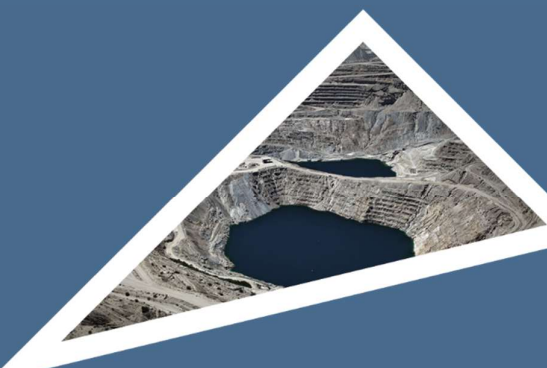


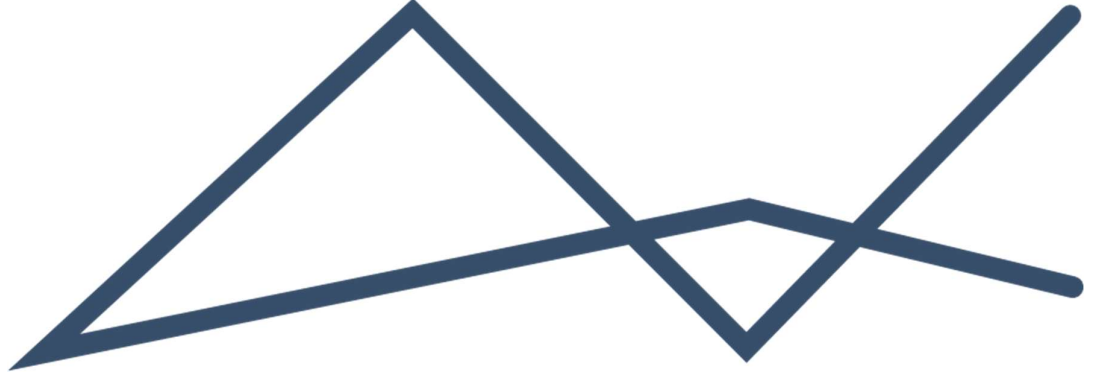


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PHASE 1 HERITAGE IMPACT ASSESSMENT REPORT





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Appendices

Appendix 1: CV of the Archaeologist

Appendix 2: Specialist Declaration



Abbreviations

AD	<i>Anno Domini</i>
ASAPA	Association of South African Professional Archaeologists
CD:NGI	Chief Directorate of National Geo-spatial Information
CRM	Cultural Resource Management
DFFE	Department of Forestry, Fisheries and the Environment
DMR	Department of Mineral Resources
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioner Association of South Africa
EIA	Environmental Impact Assessment
EMP	Environmental Management Programme
ESA	Earlier Stone Age
HIA	Heritage Impact Assessment
LCT	Large Cutting Tool
LSA	Later Stone Age
MPRDA	Mineral and Petroleum Resources Development Act
MSA	Middle Stone Age
NEMA	National Environmental Management Act
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
ya	Years ago



Executive Summary

Genade Boerdery (Pty) Ltd wishes to create 8 new cultivation (pivot) areas for the cultivation of potatoes. The development of these pivots will occur in phases over the course of 5 years and the crops will be rotated to prevent blight and allow for conservation of the soil. Once the planting cycle for a pivot area is completed, the area will be reseeded with grazing grasses for cattle. Seven of the new cultivation areas will each cover 60 hectares and one will cover 50 hectares, resulting in a total area of ~470 hectares of indigenous vegetation clearance by the end of the five-year period. Environmental Impact Management Services (Pty) Ltd (EIMS) has been appointed as the Environmental Assessment Practitioner (EAP) to assist with undertaking the required authorisation processes including the conducting of an Environmental Impact Assessment which includes this Heritage Impact Assessment.

A comprehensive assessment was conducted to evaluate the potential impact of the project on archaeological and heritage resources. The study included a literature review, desktop assessment, and a single day field survey.

Through a desktop investigation, two potential heritage features were identified. These features were further evaluated and are not of heritage significance. A total of 8 separate locations were earmarked in relation to a sprawl of LSA finds identified within the footprint of Pivot 8. These finds have been deposited in the area through various processes associated with nearby diggings, and drainage channels. Finds include scatters of LSA tools, not limited to flakes, cores, and debitage.

The construction activities will affect the scatters of LSA finds being within the footprint of the pivots proposed, particularly Pivot 8. A recommendation has been made to consider the impact of the activity proposed on identified features, while advising the developer's continued vigilance for the identification of increasing densities of stone tools. A Chance Find Procedure is recommended to manage any further discoveries during development should finds be discovered during the proposed activities. This includes halting activities if significant finds are discovered, recording their location, and consulting a qualified archaeologist for further evaluation.

Apart from the stone tool finds and sites identified, no other significant heritage resources were identified. As long as the proposed mitigation measures are implemented there should be no significant heritage impacts. Therefore, from an Archaeological perspective, the development will not have significant foreseeable impacts and should be allowed to proceed.



1 BACKGROUND INFORMATION

This section provides an overview of the proposed project as well as details of the Archaeologist, the terms of reference, and legislative background informing this assessment.

1.1 DESCRIPTION OF PROJECT

Genade Boerdery (Pty) Ltd (hereafter referred to as the Applicant or developer) wishes to create 8 new cultivation (pivot) areas for the cultivation of potatoes. The development of these pivots will occur in phases over the course of 5 years and the crops will be rotated to prevent blight and allow for conservation of the soil. Once the planting cycle for a pivot area is completed, the area will be reseeded with grazing grasses for cattle. Seven of the new cultivation areas will each cover 60 hectares and one will cover 50 hectares, resulting in a total area of ~470 hectares of indigenous vegetation clearance by the end of the five-year period.

The proposed project is located on the farm Middel Plaats South No. 104, Sol Plaatjie Local Municipality, Northern Cape Province. The site is ~8km south of Schmidtsdrift. The centre point of the site is -28.785582°S, 24.074790°E. See Figure 1 for Locality Map.

1.2 HERITAGE SPECIALIST DETAILS

As prescribed by the SAHRA Minimum Standards (2007), a Heritage Specialist (Professional Archaeologist) was appointed for the undertaking of the Archaeological Impact Assessment. Dr Lucien James was appointed in this regard. The following is a summary of the Heritage Specialist's details. Table 1 provides a summary of the Archaeologist's contact details, qualifications, and professional membership. Refer to Appendix 1 for full CV of Archaeologist.

Dr Lucien James is an Environmental Consultant and Archaeologist with experience in different fields across the Arts, Social Science, Natural Science, and academia in general. He has been employed by EIMS as an environmental consultant since March 2023 working on several projects under various roles. He is registered with EAPASA as a Candidate EAP. Lucien has obtained a BSc (Hons) in Geography, Archaeology and Environmental Studies (Archaeology-focused) and is accredited as a Professional Archaeologist with the Association of South African Professional Archaeologists (ASAPA). He holds a MSc in Geography having done research on phytoremediation and the mining industry. In 2024, he completed his Ph.D. through research with a focus on collaborative River Basin Management in South Africa. He has worked as a Teaching Assistant (TA) and researcher since 2018 and engages in academic work through publications and conferences. He has taught 1st year, 2nd year, 3rd year and Honour's Archaeology and Geography courses. His research has been funded by the National Research Foundation (NRF) and the Water Research Commission (WRC). He is also actively publishing new papers in international academic journals. He has presented his research at a national level through various conferences in South Africa and has participated in other conferences and workshops on Climate Change and Climate Change Adaptation.

