420 JQ	844	2527DB	-25.562950	27.835711	52.73	Entire Portion
8	Mamagalieskraal 420 JQ	845	2527DB	-25.565961	27.828908	46.01	Entire Portion
9	Mamagalieskraal 420 JQ	846	2527DB	-25.570265	27.827075	24.44	Entire Portion
10	Mamagalieskraal 420 JQ	847	2527DB	-25.572962	27.827089	7.66	Entire Portion
11	Mamagalieskraal 420 JQ	848	2527DB	-25.575003	27.826753	10.36	Entire Portion
12	Mamagalieskraal 420 JQ	849	2527DB	-25.580391	27.827928	24.46	Entire Portion
13	Mamagalieskraal 420 JQ	RE/850	2527DB	-25.577465	27.831540	13.53	Entire Portion
14	Mamagalieskraal 420 JQ	851	2527DB	-25.574154	27.833258	42.82	Entire Portion
15	Mamagalieskraal 420 JQ	852	2527DB	-25.570074	27.836054	55.68	Entire Portion

No	Parent Farm	Portion	Map Reference (1:50 000)	Lat (y)	Lon (x)	Farm Portion Extent (ha)	Prospecting extent (ha)
16	Mamagalieskraal 420 JQ	896	2527DB	-25.576431	27.828947	2.50	Entire Portion
17	Mamagalieskraal 420 JQ	897	2527DB	-25.577862	27.829622	2.50	Entire Portion
18	Mamagalieskraal 420 JQ	898	2527DB	-25.580021	27.830647	2.50	Entire Portion
19	Mamagalieskraal 420 JQ	899	2527DB	-25.580924	27.831076	2.55	Entire Portion
20	Mamagalieskraal 420 JQ	900	2527DB	-25.579020	27.830172	2.50	Entire Portion
21	Voorspoed 421 JQ	421	2527DB	-25.563134	27.822524	21.43	Entire Portion
22	Krokodilkraal 426 JQ	1	2527DB	-25.566457	27.860953	1218.64	770.70
23	Krokodilkraal 426 JQ	3	2527DB	-25.567742	27.863639	1.55	Entire Portion
24	Krokodilkraal 426 JQ	4	2527DB	-25.575202	27.863202	0.40	Entire Portion
	Total Extent						1220.93 ha

Brits is located roughly 7 km to the southwest of the proposed prospecting area, while Ga-Rankuwa is located 11 km to the east-southeast and Moinooi 35 km to the southwest. The demarcated study area falls within the Madibeng Local Municipality and the Bojanala District Municipality in the North West Province. The Letlhabile tertiary road runs in a north-south direction approximately 1.3 km to the west of the study area, while the R566 secondary road runs in an east-west direction 5.6 km to the south and the N4 national road a further 2.9 km to the south (**Figures 1 – 3**).

In terms of vegetation, the study area falls within the Savanna Biome and Central Bushveld Bioregion. On a local scale, the proposed study area is classified as Marikana Thornveld. According to Mucina & Rutherford (2006), Marikana Thornveld is found in the North West and Gauteng Provinces only and occurs on the plains from Rustenburg in the west, through Marikana and Brits to the Pretoria area in the east. In terms of conservation, Marikana Thornveld is considered endangered with a conservation target of 19%. Less than 1% is statutorily conserved in the Magaliesberg Nature Reserve, while more is conserved in the De Onderstepoort Nature Reserve. Cultivation, urban or built-up areas transformed about 48% of the vegetation unit and erosion is generally low. Alien invasive plants generally occur in high densities along drainage lines.

According to (Mucina & Rutherford 2006) the average elevation for Marikana Thornveld varies between 1050 and 1450 MASL (Metres Above Sea Level). The average elevation of the study area is 1135 MASL and slopes from the more elevated south-eastern side towards the lower north-western area.

The study area falls within the summer rainfall region and the average annual rainfall is roughly 629 mm. The average maximum temperature for the study area is recorded during January when an average of 23.5 °C is reached. The average minimum temperature is recorded during July when an average of 12.6 °C is reached (Climate-data.org 10/12/2021).

The study area falls within the A21J Quaternary Catchment within the Crocodile West and Marico Water Management Area. The closest perennial river to the study area is the Crocodile River that flows approximately 7.4 km to the west of the proposed North West Vanadium (Pty) Ltd Prospecting Project. Another perennial river, the Sand River, flows approximately 16 km to the east. A non-perennial river, Rosespruit, flows along the northern boundary of the study area, while several smaller non-perennial offshoots intersect the study area as well.

Access to the demarcated study area is through a dirt road turning from the Letlhabile tertiary road. The western section of the study area is associated with crop cultivation and agricultural activities, while the larger eastern section is associated with disused agricultural fields and two villages: Ntsopilo and Rankotia. Buildings and infrastructure are visible on all of the Farm Portions, except Portions 841, RE/843, 848, 851, 852, 896 and 899 of the Farm Mamagalieskraal 420 JQ, and the Farm Voorspoed 421 JQ. It should also be noted that a canal intersects the study area.

The general area surrounding the study area consists of agricultural activities, mining development and urban built-up areas. Mining development is found directly to the east of the study area, agricultural activities to the north and west, and urban built-up to the southwest, south and southeast.

2.2 Project description

The area demarcated for the prospecting of copper ore, gold ore, iron ore, manganese ore, nickel ore, niobium (columbium) ore, platinum group metals, rare earths, tantalum / niobium ore, titanium, vanadium ore and zinc ore covers about 1220.93 ha (**Figures 2 & 3**). 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

- Desktop Studies:

Available geological literature and historic prospecting data will be reviewed and a work program will be developed. Key sources of information will be the Council for Geoscience and surrounding mining operations.

- **Geological Mapping:**

Geological mapping is a manual process carried out on foot and causing no ground disturbance. Mapping will be undertaken by a geologist using enlarged geological maps, aerial photographs, satellite imagery and topographic maps. All geological and surface features will be recorded on field maps and data capture field sheets and be integrated into the central project database.

- **Magnetic Survey:**

A ground based geophysical survey will be undertaken over the target area. The survey direction will be perpendicular to the orientation of the east-west orientation of the targeted structures. Data will be processed and modelled to identify and locate structures that would contribute to the concentration of vanadium and other mineralisation.

- **Data compilation, integration and interpretation:**

All recorded data from non-invasive and invasive prospecting techniques will be integrated into a central spatial database to ease interpretation and review. Software to be used during this exercise include Excel, Access, ArcGIS and QGIS.

Invasive Activities

- **Surface Soil and Rock Sampling:**

Rock outcrops and float samples observed during the mapping exercise will be collected for sample analysis. Location, type of occurrence and field lithology will be recorded on data capture field sheets and be integrated into the central project database. Samples will be sent for [XRF and trace element] analysis and results will be linked to sample details and integrated into the central project database

Magnetite grains from soil will be collected with the use of a magnet along the geophysical north-south traverses. Location, type of occurrence and a description of the soil will be recorded on data capture field sheets and be integrated into the central project database. Samples will be sent for [trace element] analysis and results will be linked to sample details and integrated into the central project database

- **Diamond Drilling:**

Diamond drilling will be undertaken to confirm the presence and orientation of the Bierkraal Magnetite Gabbro. Drill targets will be generated following the integration of all geological, geochemical and geophysical data collected.

Four 1000 m spaced traverses will be drilled across the identified structure during the initial phase and anomalous target areas will be followed-up with infill drilling.

Drilling, logging and sampling of recovered core will be supervised by an experienced Geologist and be undertaken to best practice standards. The drill program will be tendered to pre-qualifying drilling contractors. The bids will be reviewed on the basis of experience, past safety performance and cost. The drill program will entail the following steps:

- Access permission from surface rights holders and users;
- Drill collars will be positioned using a hand-held GPS. The actual position to be within 20m of the planned collar position. The exact location can be optimised to minimise the environmental disturbance and impact;
- Preparation of drill access and collars;
- Drilling and recovering of core: [PQ] collar to be installed over first 5-20m of unconsolidated overburden and then [HQ/NQ] core drilling to advance from that depth;
- The average drillhole depth would be c 50m
- Downhole surveys will be undertaken on selected holes to quantify deflection;
- Drill core will be logged and photographed;
- Initial on-site analysis will be undertaken using a handheld XRF analyser;
- Drill core will be split: Half core will be preserved, and the other half would be available for sampling;
- Mineralised zones will be sampled for further [XRF, trace element and density] analysis at a certified laboratory;
- Drillhole collars will be capped with concrete and numbered;
- Final collar positions will be surveyed during a differential GPS to accurate X, Y and Z; and
- Core will be stored in a secured location at all times.

A total of 15 diamond drill holes are estimated.

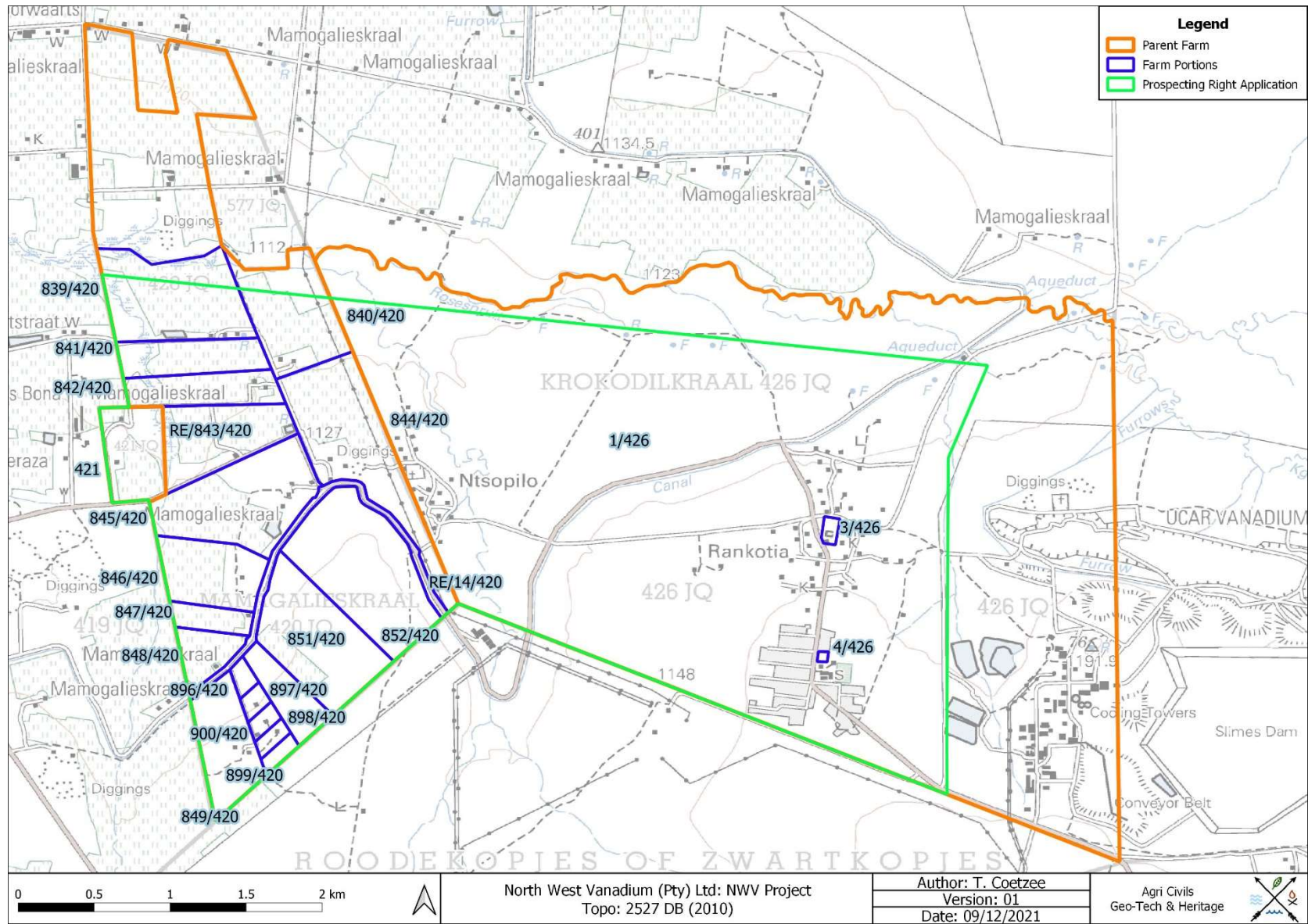


Figure 2: Segment of SA 1:50 000 2527 DB indicating the area demarcated for prospecting.