Table 1: Details of the Archaeologist

Name:	Lucien Nicolas James
Tel no.	+27 11 789 7170
E-mail	lucien@eims.co.za
Professional Qualification/ Training:	BA (Archaeology and Geography); Wits University, 2017
	BSc (Hons) Geography, Archaeology and Environmental Studies; Wits University, 2018
	MSc (Geography, Archaeology and Environmental Studies); Wits University, 2021
	Ph. D; Wits University, 2024



Professional Membership/ Registrations:	Registered Candidate Environmental Assessment Practitioner (EAPASA reg. no. 2023/6772)
	Accredited Professional Archaeologist (ASAPA member no. 0619)

1.3 DECLARATION

Refer to Appendix 2 for Declaration of the Archaeologist.

1.4 TERMS OF REFERENCE

This report aims to achieve several pre-defined objectives as per the prescription of the SAHRA Minimum Standards (2007), i.e. this report:

- a) Identifies the sites as well as potential associated heritage objects within and in close proximity of the footprint of a study area,
- b) Assesses the significance of sites and heritage objects,
- c) Comment on the impact of the development,
- d) Make recommendations for the mitigation or conservation of sites and associated Heritage objects

To address the terms of reference, a methodology has been adopted. This methodology is further elaborated on in sections to follow.

1.5 LEGISLATIVE REQUIREMENTS

This section describes the legislative requirements relating to this HIA report.

The National Heritage Resources Act (Act 25 of 1999 – NHRA) stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the NHRA 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...” The NHRA is utilised as the basis for the identification, evaluation and management of heritage resources and in the case of Cultural Resource Management (CRM) those resources specifically impacted on by development as stipulated in Section 38 of NHRA, and those developments administered through the National Environmental Management Act (Act 107 of 1998 – NEMA), and Mineral and Petroleum Resources Development Act (Act 28 of 2002 – MPRDA). In the latter cases the feedback from the relevant heritage resources authority is required by the State and Provincial Departments managing these Acts before any authorisations are granted for a development. The last few years have seen a significant change towards the inclusion of heritage assessments as a major component of Environmental Impact Processes required by the NEMA and MPRDA.

The NEMA 23(2)(b) gives effect to the NHRA and states that an integrated environmental management plan should, “...identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage”. A study of subsections (23)(2)(d), (29)(1)(d), (32)(2)(d) and (34)(b) and their requirements reveals the compulsory inclusion of the identification of cultural resources, the evaluation of the impacts of the proposed activity on these resources, the identification of alternatives and the management procedures for such cultural resources for each of the documents noted in the Environmental Regulations. A further important aspect to be taken into account of in the EIA Regulations under the NEMA relates to the Specialist Report requirements (Appendix 6 of EIA Regulations 2014, as amended) which apply to Heritage Impact Assessments.

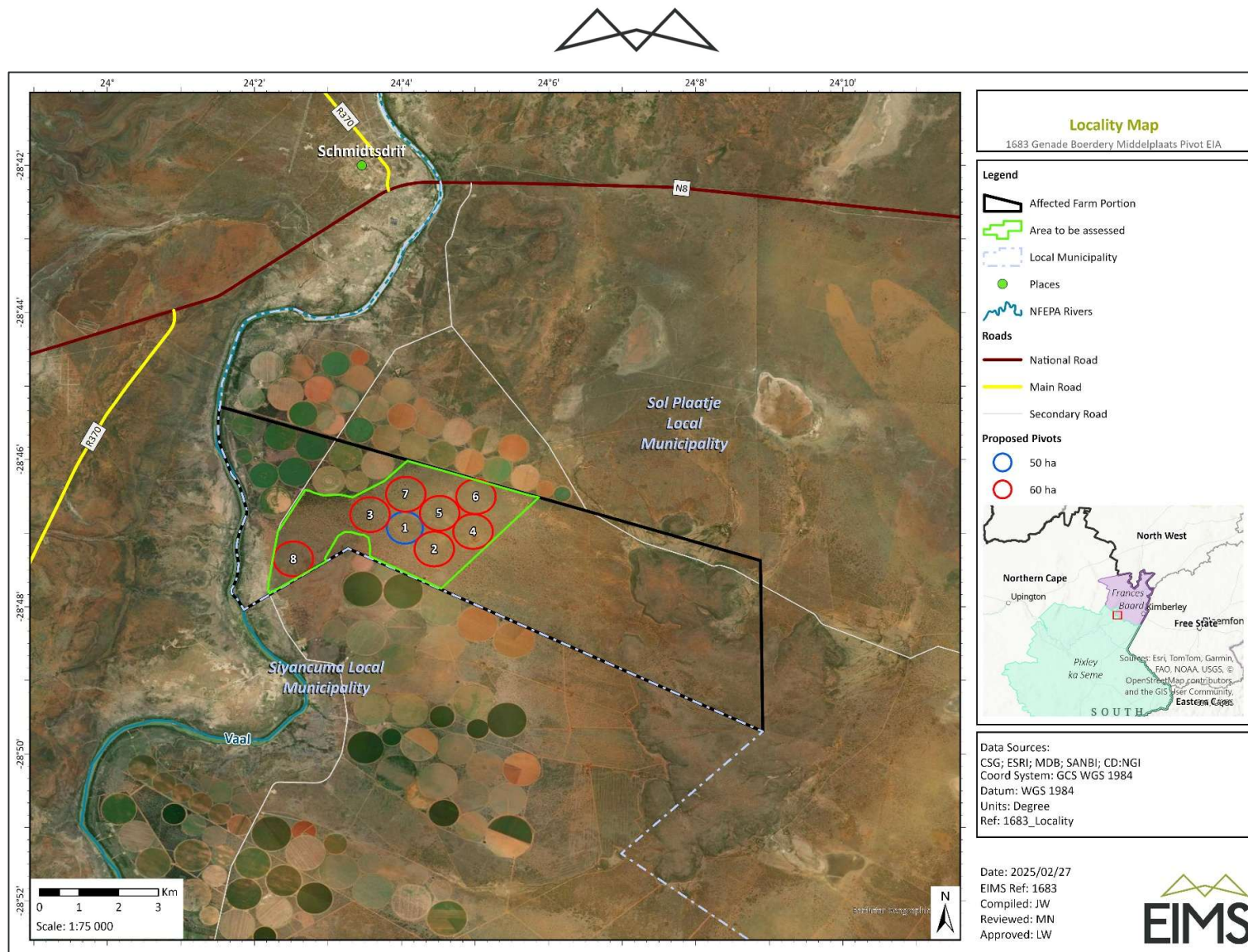


Figure 1: Locality Map



The MPRDA also gives effect to the NHRA as this Act defines ‘environment’ as it is in the NEMA and, therefore, acknowledges cultural resources as part of the environment. Section 39(3)(b) of this Act specifically refers to the evaluation, assessment and identification of impacts on all heritage resources as identified in Section 3(2) of the NHRA that are to be impacted on by activities governed by the MPRDA. Section 40 of the MPRDA requires the consultation with any State Department administering any law that has relevance on such an application through Section 39 of the MPRDA. This implies the evaluation of Heritage Assessment Reports in Environmental Management Plans or Programmes by the relevant heritage authorities.

2 ARCHAEOLOGICAL BACKGROUND

This section presents the archaeological background to the study. A review of literature is presented to contextualise archaeology in South Africa. Available information on databases and collections as well as previous relevant assessments is presented.

2.1 LITERATURE REVIEW

Prior to the implementation of the methodology to be discussed, a comprehensive literature review was conducted to understand the archaeological and historical background of the site. Two main components were considered, that is, (1) the pre-historical linkages (that is relationships between people and the area pre-dating written records) and (2) historical linkages between people and the area in question. A brief overview of South Africa’s Archaeology is necessary to contextualise this report, and this is provided in the sections below.

2.1.1 OVERVIEW OF ARCHAEOLOGY IN SOUTH AFRICA

South Africa’s Archaeology is characterised by pre-historic events for the most part of the record. In this regard, the earliest archaeological evidence is mainly associated with the presence of hunter-gatherers and precolonial pastoralism. It is mainly in the last 2000 years when major social changes take place, including migrations, colonialism, industrialisation, and the establishment of complex societies and associated settlements (Huffman, 1982; Hall, 1993; Huffman, 2004; Mitchell and Whitelaw, 2005; Huffman, 2007). The country is characterised by three main periods, which are each associated with corresponding material evidence. These periods include:

1. The Stone Age (as early as 2.6 Million ya to as late as the last 100 years)
2. The Iron Age (100 AD to as late as the 19th century)
3. Historical Period (last 500 years)

This literature review considers these periods expanding on the context of each in terms of the current development and associated site.

2.1.2 THE STONE AGE

South Africa’s Stone Age stretches as far back as 2.6 Million ya, pre-dating modern humans. South Africa’s Stone Age can be divided into three phases, namely:

- A. Earlier Stone Age (ESA)
- B. Middle Stone Age (MSA)
- C. Later Stone Age (LSA)

A) EARLIER STONE AGE

The ESA represents the oldest material evidence in the archaeological record of South Africa. The phase can be divided according to different stone tool industries which are characterised by differing lithic technologies and assemblages. Specifically, ESA examples identified and studied in South Africa mainly relate to (a) Oldowan and (b) Acheulean stone tool industries (Klein, 2000).

The Oldowan dates as far back as 2.6 Million ya and examples of this industry can be found across Africa (Leakey, 1971; Chazan *et al.*, 2012; Kuman *et al.*, 2018; Stollhofen *et al.*, 2021; Favreau, 2023). The industry includes the earliest examples of key lithics such as hammerstones, manuports, cores, and flakes among other stone tool



types. Figure 2 illustrates some of the different tools of this industry. Oldowan examples can be found across South Africa with some archaeological sites being the origins of some of the key examples of the type of lithics specifically found (Chazan *et al.*, 2012; Kuman *et al.*, 2018). These archaeological sites include Wonderwerk Cave in the Northern Cape and Swartkrans Cave which forms part of the Cradle of Humankind near the Johannesburg area. Both of these sites are National Heritage Sites.

The Acheulean stone tool industry differs from the Oldowan since it includes examples of Large Cutting Tools (LCTs). This includes tools such as handaxes, picks, and cleavers. As highlighted by Li *et al.* (2018), the Acheulean is characterised by the handaxe, which has been extensively studied. Differing from the Oldowan, these LCTs dating as far back as 1.7 Million ya (Kuman and Gibbon, 2018). Once more, the Cradle of Humankind and associated Sterkfontein hominid sites are key locations where some of the best examples of Acheulean stone tools have been found (Kuman and Gibbon, 2018; Li *et al.*, 2018). Figure 2 includes examples of the Acheulean LCTs (labelled v-z).

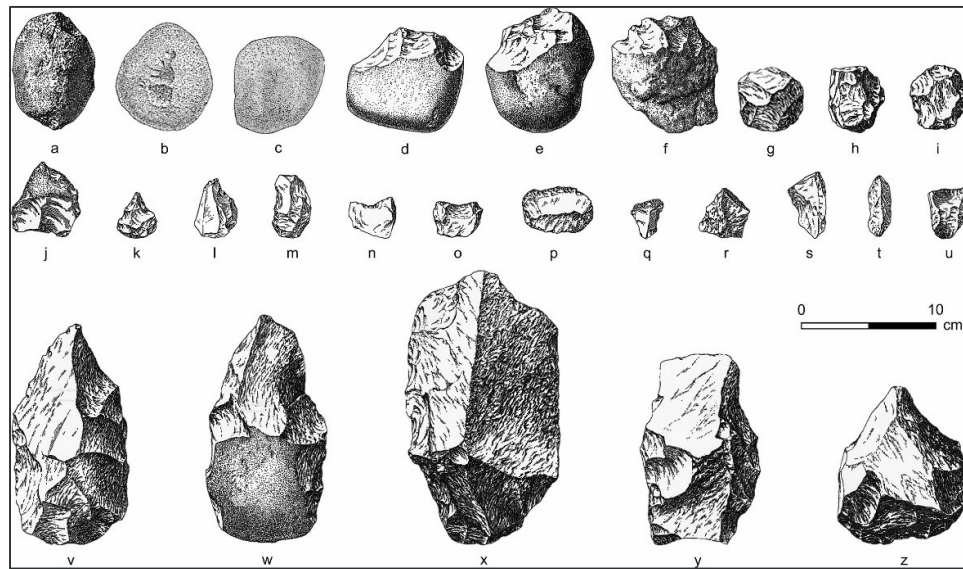


Figure 2: Examples of ESA lithics. Typical Oldowan tools (a-f). Acheulean LCTs (v-z) (after Kuman and Gibbon, 2018).

More specifically related to the site in question, it is worth providing an overview of the Fauresmith industry and its link to the Northern Cape. Defined by technological developments differing from the Acheulean industry, blades, points, and Levallois-like cores are associated with the Fauresmith. It has been argued that the Fauresmith should be viewed as a precursor anticipating the MSA (Beaumont and Morris, 1990). Two sites are associated with the Fauresmith industry, that is, the Kathu Townlands, and Canteen Kopje. Canteen Kopje, in particular, is a renowned archaeological site in the Northern Cape, known for its extensive Earlier Stone Age sequence, which spans over 1.7 million years. The site has yielded a rich assemblage of Fauresmith tools, providing valuable insights into the technological practices and behavioural diversification of early hominins. Canteen Kopje's significance is further highlighted by its continuous occupation through various Stone Age periods and its role in understanding human evolution and toolmaking.

B) MIDDLE STONE AGE

Following the ESA, a phase related to very specific industries and stone tool examples chronologically occurs. The MSA represents one of the most interesting prehistoric periods of, not only South Africa's archaeological record, but of global significance. The MSA brought with it new material evidence which suggests changes in lifestyle and complexity being inspired by environmental changes (Wadley, 2015). Dating between 280 000 and 30 000 ya, the MSA is characterised by a material culture that includes lithic technology, as well as an emerging material culture including artefacts such as shell beads (Villa *et al.*, 2009; Henshilwood, 2012). While MSA sites



occur across South Africa, key sites include Blombos Cave, Sibudu Cave, and Klasies River. Figure 3 offers an illustrative overview of the material associated with the MSA.