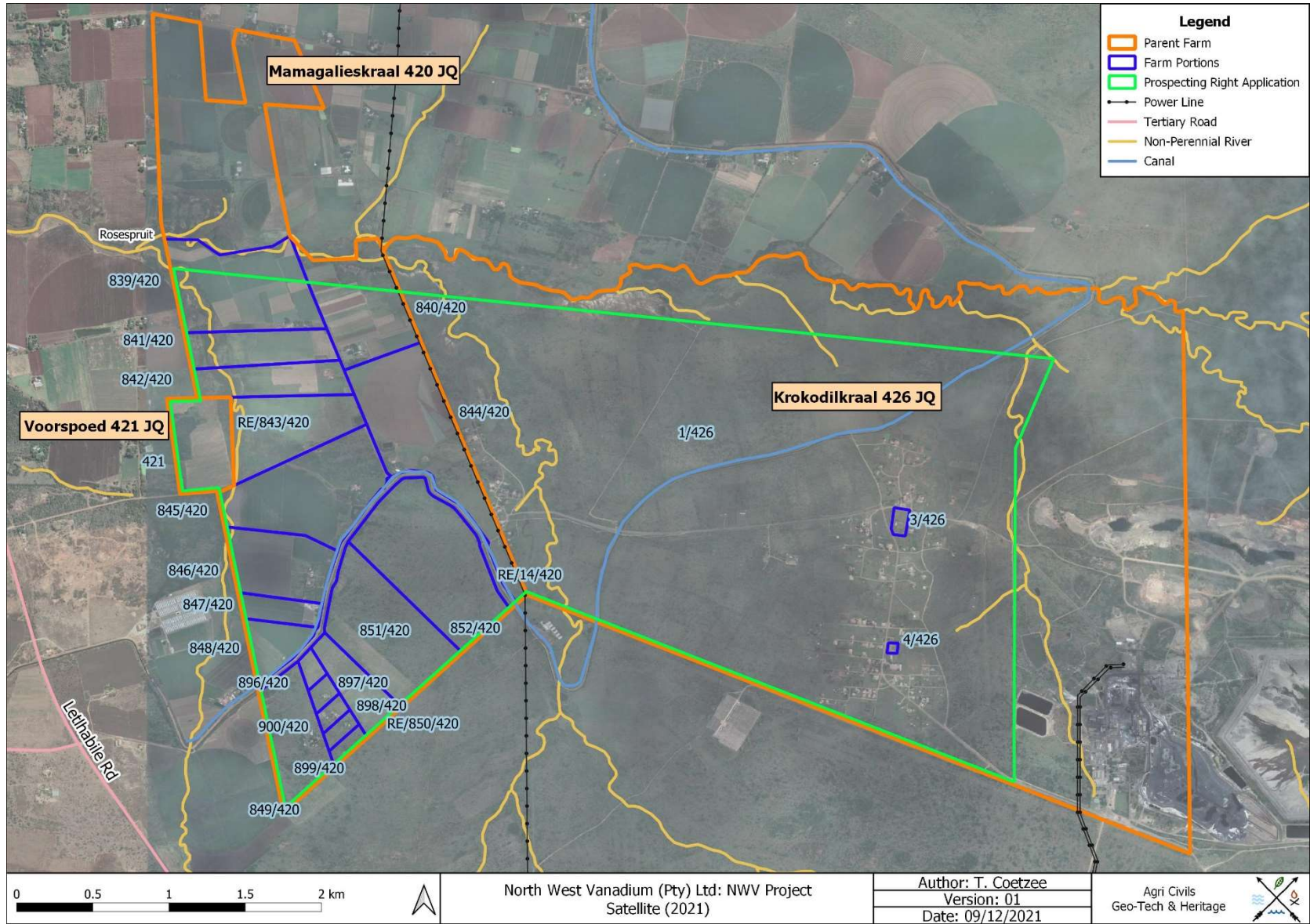


Figure 3: Proposed prospecting area portrayed on a 2021 satellite image.

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 1943, 1968, 1980, 1985, 1996, 2001 and 2010, as well as the historical aerial images dating to 1949, 1964, 1968 and 1985, proved useful in terms of providing an indication of potential heritage sites and past land uses associated with the study area. Twenty-five potential sites were observed within the demarcated boundary (**Table 2 & Figure 4**). It should be noted that the prefix '2527' is not used when referring to the site names due to the length of the name, but is recorded as such in **Table 4**. Based on contemporary satellite imagery, 13 of the sites appear to have been demolished as no surface remains are visible. Two ruins, as well as nine sites associated with building/structures and one intact cemetery were also noted. A site inspection, consisting of a visit to the demarcated land parcels and an inspection along the existing local roads, was conducted during December 2021. This provided insight into current site conditions, potential disturbances, as well as past and present land uses. General site conditions of the respective land parcels, as well as the general environment, were recorded via photographic record (**Figures 5 – 32**). The total area inspected was 1220.93 ha. Because heritage resources are often associated with perennial and non-perennial rivers/streams, the non-perennial streams intersecting the study area were buffered by a distance of 500 m, indicating a potentially sensitive area. The areas previously/currently associated with cultivated land were traced and plotted as shown on topographical maps, indicating disturbed areas that are 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	Krokodilkraal 426 JQ	1	Surface Remains	17.4	-25.566033	27.840107
K02	Building	Krokodilkraal 426 JQ	1; 3	Surface Remains	68.2	-25.567523	27.864577
K03	Building	Mamagalieskraal 420 JQ	839; 841	Demolished	1.4	-25.556851	27.828492
K04	Building	Mamagalieskraal 420 JQ	840; 844	Surface Remains	2.5	-25.557824	27.831889
K05	Building	Mamagalieskraal 420 JQ	844; RE/843	Demolished	1.3	-25.560938	27.832278
K06	Building	Mamagalieskraal 420 JQ	844	Demolished	1.3	-25.562208	27.833100
K07	Building	Mamagalieskraal 420 JQ	845	Demolished	2.2	-25.564323	27.832178
K08	Building	Mamagalieskraal 420 JQ	845	Demolished	1.4	-25.565742	27.832609
K09	Building	Mamagalieskraal 420 JQ	846; 847; RE/14	Surface Remains	3.4	-25.572284	27.829356
K10	Building	Mamagalieskraal 420 JQ	848; RE/14	Ruin	1.9	-25.576247	27.827048
K11	Building	Mamagalieskraal 420 JQ	848	Demolished	0.6	-25.574924	27.827037

Site No	Type	Parent Farm	Farm Portion	Current Status	Estimated Extent (ha)	Lat (y)	Lon (x)
K12	Hut	Mamagalieskraal 420 JQ	848	Demolished	1.0	-25.575001	27.827876
K13	Building	Mamagalieskraal 420 JQ	839	Demolished	4.2	-25.554466	27.822529
K14	Building	Mamagalieskraal 420 JQ	839	Surface Remains	3.1	-25.556126	27.827770
K15	Building	Mamagalieskraal 420 JQ	842	Surface Remains	1.0	-25.559114	27.830005
K16	Building	Mamagalieskraal 420 JQ	RE/843	Surface Remains	1.7	-25.562968	27.828381
K17	Building	Mamagalieskraal 420 JQ	844	Demolished	1.1	-25.563436	27.834633
K18	Building	Mamagalieskraal 420 JQ	845	Surface Remains	1.2	-25.565775	27.831319
K19	Building	Mamagalieskraal 420 JQ	845	Demolished	0.7	-25.563510	27.830128
K20	Building	Mamagalieskraal 420 JQ	845	Demolished	0.9	-25.564415	27.828835
K21	Building	Mamagalieskraal 420 JQ	846	Surface Remains	1.6	-25.570868	27.828667
K22	Building	Mamagalieskraal 420 JQ	848	Demolished	0.6	-25.574384	27.828501
K23	Building	Voorspoed 421 JQ	0	Ruin	1.0	-25.561218	27.821949
K24	Building	Voorspoed 421 JQ	0	Demolished	0.8	-25.563844	27.821630
K25	Cemetery	Krokodilkraal 426 JQ	1	Intact	0.5	-25.564122	27.839331

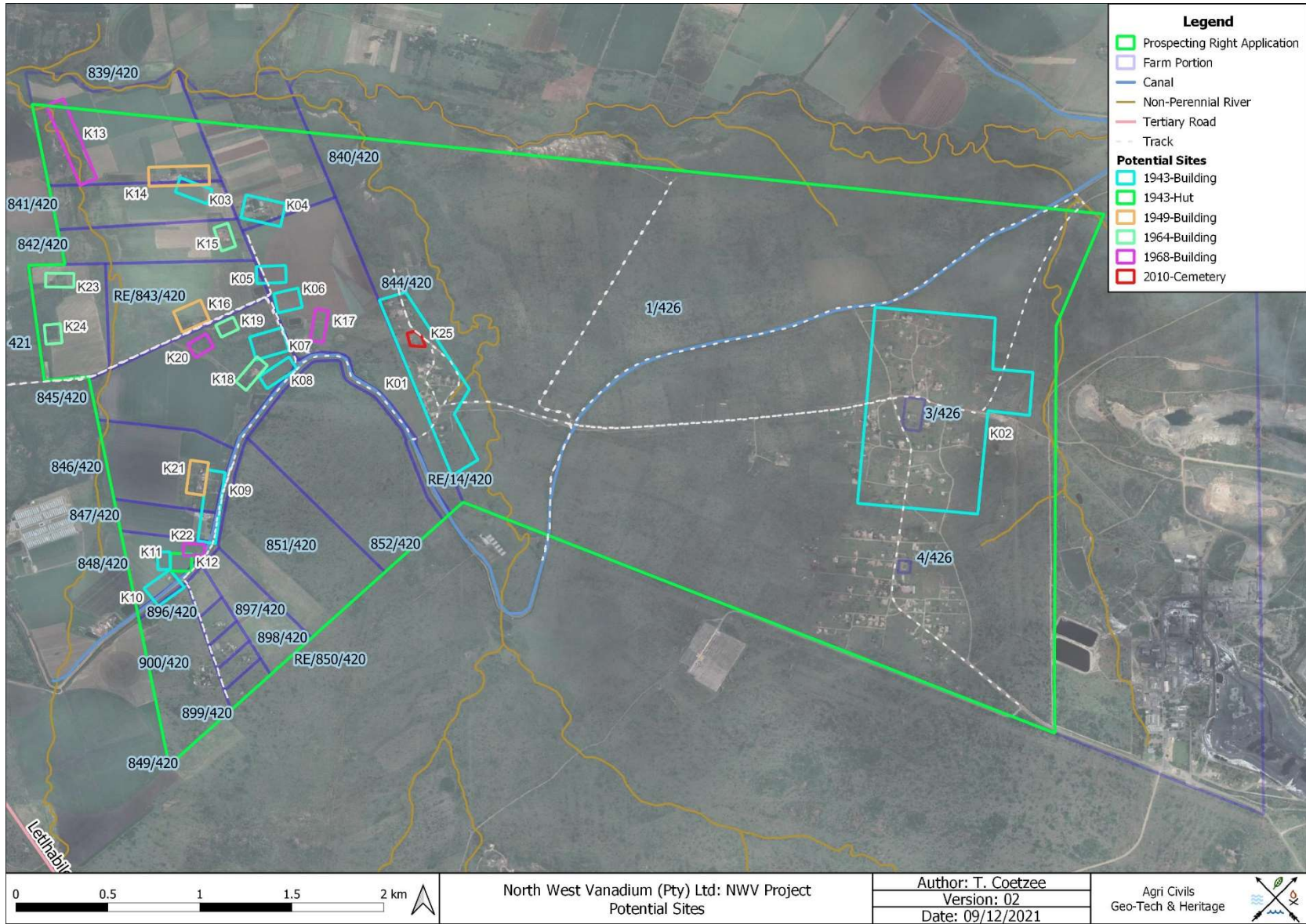


Figure 4: Potential Sites.