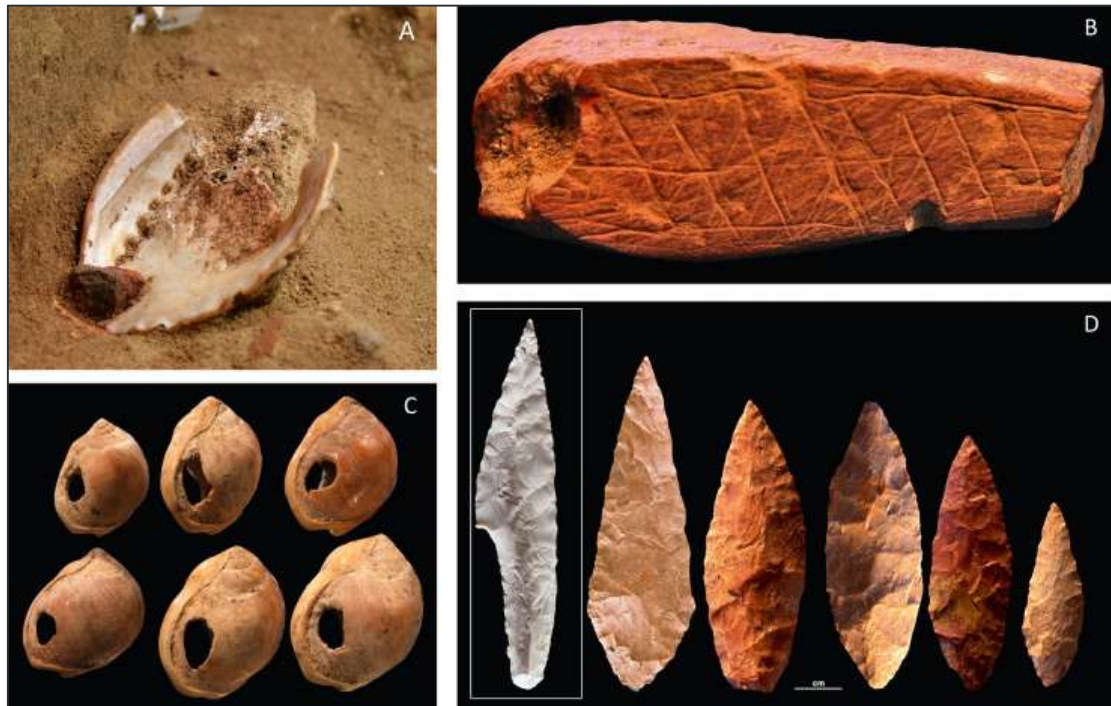


Figure 3: Examples of MSA material evidence or artefacts after Wadley (2015). Abalone (*Haliotis midae*) shell with traces of an ochre-rich liquid (A); engraved ochre slab (B); perforated shells (C); Still Bay points (D). (after Henshilwood, 2012)

In terms of Stone tool technology, flake-based lithics are characteristic of the MSA (Jacobs *et al.*, 2008). In this regard, stone tool industries of the MSA include examples of worked stone flakes knapped off cores. Notable MSA examples include Still Bay and Howieson's Poort tools. Both Still Bay and Howieson's Poort lithics include examples of pointed tools, with the idea that such would have represented the earliest examples of hafted tools in South Africa (Jacobs *et al.*, 2008; Villa *et al.*, 2009; Henshilwood, 2012; Wadley, 2015). Still Bay technology (as seen in Figure 3), for example, includes examples of bifacial sharpened points which differ from past technologies such as the Acheulean (Henshilwood, 2012). Other examples of hafted stone tools are also associated with this phase, particularly those found at Klasies River (Wurz, 2002; Morrissey, Mentzer and Wurz, 2022).

C) LATER STONE AGE

The LSA represents a phase in the Stone Age which includes the widest record of material evidence. Dating between 43 000 ya and as late as the last 100 years, the LSA is associated with a period in South Africa's prehistory and history during which modern human ways of life, particularly hunter-gatherer activity is observed. Since South Africa was mainly occupied by hunter-gathering groups for the most of this period, LSA material culture has been studied in this regard. In other words, LSA material culture and artefacts have been associated with the lives of the San, for example (Mitchell, 2012; Villa *et al.*, 2012; Mesfin, 2024).

Key archaeological finds associated with the LSA are, firstly, a broad array of lithics. All LSA lithics include features of advanced shaping and working, otherwise referred to as retouch. Key tools include blades, bladelets and scrapers as pictured in Figure 4. Other tools include segments and adzes which are specific to the LSA. As previously stated, the LSA includes a large array of material evidence such as ostrich eggshell beads, bone tools, digging sticks, as well as other material which are also associated with Iron Age archaeology (Figure 5).

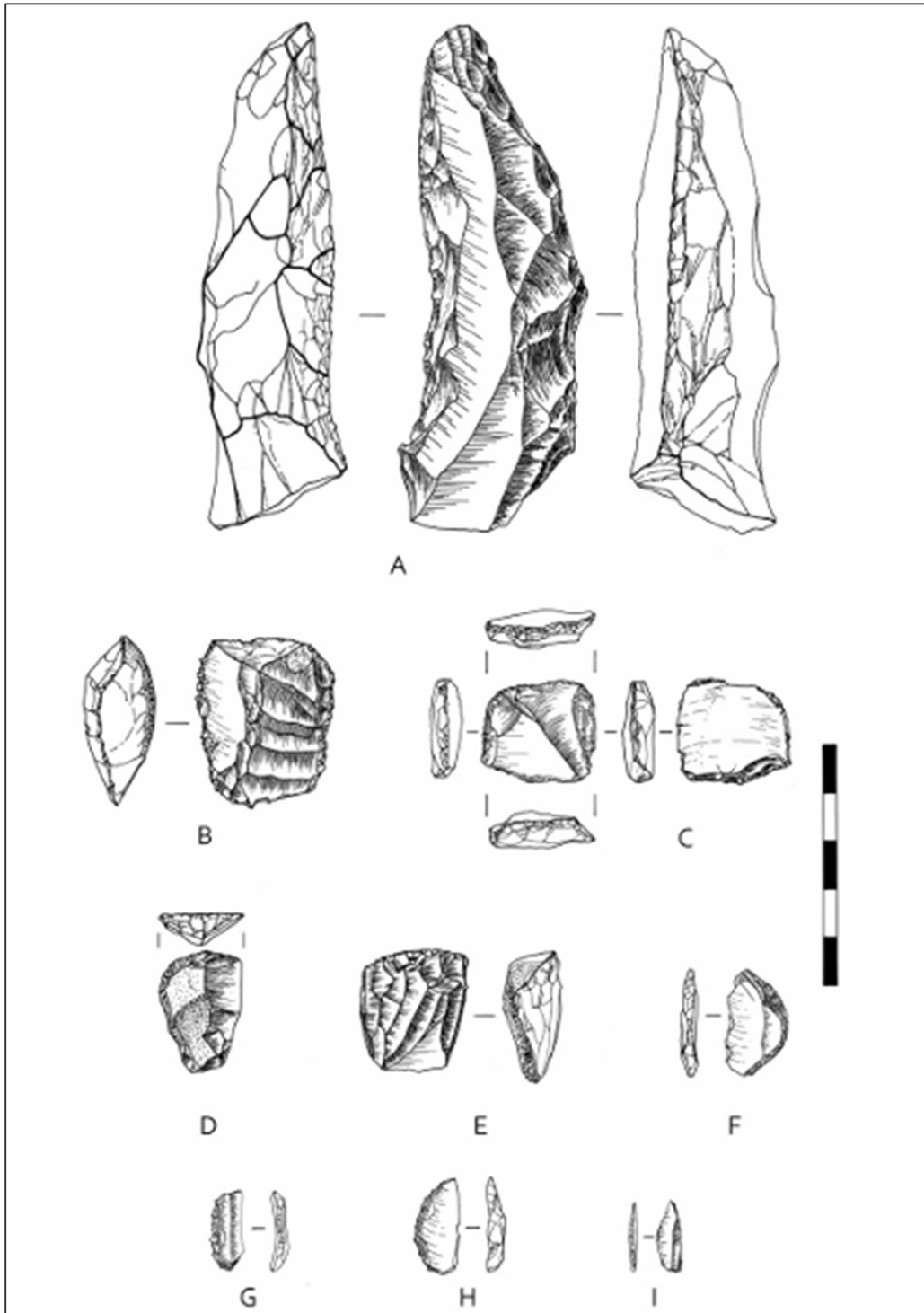


Figure 4: Examples of an adze (A), scrapers (B-D, G), backed bladelets (I), bladelet cores (e), and segments (F, H). Typical pieces associated with the LSA (after Forssman *et al.*, (2010))