Figure 5: Canal associated with RE/14/420.

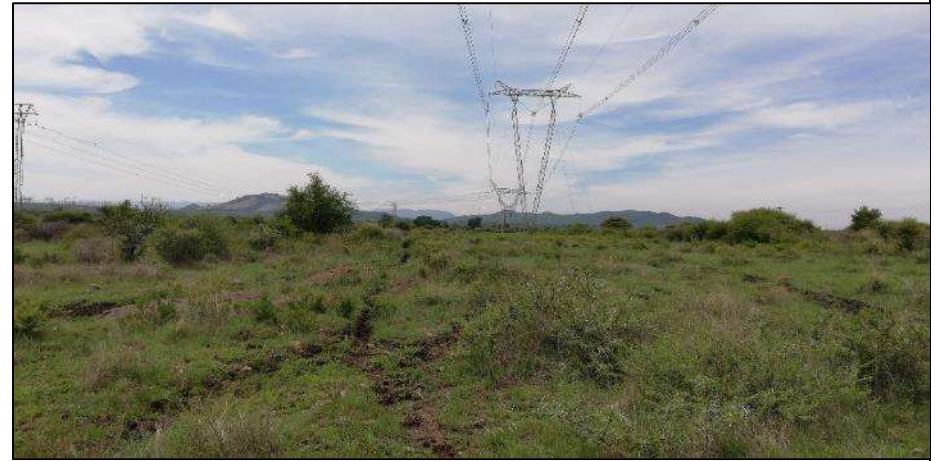


Figure 6: Powerlines intersecting 844/420.



Figure 7: Cultivated section on 844/420.



Figure 8: Dense vegetation on 844/420.



Figure 9: Fenced-off section on 845/420.



Figure 10: Access road and dense vegetation on 846/420.



Figure 11: Agricultural activities on 847/420.



Figure 12: Cultivated section on 848/420.



Figure 13: Cultivated section on 849/420.



Figure 14: Open veldt on 849/420.



Figure 15: Previously cultivated field on RE/850/420.



Figure 16: Dense vegetation on 851/420.



Figure 17: Environment on 852/42.



Figure 18: Previously cultivated field on 896/420.



Figure 19: Entrance on 897/420.



Figure 20: Fenced-off section on 898/420.



Figure 21: Open veldt on 899/420.



Figure 22: Infrastructure on 900/420.



Figure 23: Cultivated land on 421.



Figure 24: Infrastructure on 1/426.



Figure 25: Open veldt on 1/426.



Figure 26: Dense vegetation on 1/426.



Figure 27: Environment on 1/426.



Figure 28: Infrastructure on 3/426.



Figure 29: Infrastructure on 4/426.



Figure 30: Mining in the general surroundings.



Figure 31: Disused agricultural fields.



Figure 32: Existing agricultural fields.

3.1 Limitations

Access was not obtained to three of the land parcels: Portions 839, 840 and 841 of the Farm Mamagalieskraal 420 JQ. This was due to gates being locked and the contact details not being available at the time of surveying. As can be seen from the site photographs, several land parcels are associated with dense vegetation as well.

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).

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.

In terms of the general project area, the region is well known for LIA sites. According to Pistorius (2011), the Central Bankeveld, a narrow strip of land between the northern bushveld savannah and the centrally situated Highveld, proved to be a suitable living environment for the first Tswana, who practised herding, agriculture, metal working and trading. Accordingly, they settled the region between AD 1600 and AD 1840.

The early Tswana settlements, characterised by an elaborate stone-built environment, populate the norite hills between Onderstepoort and the Pilanesberg. The most formidable of these chiefdoms were the Fokeng, Kwena Mōgale (Bapō), Kwena Mōgōpa and the Bakgatla. Several of the Kgatla spheres emerged in the Brits area, while the Fokeng were located further to the west near Rustenburg. Mzilikazi subjugated the Kgatla, who were used as labourers to build one of the Ndebele villages that was likely known as emHlalandlela (Pistorius 2011).

The Bapō, people who descended from the Amambō Nguni from KwaZulu-Natal, settled in the Magaliesberg during the 16th or 17th Century. Thlōgōkgōlō (Wolhuterskop) was one of their capitals and several of the chiefs were known by the name of Mōgale, from where the name Magaliesberg (Pistorius 2011).

During the *difaqane* a large number of Tswana were displaced between the last quarter of the 18th Century and the first quarter of the 19th Century. During August 1827 Mzilikazi's Ndebele arrived from the Vaal River region and defeated the Kwena Mōgōpa, the Kgatla and what remained of the Bapō after an earlier defeat by the Pedi of Thulare. Following the conflict, the Ndebele established several settlement complexes in the general area from where they maintained a grip on the local population. Four of these Zulu/Nguni residences (*imisi*) and military kraals (*amakhanda*) have been discovered by archaeological surveys (Pistorius 2011).

According to Van Vollenhoven (2006), Mzilikazi settled at Kungwini, present day Wonderboom in Pretoria North, and were attacked by the Zulu king Dingane in 1832. Accordingly, the Sotho-Tswana groups are the largest Bantu language speaking people who are formed by the Northern and Southern Sotho, as well as the Tswana.

Pistorius (2011) states that from the latter half of the 18th Century, internal strife between various Tswana chiefdoms seems to have increased and resulted in the splintering of the existing chiefdoms into independent spheres of influence. During the early 19th Century, travellers, traders and missionaries encountered and noted the devastated Tswana chiefdoms. These travellers include traders such as Robert Schoon and William McLuckie in August 1829, followed by the missionary Robert Moffat who visited Mzilikazi in an *umusi* near present day Pretoria. During June 1835, Charles Bell and several members of Andrew Smith's expedition visited a Ndebele village near Rustenburg. Charles Bell subsequently painted the village. In December 1836, Cornwallis Harris visited and painted emHlalandlela near Madibend (Brits). Numerous Tswana chiefdoms unfolded during the last decades of the 18th Century and the first decades of the 19th Century. The causes were complex, multidimensional and included ecological potential, social and political formation and expansion of different spheres of influence,

the establishment of short- and long-distance trade relations and local and regional wars. The causes and events not fully recorded in oral traditions or other records and therefore indicate further research potential.

The earliest Voortrekkers who moved across the Magaliesberg in the early 19th Century settled in the Rustenburg area, as well as further to the east. Main activities eventually included tobacco and citrus farming, as well as cattle herding. British blockhouses dating to the Anglo Boer War are found along the Magaliesberg between Pretoria in the east and Rustenburg in the West. Several of these structures are located to the south of the project area in Kommandonek and Pampoennek. With the discovery of the Merensky Reef in 1929, the area's economy gradually changed from farming to platinum, chrome and granite mining (Pistorius 2011).

4.2.1 Historical aerial imagery and topographical maps

Historical images and topographical maps dating to 1943, 1949, 1964, 1968, 1980, 1985, 1996, 2001 and 2010 (**Appendix A**) were used to determine the location and relative age of the structures and buildings associated with the demarcated portions (**Table 2**), as well as the historical land uses.

The topographical map dating to 1943 (**Appendix A: Figure 48**) indicates the presence of 12 areas associated with buildings or structures (Sites K01 – K12), several roads, footpaths, cultivated areas and a canal. Seven of these sites (K03, K05, K06, K07, K08, K11, K12) appear to have been demolished as no surface indications are visible on contemporary satellite imagery. Four of the sites are still associated with surface remains (K01, K02, K04, K09). Should these buildings / structures, or parts thereof, form part of the original structure, it would at least be 78 years old. One of the sites (K10) appears to presently consist of a building ruin. Sites K11, K12 (hut) and the majority of the buildings associated with Site K07 appear to have been demolished by 1949 (**Appendix A: Figure 49**), while site K03 was demolished by 1964 (**Appendix A: Figure 50**). Sites K05 and K08 are no longer visible on the 1968 aerial image (**Appendix A: Figure 51**) or the 1968 topographical map (**Appendix A: Figure 52**), suggesting that they have been demolished by this time. The last building associated with Site K07 appears to have been demolished by 1985 (**Appendix A: Figures 54 & 55**) and the building at Site K06 by 1996 (**Appendix A: Figure 56**). Building ruin K10 seems to have been partially demolished between 1985 and 1996 (**Appendix A: Figures 55 & 56**).

The aerial image dating to 1949 (**Appendix A: Figure 49**) indicates the presence of three areas associated with buildings or structures (Sites K14, K16, K21) not previously identified. All three sites are still associated with surface remains. Should these buildings / structures, or parts thereof, form part of the original structure, it would at least be 72 years old.

The 1964 aerial image (**Appendix A: Figure 50**) shows the presence of an additional 5 sites consisting of buildings or structures (Sites K15, K18, K19, K23, K24), two of which appear to have been demolished. Site K19 appears to have been demolished by 1985 (**Appendix A: Figures 54 & 55**) and Site K24 sometime after 2010 (**Appendix A: Figure 58**). Based on contemporary satellite imagery, Sites K15 and K18 are still associated with intact buildings. These buildings/structures could have been constructed between 1949 and 1964 and could therefore exceed 60 years of age. The building associated with Site K23 seems to have partially been demolished after 2010 as the building currently appears to be a ruin.

Four sites (Sites K13, K17, K20, K22) consisting of buildings/structures were identified on the 1968 aerial image (**Appendix A: Figure 51**) and the 1968 topographical map (**Appendix A: Figure 52**). Three of these sites, K13, K17 and K20, however, have been demolished by 1985 (**Appendix A: Figures 54 & 55**), while Site K22 appears to have been demolished by 1996 (**Appendix A: Figure 56**). It should also be noted that since these buildings/structures were constructed between 1964 and 1968, they do not exceed 60 years of age. The 1968 topographical map is also the first map to indicate the names of the two villages: Ntsopilo and Rankotia.

Although several additional buildings are indicated on more recent topographical datasets, these structures are of contemporary origin. One cemetery (Site K25), however, was identified on the 2010 topographical map (**Appendix A: Figure 58**). The majority of the agricultural activities, especially on the Krokodilkraal 426 JQ section, seem to have ceased between 1985 and 1996 (**Appendix A: Figures 55 & 56**).

4.3 Examples of Heritage Sites

Figures 33 – 43 are examples of heritage sites often encountered. Such sites are may be associated with water sources, rocky outcrops and hills and should be avoided by the prospecting activities.



Figure 33: ESA artefacts from Sterkfontein (Volman 1984).

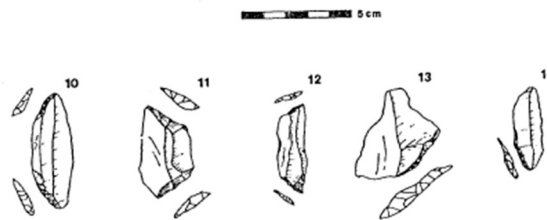


Figure 34: MSA artefacts from Howiesons Poort (Volman 1984).



Figure 35: LSA scrapers (Klein 1984).



Figure 36: Example of undecorated potsherds.



Figure 37: Example of a decorated potsherd.



Figure 38: Example of a potential granary base.



Figure 39: Example of a stone-walled site.



Figure 40 : Example of a broken lower grinding stone.



Figure 41: Example of a dilapidated stone-walled site.



Figure 42: Example of a historical building.



Figure 43: Example of a potential informal grave.

4.4 Previous Heritage Studies

Buffelsfontein East & West Expansion Project

A Heritage Impact Assessment was conducted by Pelsler & Van Vollenhoven (2008) for the initial Buffelsfontein East and West mining expansion on the Farm Buffelsfontein 465 JQ. The study recorded one angular stone-walled enclosure and an extensive LIA stone-walled site. It was assumed that the angular enclosure was likely to relate to recent quarrying and mining activities and was considered to be of low significance. The site was subsequently demolished. The LIA stone-walled site was determined to be highly significant as this site appears to form part of a larger complex that was identified by Dr Julius Pistorius. Accordingly, the site is associated with the ancestors of the Tswana and dates from the 17th Century onwards. Material culture observed during their survey included hut enclosures, middens etc. Due to the site already being impacted and the possibility of future expansion, the HIA proposed a detailed mapping and drawing of the site, as well as archaeological excavations. An alternative consisting of the fencing-off of the site and compiling a management plan was proposed as well. The Buffelsfontein Project area is located 27 km to the southwest of the NWV prospecting area.

Kgabalatsane Solar PV 2 Facility

The HIA survey conducted for the development of the Kgabalatsane Solar PV 2 Facility on the Farm Syferfontein 430 JQ, located 6.6 km east-northeast of the proposed NWV prospecting area, revealed no heritage sites. However, it is noted that Bakwena-ba-Mogapa owned the farm, as well as several surrounding farms, from at least the late 1800's. According to research, the prospecting and mining of iron ore commenced on the farm during the 1950's. The farm also became part of the Bophuthatswana homeland in the late 1970's (Van der Walt 2014).

Evraz Vametco Operation

Pistorius (2011) conducted a Phase 1 Heritage Impact Assessment for the Evraz Vametco operation directly to the east of the proposed NWV prospecting area. The HIA recorded a historical house, stone-walled sites dating to the Late Iron Age, as well as two cemeteries dating to the Historic Period that was still in use at the time of the survey. The historical house was deemed to be of low heritage significance due to its dilapidated state. It was also noted that such remains are common in the area. The 14 LIA sites consist of stone-walling. Two of the sites are well preserved and are therefore of high significance, while the remaining 12 sites vary between medium and high significance based on the level of preservation. According to Pistorius (2011), the LIA sites can contribute to a better understanding of the regional Tswana pre-history since the sites fall within the sphere of influence of the Kgatla and Bakwena Bamôgôpa who were subjugated by Mzilikazi's Ndebele between 1827 and 1832. A phase 2 archaeological impact assessment consisting of the documentation and excavation of the remains was recommended, and that the cemeteries be fenced-off.

Granite prospecting on Roodekopjes of Zwartkopjes 427 JQ and Mamagalieskraal 420 JQ.

A Cultural Heritage Assessment was conducted by Coetzee (2016) for the prospecting of granite on several portions of the Farms Roodekopjes of Zwartkopjes 427 JQ and Mamagalieskraal 420 JQ. It should be noted that the study area is located directly to the south of the proposed NWV prospecting area and also include two mutual portions: Portions 849 and 851 of the Farm Mamagalieskraal 420 JQ. The study recorded nine LIA stone-walled sites, two historical farm workers house complexes and two cemeteries. The workers house complexes were graded to be of low significance, the cemeteries to be of high significance, while the LIA sites were assigned grades varying between medium and low significance. It should be noted that six of the LIA sites appear to be individual wards (family units) and may constitute a single large settlement. Recommendations for the LIA sites and historical farm workers house complexes include a Phase 2 survey, mapping and the application for destruction permits, while exhumation, reburial and a permit application were recommended for the cemeteries. It should also be noted that none of these sites are located on the two mutual portions.

5. Archaeological and Historical Remains

This section serves as an indication of heritage material to be expected during a Phase 1 heritage study of the study area based on previous research, as well as historical aerial images and topographical maps.

5.1 Stone Age Remains

Although Stone Age sites are scattered along the Magaliesberg, the heritage studies conducted in the vicinity of the study area did not locate any such remains. Because such sites are often associated with water sources, stone age material are more likely to be encountered within the 500 m river buffer zone of the study area. Stone Age sites are also not likely to be detectable on aerial imagery and are generally discovered during pedestrian surveys.

5.2 Iron Age Farmer Remains

Archaeological studies done in the surrounding areas located numerous stone-walled sites dating to the LIA (Pistorius 2011 & Coetzee 2016). These sites are associated with the ancestors of the Tswana and the Ndebele and are generally found between Rustenburg in the West, Pretoria in the East, and between the norite hills in the north and the Magaliesberg in the south. According to Pistorius (2011), the stone-walled enclosures located directly to the east of the study area might be associated with the regional Tswana pre-history since the sites fall within the sphere of the influence of the Kgatla and Bakwena Bamôgôpa who were subjugated by Mzilikazi's Ndebele between 1827 and 1832. It was also noted that the stone-walled sites represented a typical Tswana village or *kgoro*. The observed sites consist of centrally located cattle enclosures that are surrounded by outer scalloped walls. The scallops indicate the various dwellings (*malapa*) that were occupied by different family groups (*masika*), while the enclosures were used to shelter large and small stock and also served as the *kgotla* area that held the formal court. The possibility also exists that the sites observed by Coetzee (2016) to the south of the study area form part of the LIA sites recorded by Pistorius (2011).

Although stone-walled sites are often detectable on satellite imagery, none were observed within the demarcated NWV prospecting area. Due to the recorded LIA sites in relatively close proximity of the study area, a strong possibility exists that the undisturbed open areas associated with the NWV study area might be associated with LIA sites. Although not visible on satellite imagery, their presence might be obscured by dense vegetation and poor preservation.

5.3 Historical Remains

Figure 44 illustrates a typical building ruin associated with the study area and is likely to exceed 60 years of age. It should also be noted that the canal and the associated historical bridges are likely to exceed 60 years of age.

The archaeological studies conducted in the surrounding areas noted the presence of several buildings/structures dating to the Historic Period (Pistorius 2011 & Coetzee 2016). These include a dilapidated stone and mud house,

and farm workers house complexes. Based on historical aerial imagery and topographical maps, 20 areas associated with historical infrastructure likely to exceed 60 years of age were identified. Nine of these sites appear to have been demolished (K03, K05 – K08, K11, K12, K19, K24), while nine consist of surface remains (K01, K02, K04, K09, K14 – K18) and two of building ruins (K10, K23).



Figure 44: Building Ruin.

5.4 Contemporary Remains

Evidence from satellite imagery and topographical maps indicate the presence of several buildings and structures. **Figure 45** illustrates typical modern buildings associated with the villages Ntsopilo and Rankotia. Archaeological studies done in the surrounding areas (Pistorius 2011 & Coetzee 2016) did not record contemporary buildings or structures. Four building sites identified on the 1968 topographical map (**Appendix A: Figure 52**) appear to have been constructed between 1964 and 1968, but seem to have been demolished (K13, K17, K20, K22). These sites also do not exceed 60 years of age.



Figure 45: Contemporary buildings.

5.5 Graves

Cemetery K25 (**Figure 46**) was identified on the 2010 topographical map and visited (**Appendix A: Figure 58**). The cemetery is fenced-off and is still in use. It is unclear whether additional burial sites are located within the demarcated study area.

The heritage study conducted by Pistorius (2011) recorded two cemeteries. One of the cemeteries consists of 17 graves, while the other of several hundred. The larger cemetery was still in use at the time of the study. The heritage study conducted by Coetzee (2016) recorded two cemeteries as well. It was noted that the cemeteries are likely associated with farm workers. One of the cemeteries consists of approximately 15 graves and the other of approximately 75 graves. Both cemeteries appear to consist of formal and informal graves, some of which exceed 60 years of age. Due to the small size of burial sites and often poorly preserved surface features, such sites are rarely visible on satellite imagery and are generally detected during pedestrian surveys. Graves and cemeteries are also not always indicated on topographical maps.



Figure 46: Cemetery K25.

6. Evaluation

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

A fundamental aspect in the conservation of a heritage resource relates to whether the sustainable social and economic benefits of a proposed development outweigh the conservation issues at stake. There are many aspects that must be taken into consideration when determining significance, such as rarity, national significance, scientific importance, cultural and religious significance, and not least, community preferences. When, for

whatever reason the protection of a heritage site is not deemed necessary or practical, its research potential must be assessed and if appropriate mitigated in order to gain data / information which would otherwise be lost. Such sites must be adequately recorded and sampled before being destroyed.

6.1 Field Ratings

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

Table 3: Prescribed 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 4: Individual Site Ratings

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2527-K01	Building Intact	Local	Grade 3 A	High	Mitigation not advised
2527-K02	Building Intact	Local	Grade 3 A	High	Mitigation not advised
2527-K03	Building Demolished	General Protection B	4 B	Medium	Record site
2527-K04	Building Intact	Local	Grade 3 A	High	Mitigation not advised
2527-K05	Building Demolished	General Protection B	4 B	Medium	Record site
2527-K06	Building Demolished	General Protection B	4 B	Medium	Record site
2527-K07	Building Demolished	General Protection B	4 B	Medium	Record site
2527-K08	Building Demolished	General Protection B	4 B	Medium	Record site
2527-K09	Building Intact	Local	Grade 3 A	High	Mitigation not advised
2527-K10	Building Ruin	Local	Grade 3 A	High	Mitigation not advised
2527-K11	Building Demolished	General Protection B	4 B	Medium	Record site

Site / Survey Point Name	Type	Rating	Field Rating/Grade	Significance	Recommendation
2527-K12	Hut Demolished	General Protection B	4 B	Medium	Record site
2527-K13	Building Demolished	General Protection C	4 C	Low	No recording necessary
2527-K14	Building Intact	Local	Grade 3 A	High	Mitigation not advised
2527-K15	Building Intact	Local	Grade 3 A	High	Mitigation not advised
2527-K16	Building Intact	Local	Grade 3 A	High	Mitigation not advised
2527-K17	Building Demolished	General Protection C	4 C	Low	No recording necessary
2527-K18	Building Intact	Local	Grade 3 A	High	Mitigation not advised
2527-K19	Building Demolished	General Protection B	4 B	Medium	Record site
2527-K20	Building Demolished	General Protection C	4 C	Low	No recording necessary
2527-K21	Building Intact	Local	Grade 3 A	High	Mitigation not advised
2527-K22	Building Demolished	General Protection C	4 C	Low	No recording necessary
2527-K23	Building Ruin	Local	Grade 3 A	High	Mitigation not advised
2527-K24	Building Demolished	General Protection B	4 B	Medium	Record site
2527-K25	Cemetery Intact	Local	Grade 3 A	High	Mitigation not advised

*Note – These ratings are based on the sites and their age as identified on historical aerial imagery and topographical maps. Should any of the sites proposed to be impacted, an inspection of the specific site by a qualified archaeologist must first be conducted. It should also be noted that additional heritage sites might be located within the demarcated study area.

7. Statement of Significance & Recommendations

7.1 Statement of significance

The study area: Portions RE/14, 839-842, RE/843, 844-849, RE/850, 851, 852, 896-900 of the Farm Mamagalieskraal 420 JQ; Portions 1, 3 and 4 of the Farm Krokodilkraal 426 JQ and the Farm Voorspoed 421 JQ, North West Province.

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 LIA sites, cemeteries and historical structures. Although not identified by the previous studies, the possibility of stone age sites exists as well, especially in the vicinity of water sources. 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 47 indicates the potential sites associated with surface remains, as well as a 500 m buffer area around rivers. The 500 m buffer area is considered potentially sensitive from a heritage perspective since archaeological sites are often located within this zone. Areas previously/currently associated with cultivated fields are indicated as well. These areas are considered to be less sensitive from a heritage perspective due to the areas being disturbed. The least sensitive areas are therefore areas that are located more than 500 m from a water source, fall within previously/currently cultivated fields and are not located within close proximity of potential heritage sites or contemporary infrastructure. From a heritage perspective, these areas are considered to be more favourable for the proposed prospecting activities. Although the previously/currently cultivated areas that intersect the 500 m river buffer are also disturbed, the potential for subsurface cultural material is slightly higher compared to areas falling outside of the buffer zone. Apart from the identified potential sites, open areas falling outside of the previously/currently cultivated areas are considered to be the most sensitive areas from a heritage perspective, especially due the presence of LIA stone-walled sites directly to the south and east of the demarcated study area. The possibility also exists that culturally sensitive sites, such as burial sites, might have been created after some of the cultivated fields fell into disuse, meaning that burial sites might be located on disturbed areas as well.