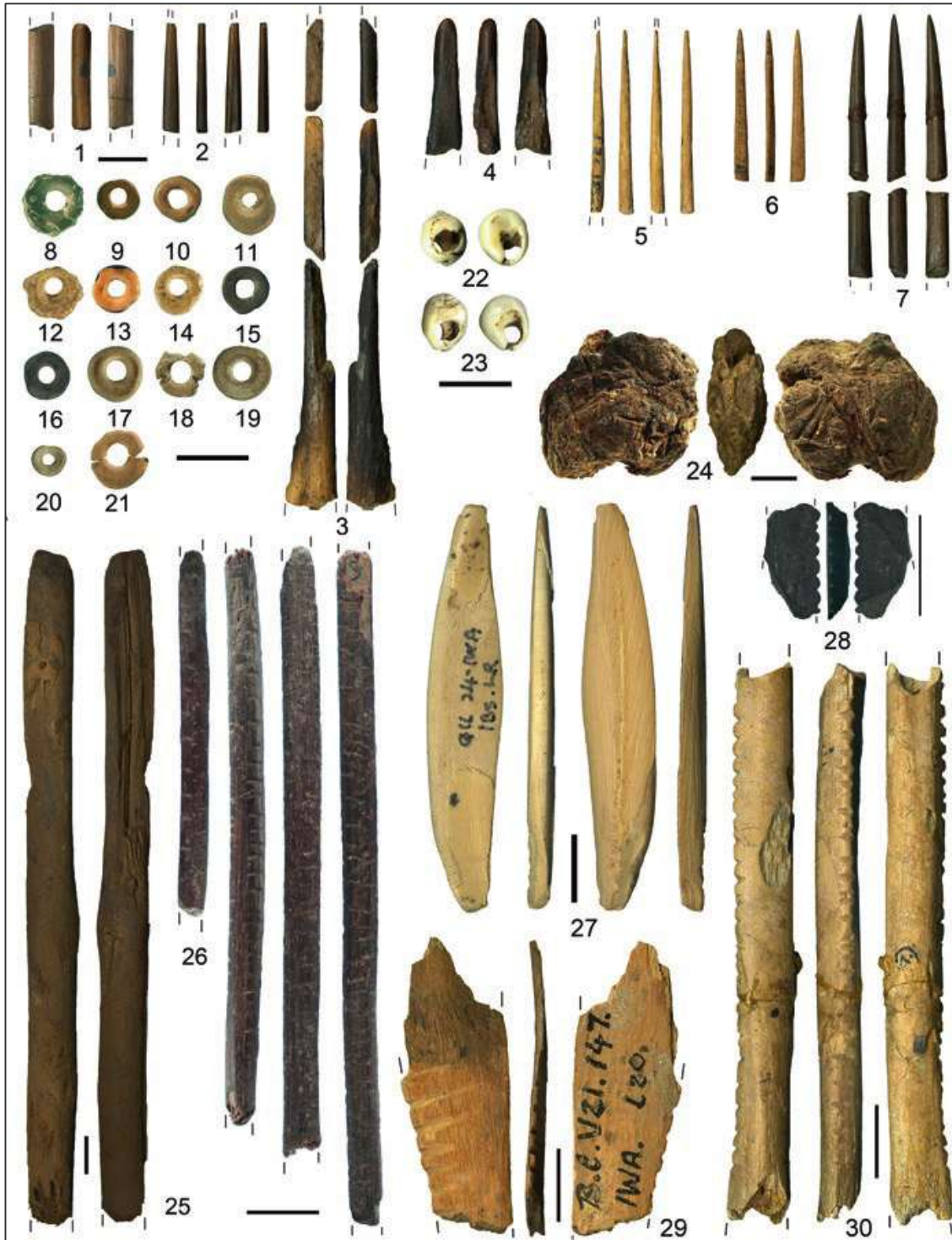


Figure 5: Some examples of LSA organic material remains from Border Cave. Bone awls and points (1-7), Ostrich Eggshell beads (8-21), tick shell beads (22-23), bound organic material (24), digging stick (25), poison applicator (26), implement made from warthog or bushpig lower canine (27), and notched bone tools (28-30)(after Backwell *et al.* (2023) and d'Errico *et al.* (2012))



2.1.3 THE IRON AGE

South Africa's archaeological record diversifies as interactions, migrations, and major changes take place over the last 2000 years. While hunter-gatherers continue to occupy most of the southern African landscape, the area becomes a melting pot with pastoralists gradually moving in from the North, and changes in hunter-gather lifestyles take effect. Bantu pastoralists bring with them iron working, together with key associated markers of pastoralist lifestyles. Unlike hunter-gatherer lifestyles in South Africa which are generally nomadic, and without distinct settlement patterns, pastoralists transform the landscape, introducing structures and complex societies. Altogether, the Iron Age is characterised by materials that signify the depth of change that takes place across southern Africa over the last 2000 years.

The Iron Age can be divided into three phases:

- A. Early Iron Age
- B. Middle Iron Age
- C. Late Iron Age

A) EARLY IRON AGE

Coinciding with the LSA, the Early Iron Age is characterised by the arrival of Bantu-speaking pastoralists, as well as Khoe herders. Dating between 200 and 1000 AD (200 to 900 AD according to Huffman (2007)), the Early Iron Age represents a period which transforms the southern African landscape with more people coming into the area, more interaction taking place, and the earliest examples of complex societies developing. The Early Iron Age and associated material evidence represent the first signs of migration and exchanges between hunter-gatherers, sheep herders, and pastoralists.

As summarised by Huffman (2007), during this period, the first occurrences of material culture related to groups originating from central to northern Africa can be observed. Huffman (2007) relates this occurrence to the spread and diffusion of Bantu languages across most of southern Africa. Above all, Huffman (2007) argues for the relationship between the spread of language to the spread of material culture and tradition observable through the stylistics of pottery and ceramic tradition.

Key ceramic types relate to the broader Kalundu and Urewe traditions, that is, the two main traditions associated with the Eastern and Western streams of migration supported by migration theories (Figure 6). Associated ceramic styles include Silver Leaves, Happy Rest, and Lydenberg, all related to similarly named sites. Another key ceramic tradition that occurs during this period is Bambata pottery which is indicative of hunter-gatherer and pastoralist interaction. Figure 7 provides an illustration of some examples of Bambata potsherds.

B) MIDDLE IRON AGE

The Middle Iron Age sees the rise of complex societies relating to interaction events, particularly those around the Shashe-Limpopo confluence area. As iconic markers in South Africa's Archaeological record, sites such as K2 and Mapungubwe represent examples of the Middle Iron Age which has been associated with dates between 1000 and 1300 AD. Several studies have considered the dynamics of the ways of life associated with the Shashe-Limpopo confluence area and its complex societies (Calabrese, 2000; Huffman, 2000; Meyer, 2000; Huffman, 2009). While this period marks more interaction between hunter-gatherers and farmers, its material culture becomes very specific.

In terms of ceramic tradition, Huffman (2009) suggests a development of ceramic styles throughout the Middle Iron Age (Figure 8). Huffman (2009) suggests that the phase is indicative of developing complex societies. Altogether, the Middle Iron Age is a period in South Africa's archaeological record that is indicative of some of the earliest examples of trade and interaction as well as the inception of complex societies in the country. This phase also sees the first occurrences of the use of gold and golden implements (Figure 9).