Contemporary buildings that appear not to exceed 60 years of age are also associated with 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). The sites identified on the 1968 topographical maps, although demolished, fall into this category as well. These sites are K13, K17, K20 and K22 on Portions 839, 844, 845 and 848 of the Farm Mamagalieskraal 420 JQ.

Portions 849, RE/850, 851, 852, 896 – 900 of the Farm Mamagalieskraal 420 JQ

No sites of potential heritage remains were observed on historical aerial imagery and topographical maps. Contemporary buildings and structures, however, are visible on Portions 849, 897, 898, 900. The 500 m river buffer zone also intersects portions 849, 896 and 852. It should also be noted that the open areas associated with Portions 849, 851 and 852 are considered to be sensitive from a heritage perspective since these areas are likely to be associated with LIA stone-walled sites.

Remaining Extent of Portion 14 of the Farm Mamagalieskraal 420 JQ

The farm portion appears to exist for the exclusive use of a section of the canal. Since the canal appears on the earliest historical dataset available (1943), the canal and the associated bridges should be considered significant from a heritage perspective.

Portions 893, 840, 841, 842, RE/843, 844, 845, 846 and 847 of the Farm Mamagalieskraal 420 JQ; The Farm Voorpsoed 421 JQ

These farm portions are associated with intact and demolished historical infrastructure, areas falling within 500 m of a river, previously/currently cultivated fields, as well as small sections of open veldt. The open areas are considered sensitive from a heritage perspective since these areas are likely to be associated with LIA stone-walled sites. The indicated potential sites are also considered to be sensitive from a heritage perspective. 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).

Although the demolished sites are considered less sensitive from a heritage perspective, a possibility exists that subsurface culturally significant material might be associated with the sites.

Portions 1, 3 and 4 of the Farm Krokodilkraal 426 JQ

These farm portions are associated with two villages (Ntsopilo & Rankotia), a cemetery, potentially historic buildings, areas falling within 500 m of a river, modern infrastructure, a small section of open veldt, and disused agricultural fields. The open and undisturbed areas are considered to be sensitive from a heritage perspective since these areas are likely to be associated with LIA stone-walled sites. The indicated potential sites are also considered to be sensitive from a heritage perspective. Should the buildings and structures associated with these sites form part of the original structures, it could exceed 60 years of age and would therefore be protected under the NHRA (25 of 1999). The cemetery is still in use and significant from a heritage perspective as the Human Tissues Act (65 of 1983) and Ordinance on the Removal of Graves and Dead Bodies (Ordinance 7 of 1925), as well as the National Heritage Resources Act 25 of 1999 apply.

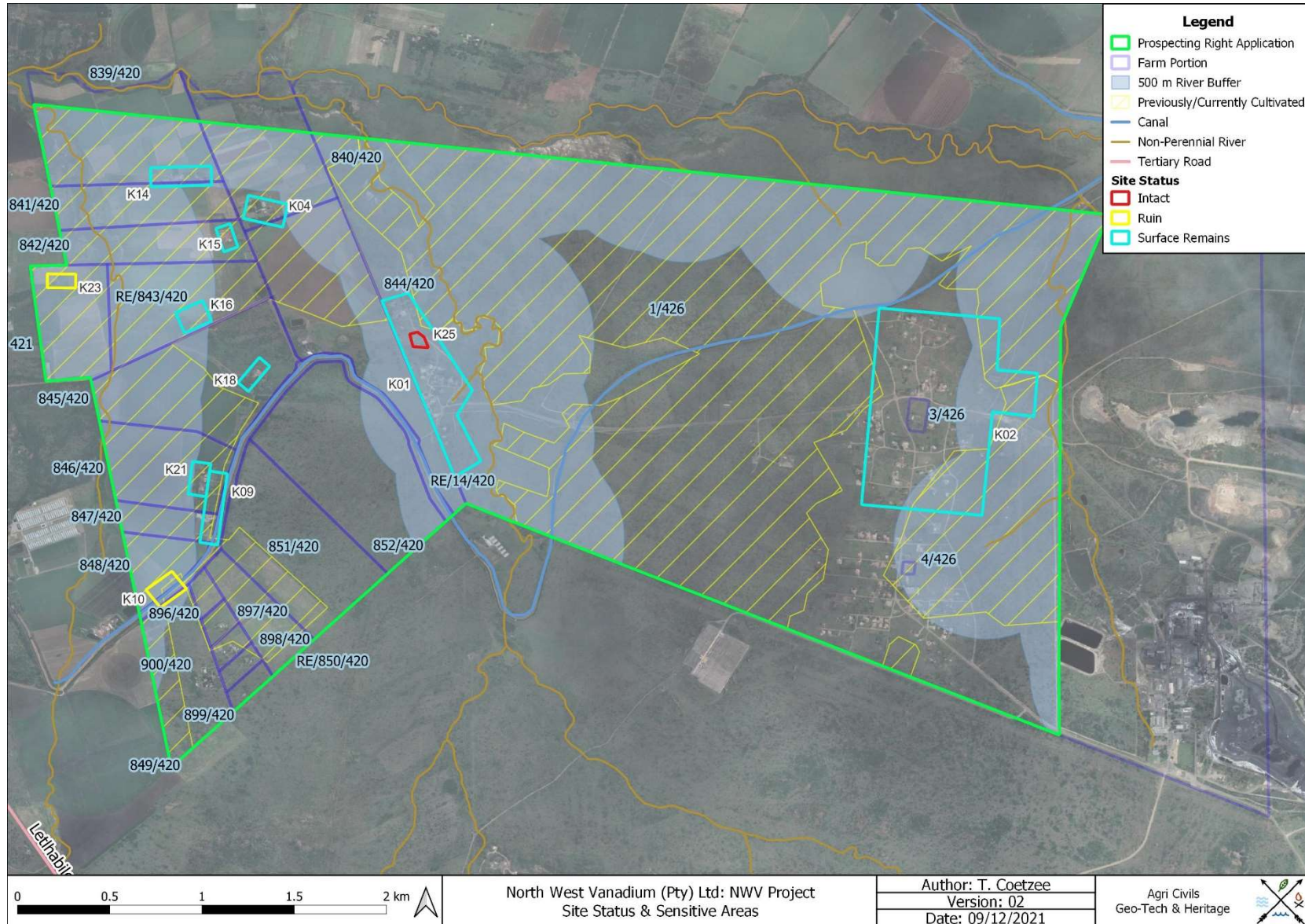


Figure 47: Site Status & Sensitive Areas.

7.2 Recommendations

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

- Although the nine demolished sites dating to 1943 and 1964 appear not to be associated with surface remains, subsurface culturally significant material might be present (Sites K03, K05, K06, K07, K08, K11, K12, K19, K24). Therefore, it is recommended that these areas be avoided by the proposed prospecting activities.
- The four demolished sites dating to 1968 (K13, K17, K20, K22) appear not to be associated with surface remains and also do not exceed 60 years of age. These sites are therefore not protected under the NHRA 25 of 1999. However, subsurface culturally significant material might be associated with these sites and care should therefore be exercised should these sites be impacted by the proposed prospecting activities.
- The nine sites associated with surface remains might date to 1943 and 1964 (K01, K02, K04, K09, K14, K15, K16, K18, K21). 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 two building ruins might date to 1943 and 1964 (K10, K23). The possibility therefore exists that the associated ruins exceed 60 years of age. It is therefore recommended that these areas be avoided by the proposed prospecting activities.
- Cemetery K25 is significant from a heritage perspective. Therefore no prospecting activities should take place within a 50 m radius of the cemetery or any other burial site.
- 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. However, the potential presence of graves at some of the modern buildings should be considered.
- The area demarcated as previously/currently cultivated is considered to be less sensitive from a heritage perspective. The least sensitive areas are therefore areas that are located more than 500 m from a water source, fall within previously/currently cultivated fields and are not located within close proximity of potential heritage sites or contemporary infrastructure. It is therefore recommended that these areas be considered for the proposed prospecting activities.

- Although the previously/currently cultivated areas that intersect the 500 m river buffer are also disturbed, the potential for subsurface cultural material is slightly higher compared to areas falling outside of the buffer zone. Care should therefore be exercised when prospecting within these areas.
- Apart from the identified potential sites, open and undisturbed areas falling outside of the previously/currently cultivated areas are considered to be the most sensitive from a heritage perspective, especially due the presence of LIA stone-walled sites directly to the south and east of the demarcated study area. These areas should therefore be avoided by the proposed prospecting activities.
- 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 it not be possible to adhere to the abovementioned recommendations, a qualified archaeologist should be present on-site during the proposed prospecting. Alternatively, once the prospecting localities have been identified, a qualified archaeologist can inspect the proposed sites and produce recommendations that will aid the protection of heritage resources. Also, a qualified archaeologist must be contacted whenever uncertainty regarding potential heritage remains exists.
- 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 portion, subject to the abovementioned conditions and recommendations.

8. Addendum: Terminology

Archaeology:

The study of the human past through its material remains.

Artefact:

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

Assemblage:

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

Context:

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

Cultural Resource Management (CRM):

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

Excavation:

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

Feature:

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

Ground Reconnaissance:

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

Matrix:

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

Phase 1 Assessments:

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

Phase 2 Assessments:

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

Sensitive:

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

Site:

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

Surface survey:

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

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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

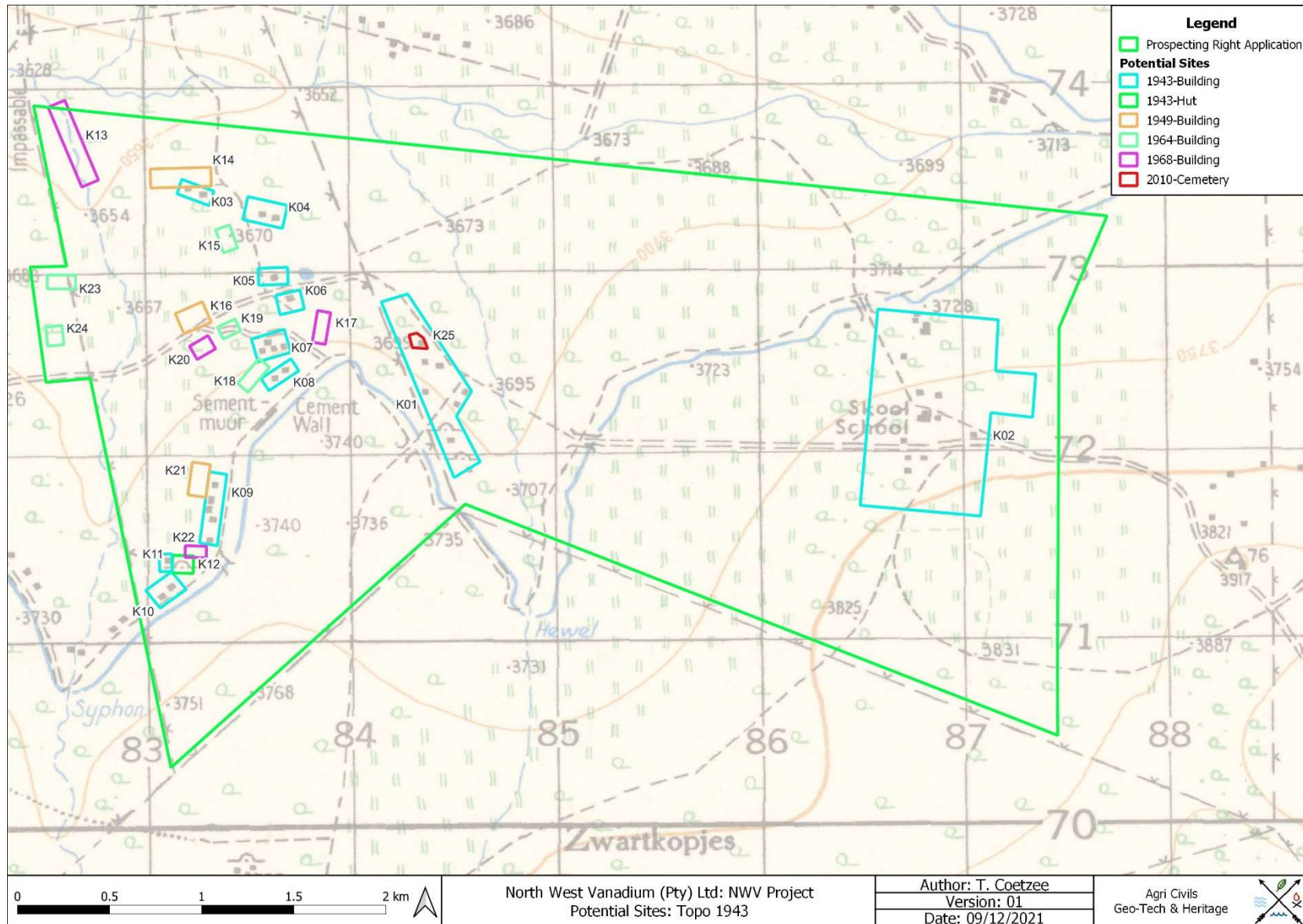


Figure 48: Segment of 1943 1:50 000 2527 DB topographical map indicating the study area.

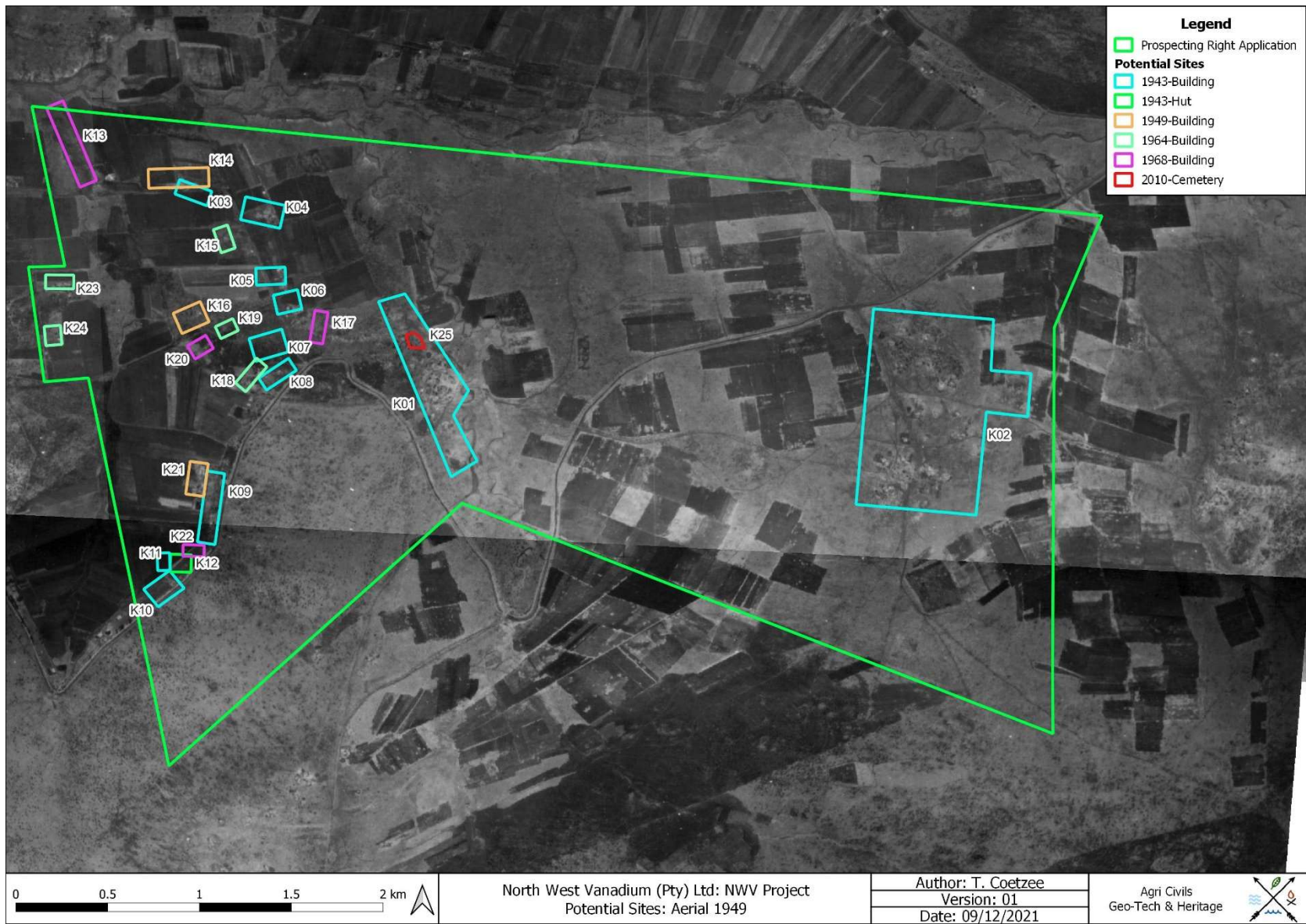


Figure 49: 1949 aerial image of the study area.

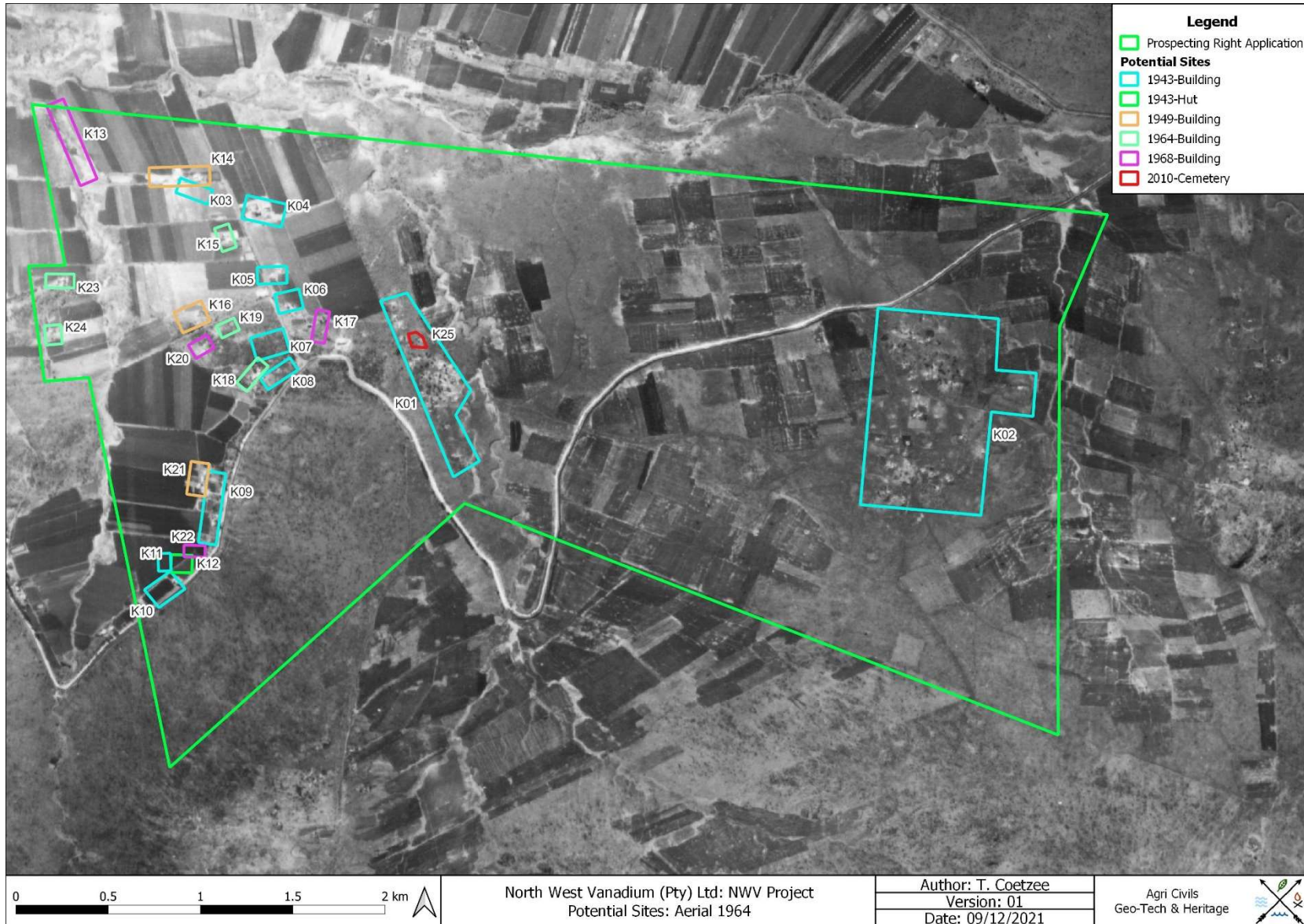


Figure 50: 1964 aerial image of the study area.

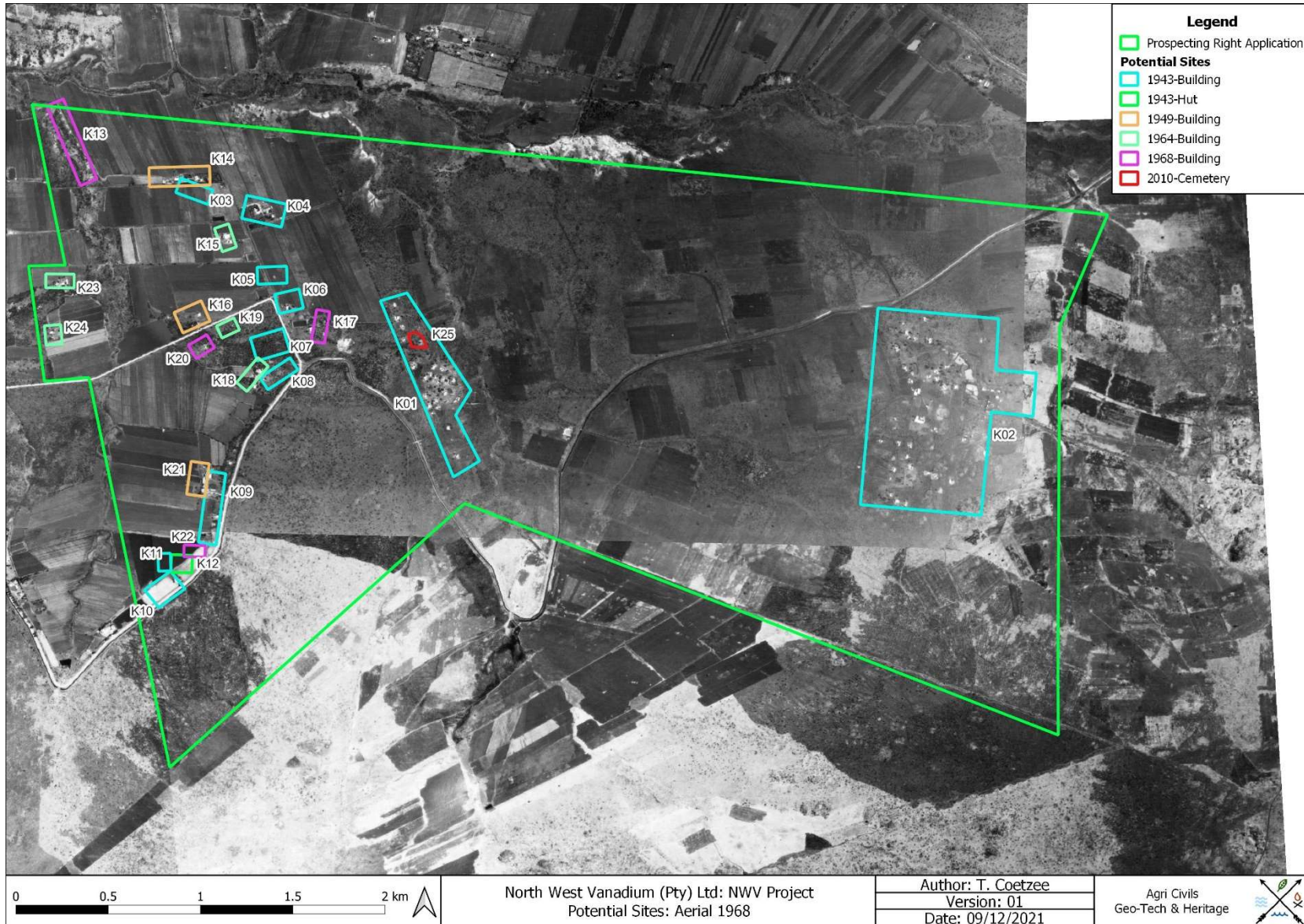


Figure 51: 1968 aerial image of the study area.