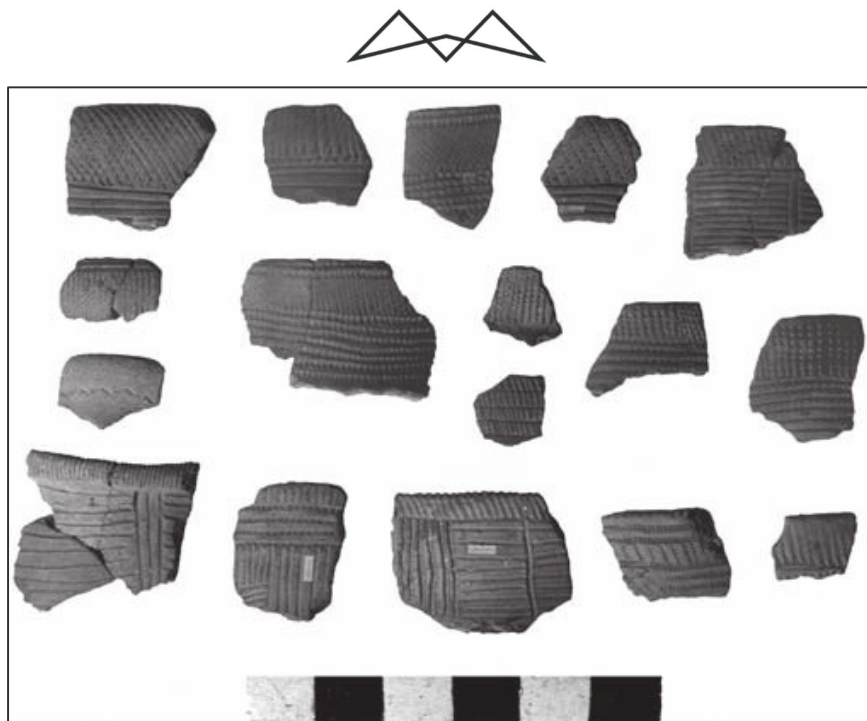


Figure 7: Examples of Bambata Potsherds (Huffman, 2005).

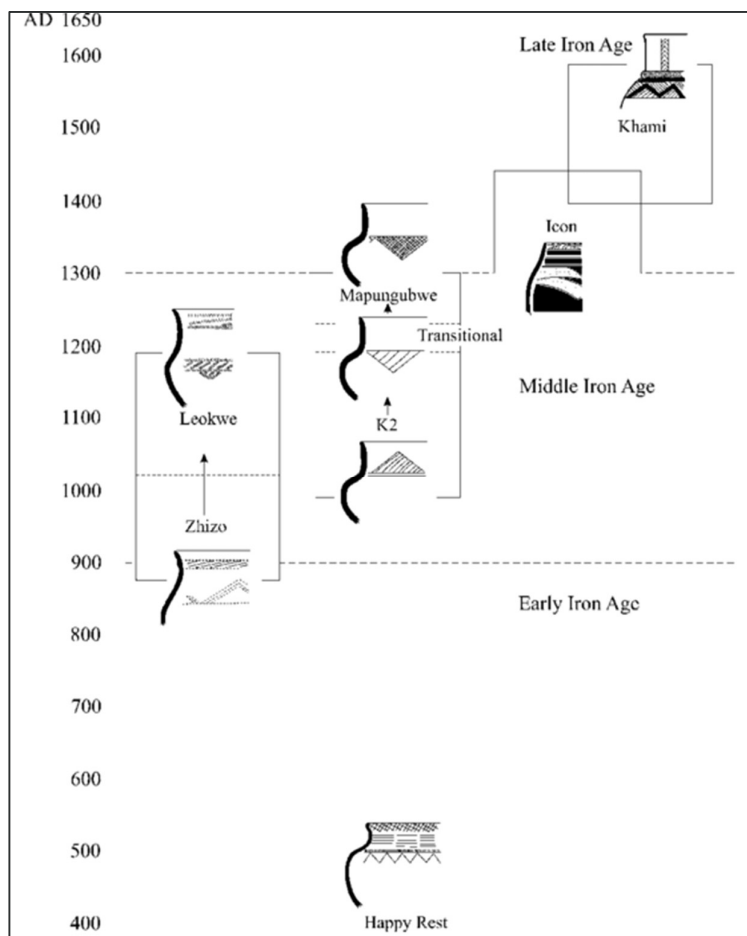


Figure 8: An Iron Age ceramic sequence demonstrating transitions between K2 and Mapungubwe ceramic styles (Huffman, 2009).

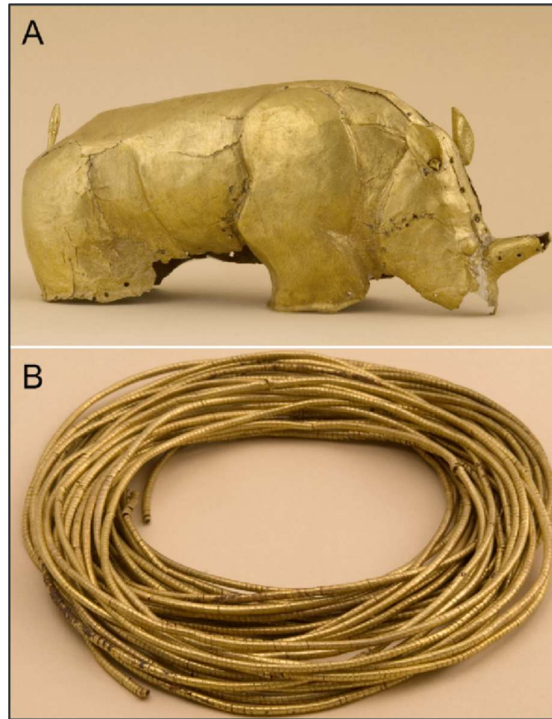


Figure 9: Famous golden implements of Mapungubwe (A - Golden Rhinoceros, B - Golden anklets) (Woodborne *et al.*, 2009).

Sadr and Rodier (2012) provide one of the most direct classifications of stone wall structures, drawing from previous understandings (Maggs, 1976; Huffman, 2007). Grouping stone wall structures into three groups (I, II and III), Sadr and Rodier (2012) argue for differences between stone wall structures. Group I stone wall structures are considered the earliest of the structures chronologically. These have also been classified as Type N structures, mainly being described as consisting of several cattle kraals in the centre linked by other walls (Maggs, 1976) (Figure 10). These structures have been noted in areas such as Klipriviersberg, south of Johannesburg, which has been related to early agropastoral activities in the area (James, 2018) (Figure 11).

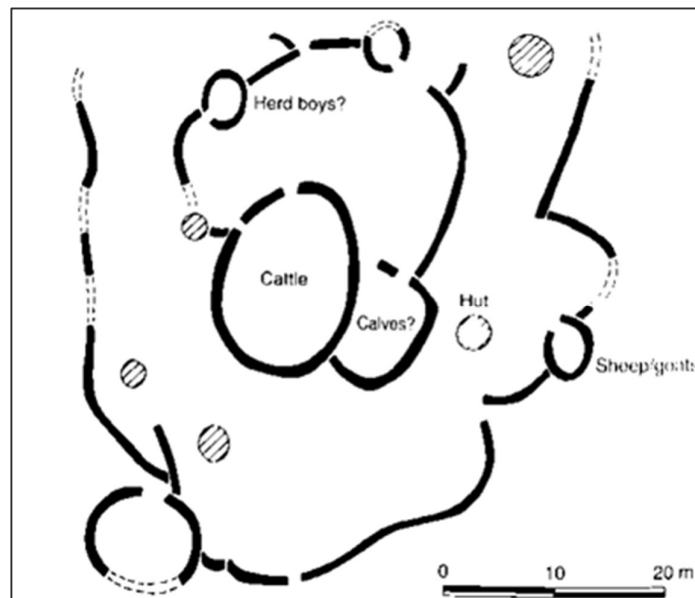


Figure 10: Type N stone wall structures as illustrated by Maggs (1976).



Figure 11: An on-site photograph of a Group I or Type N stone wall structure at Klipriviersberg Nature Reserve (James, 2018).

Representing later events of occupation during the Later Iron Age, Group II and III stone wall structures consist of more complex layouts and clustering. Group II and III structures include structures that make up the Bokoni (Mpumalanga) (Figure 12) and Kweneng (Suikerbosrand Nature Reserve, Gauteng) complexes (Figure 13).