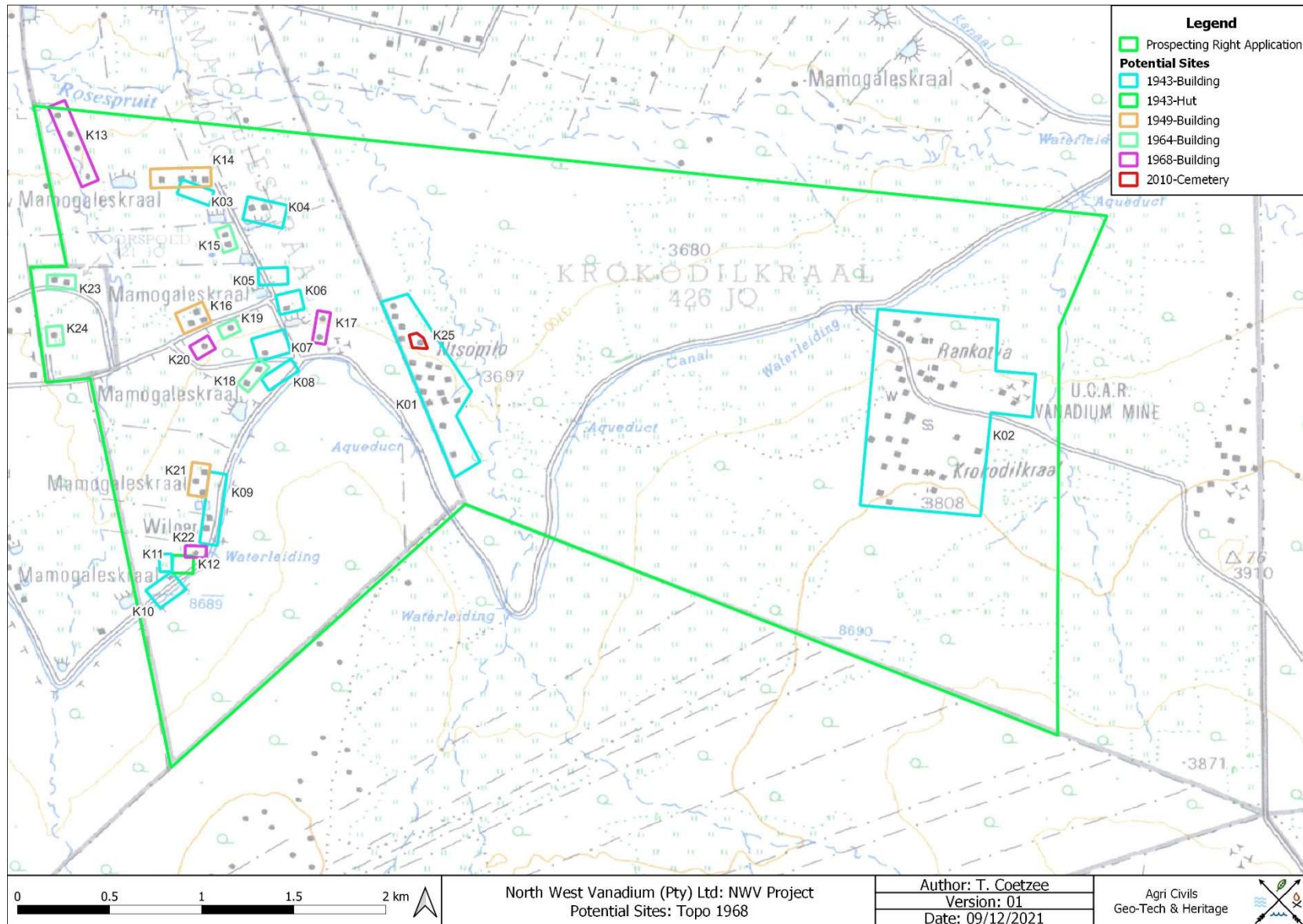


Figure 52: Segment of 1968 1:50 000 2527 DB topographical map indicating the study area.

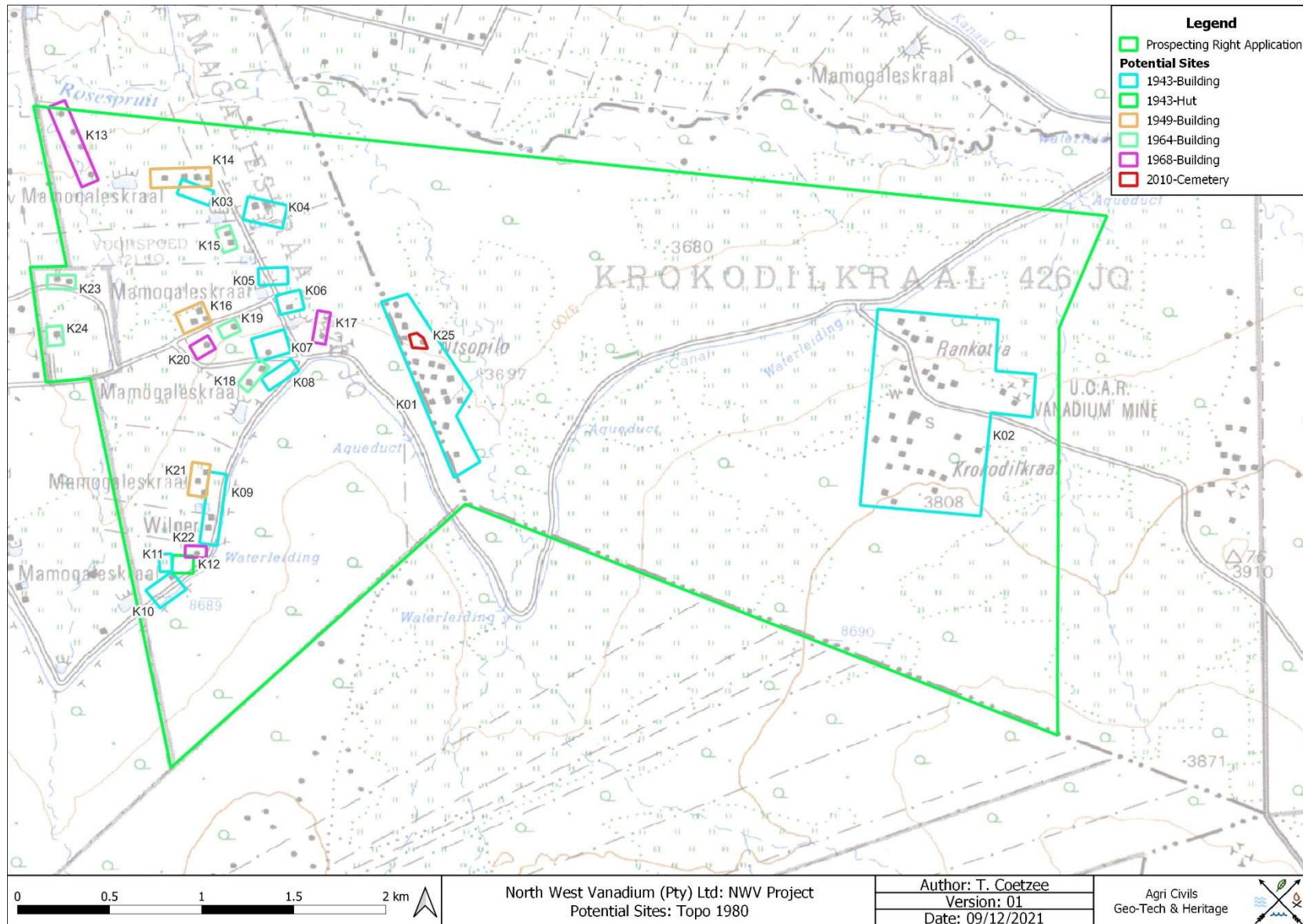


Figure 53: Segment of 1980 1:50 000 2527 DB topographical map indicating the study area.

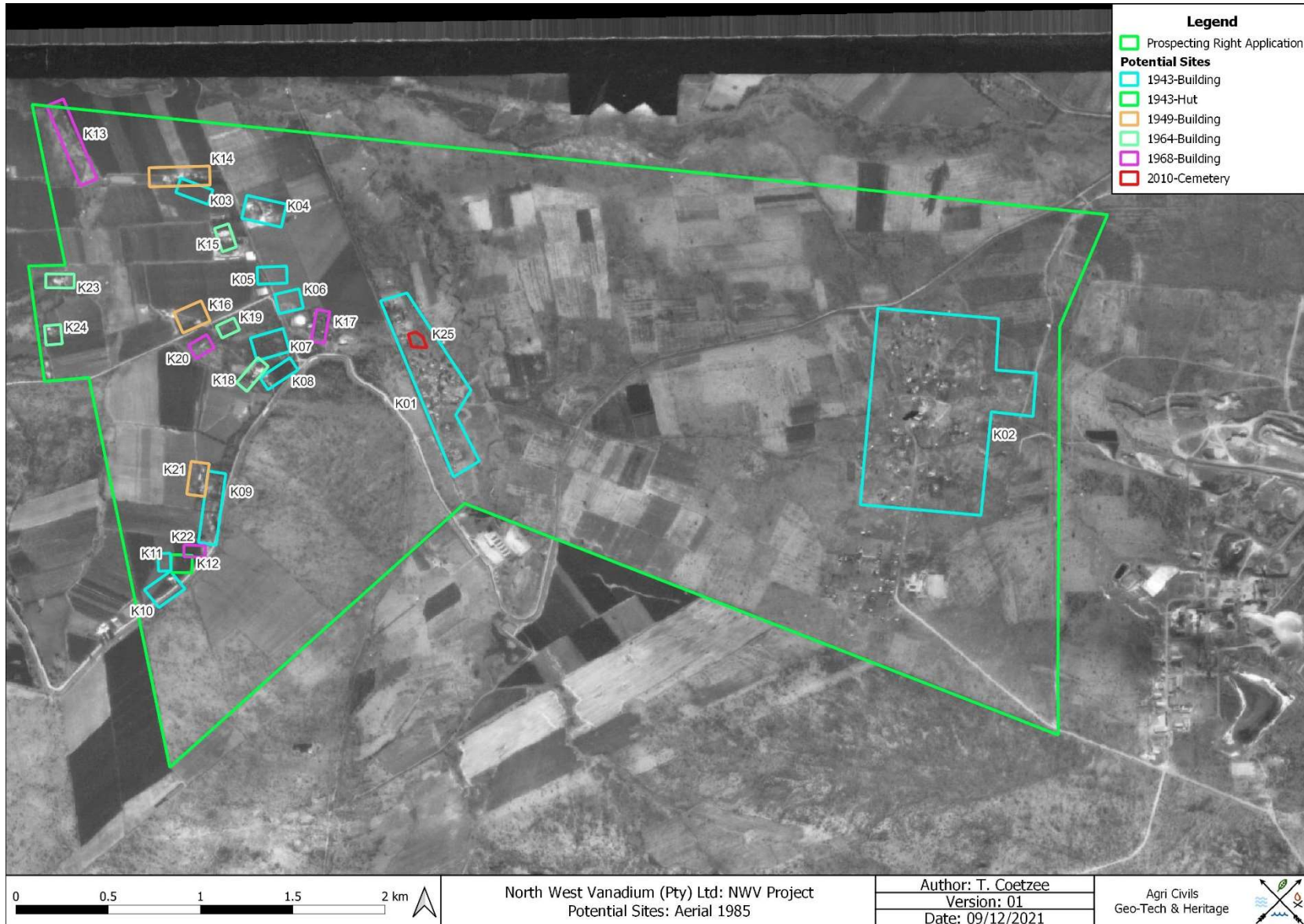


Figure 54: 1985 aerial image of the study area.