Figure 12: An aerial photograph of stone wall structures part of the Bokoni complex, Mpumalanga (after Delius *et al.* (2012)).

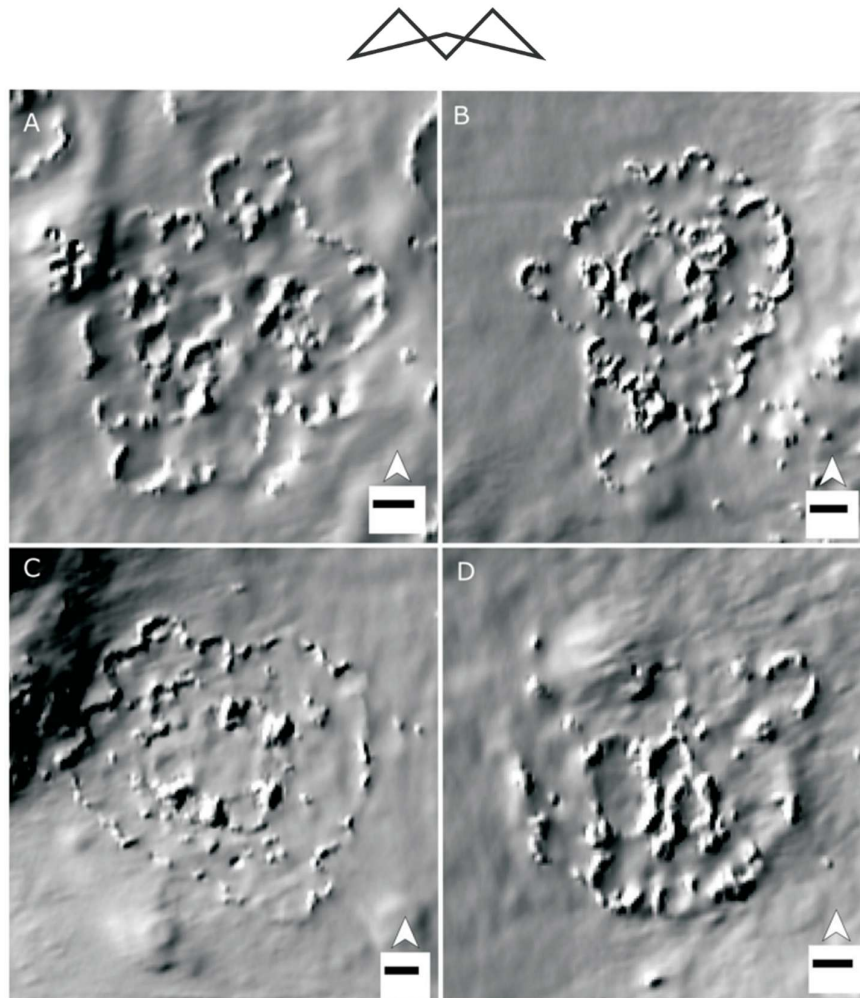


Figure 13: LiDAR imagery of Molokwane stone wall structures of Kweneng, a lost city discovered at Suikerbosrand Nature Reserve (after Sadr and Mshuqwana (2020)).

Different material culture is associated with the Late Iron Age including burials, ceramic remains, as well as LSA tools which continued to be used by different groups. The Late Iron Age and the groups associated coincide with the Historical Period of South Africa, which involved events including colonialism, industrialisation, various conflicts and social movements, ultimately leading to the development of the state as at present.

Considering the broader distribution of stone wall structures across South Africa, Type Z structures are more common around the Northern Cape area. Type Z structures are described by Huffman (2007) as similar to Molokwane, with a “loose circle of individual bilobial households surrounding the core”. Figure 14 provides an overview of the distribution of stone wall structures across the northeastern region of South Africa. Note that Type Z walling is documented by Huffman as spread towards the southwest. This distribution spreads further west.

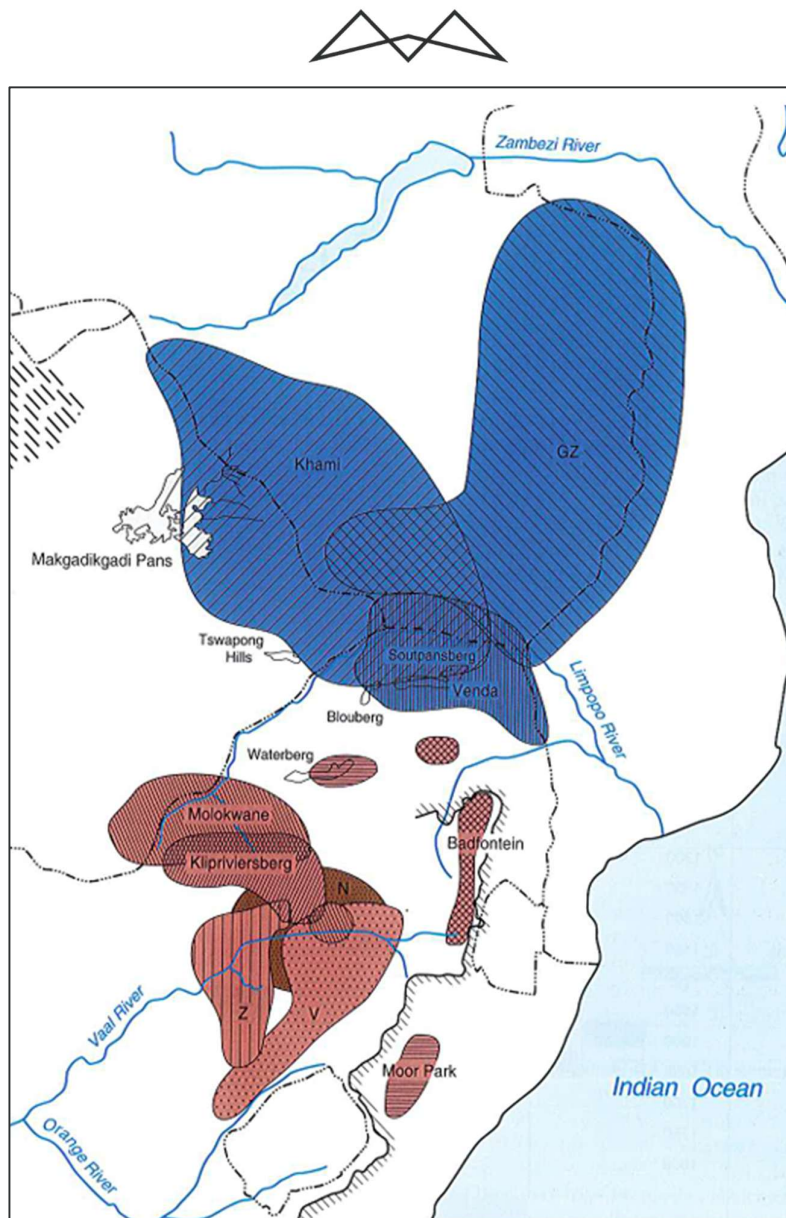


Figure 14: Distribution of the different types of stone wall structures across the northeastern region of South Africa (after Huffman, 2007)

2.1.4 HISTORICAL PERIOD

A) PORTUGUESE MARINERS AND SHIPWRECKS

Marking the documented history of South Africa, the Historical Period starts when the first European settlers arrive. Thompson (2001) provides an overview of the historical events in South Africa which have contributed to the archaeological record and overall heritage profile of the country.

The country's first encounter with Europeans is allocated to the first Portuguese expeditions which rounded the Cape of Good Hope in the sixteenth century. During their expeditions, several ships were wrecked given the harsh conditions the small vessels had to endure (Thompson, 2001; Gribble, 2002; Werz, 2010). Gribble (2002) provides a brief overview of the extent of shipwrecks off the South African coast, stating that over 3000 shipwrecks have been recorded. Shipwrecks represent the first signs of historical European interactions with South Africa.