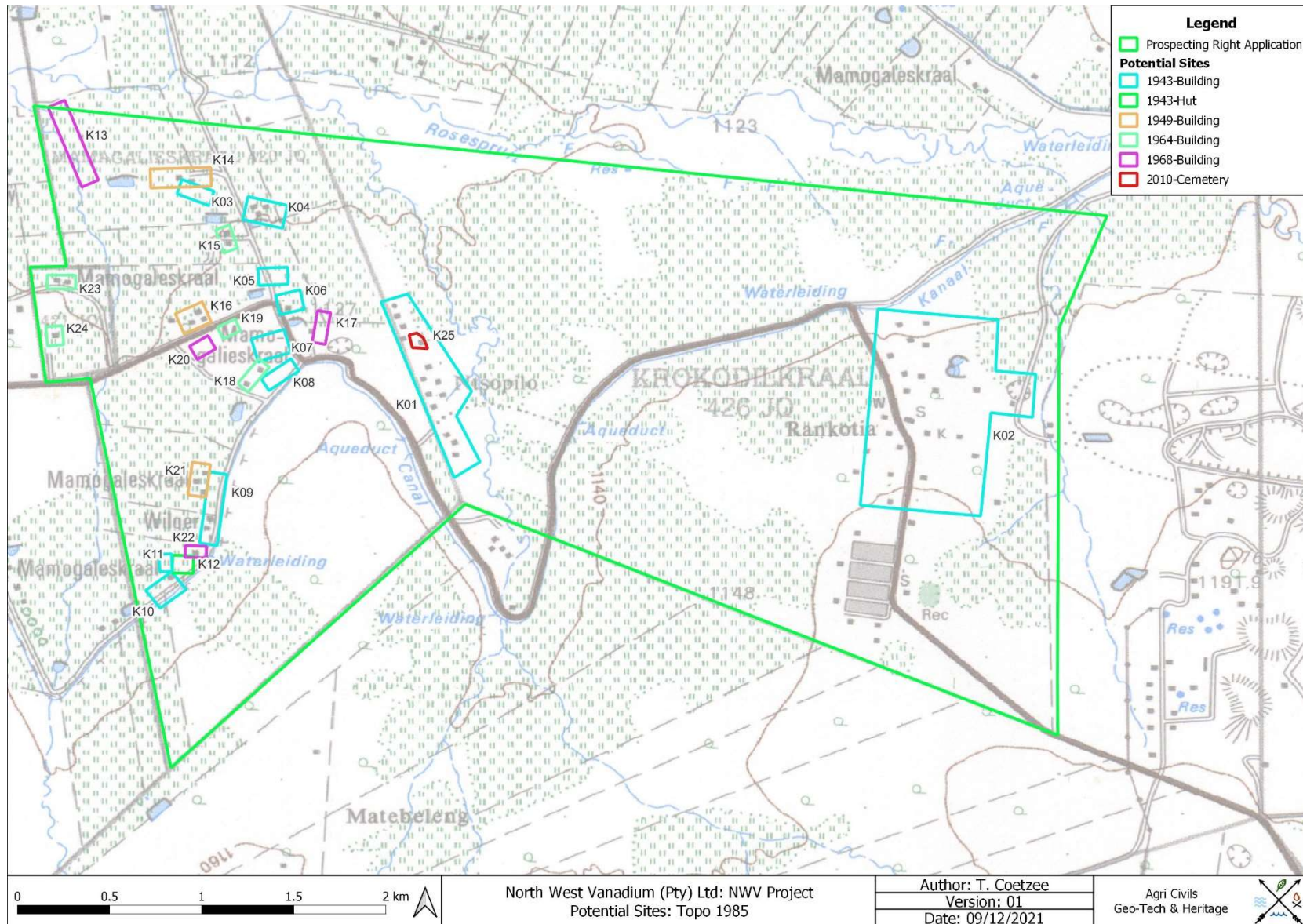


Figure 55: Segment of 1985 1:50 000 2527 DB topographical map indicating the study area.

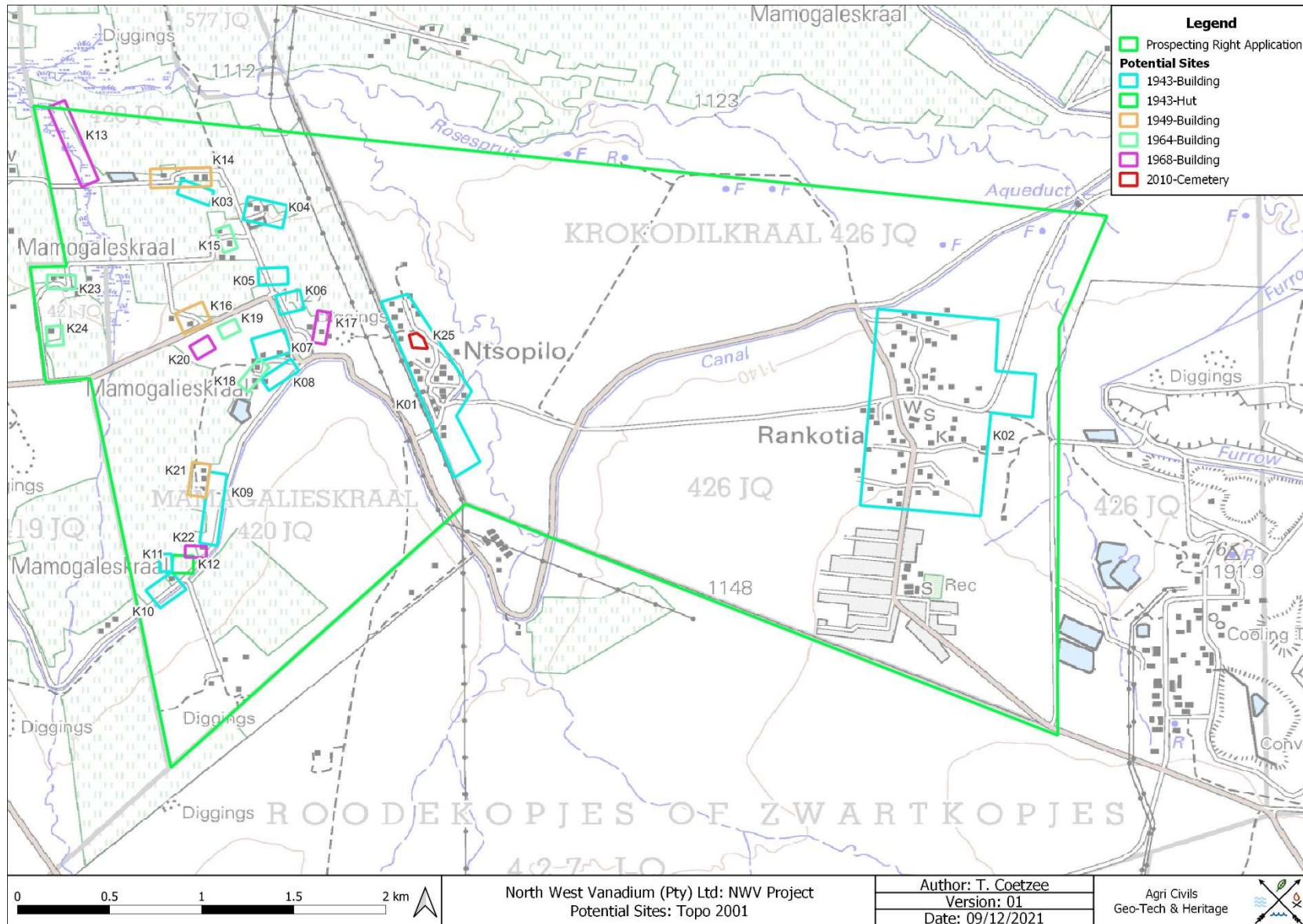


Figure 57: Segment of 2001 1:50 000 2527 DB topographical map indicating the study area.

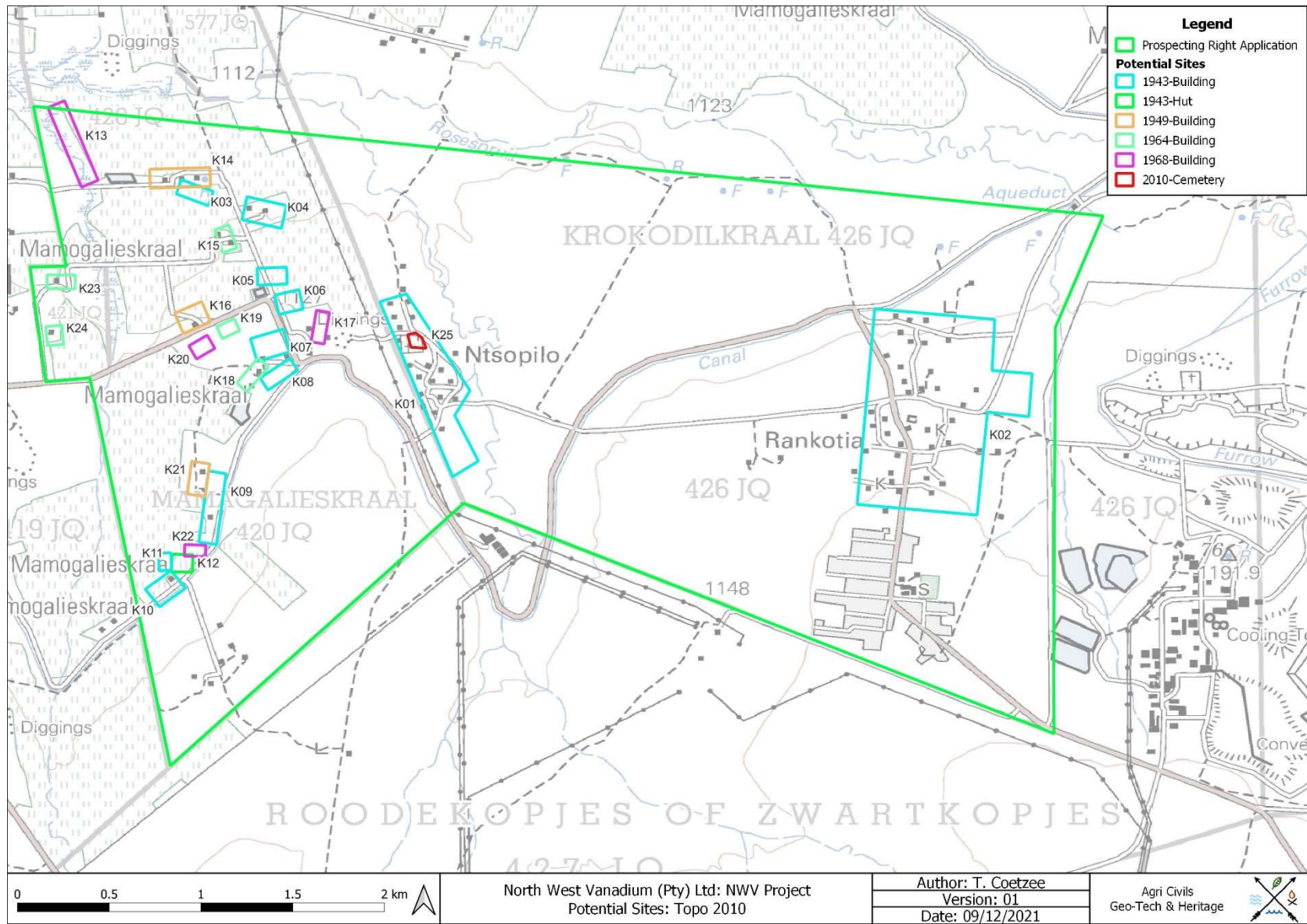


Figure 58: Segment of 2010 1:50 000 2527 DB topographical map indicating the study area.