B) THE CAPE COLONY

While Vasco de Gama and Bartolomeu Dias represent two of the first Portuguese mariners to round or interact with the South African coast, the country's history is transformed with the formation of the Dutch Cape Colony. The Dutch East India Company, establishing a port of call at Table Bay through the arrival of Jan van Riebeeck, intended for Cape Town to become a base for the rapidly growing enterprise. In the mid-1600s, the company encouraged some individuals to participate in farming and food production, in the hopes of solidifying and establishing the Cape Colony (Thompson, 2001). The Cape Colony developed into a melting pot of different people due to the expansion of the colony through slave trade, and arrival of other European groups. In terms of archaeology, research of some of the early homesteads of the Cape Colony such as Vergelegen provide more understanding of the extent of interaction between different groups from as far as East Asia, to Brazil (Markell *et al.*, 1995) (Figure 15).

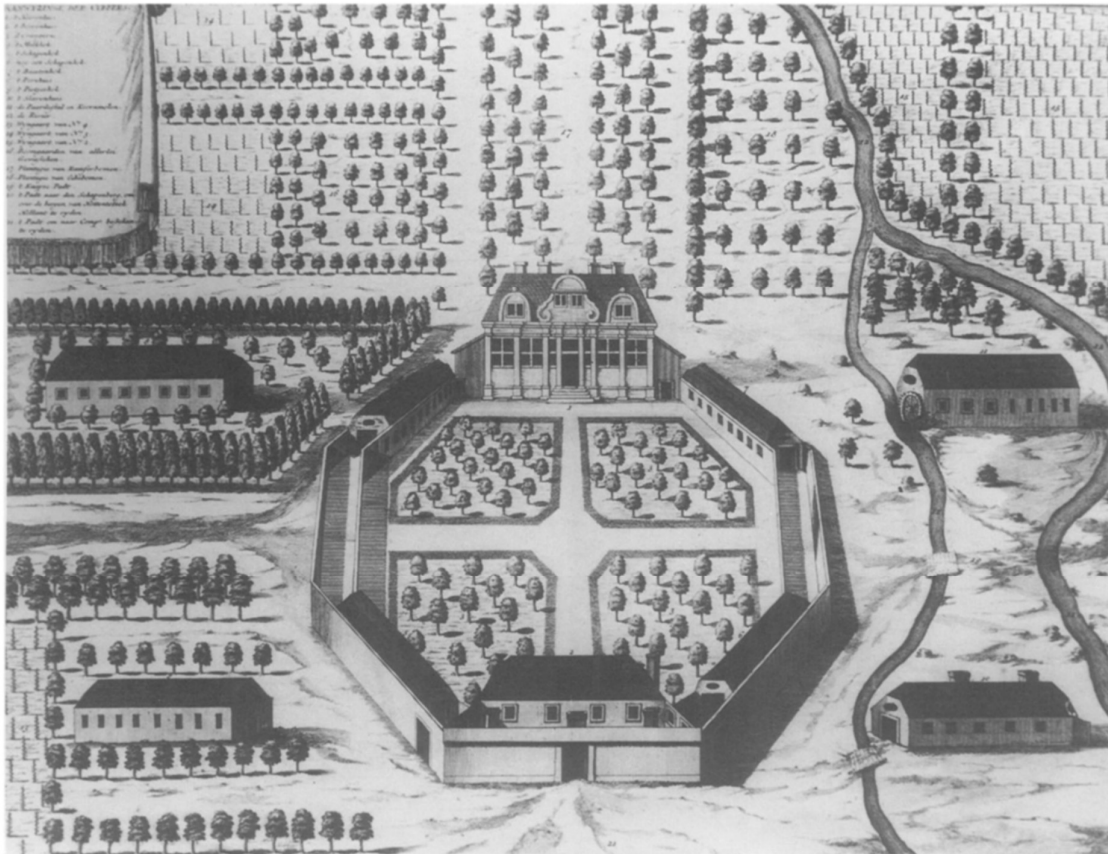


Figure 15: A 1700s drawing of Vergelegen, a Cape Colony homestead including multiple buildings including slave lodges. (after Markell *et al.* 1995).

It was through these first extensive events of interaction that essentially led to the formation of the Afrikaans language, and Afrikaner culture. In short, through extensive interaction and influence, Afrikaans was formed, with the first written scripts of the language curiously having been written in Arabic script (Figure 16).

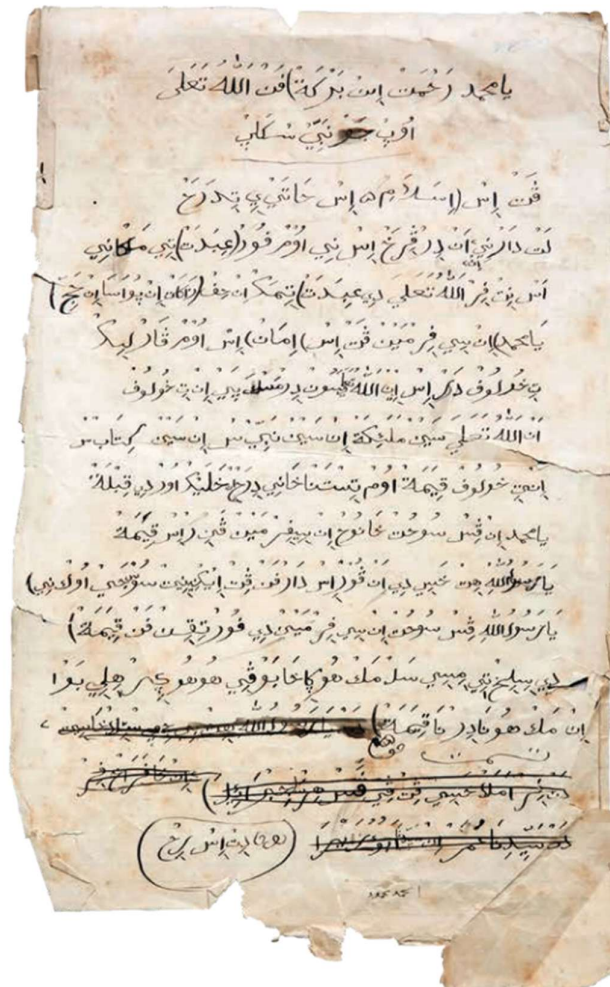


Figure 16: An Arabic script representing the first written texts of the Afrikaans language (late 19th Century)
(after Davids (2018))

In the context of the Northern Cape, the Cape Colony's influence is argued by Penn (2005) to have taken a different form characterised by shifting frontiers between the colony and original inhabitants of the region. Interaction between the group, documented through records which were often forgotten to the historical narrative of South Africa. As the Cape Colony advanced towards the Orange River, conflicts ensued between trekboers and the Khoisan hunters and herders. This led to either, the detriment of Khoisan groups, or the absorption of these groups into the colony itself. This further demonstrates the extensive nature of interaction and resulting influence of the Cape Colony on South Africa.

C) DEVELOPMENT OF THE SOUTH AFRICAN MINING INDUSTRY

It was in the late 1800s that South Africa's economic development reached a point of rapid acceleration. While the coast was represented by a richly diverse Cape Colony, the central landmass of the country had been heavily invested in for the exploitation of mineral resources following key discoveries. Diamonds and gold were of particular interest. It was only later when platinum was discovered as part of the Bushveld Complex to the north of the country, which further inspired investment in mining and mining infrastructure (Cawthorn, 2010). Given the complex nature of the deep gold reefs of key locations such as Johannesburg, investments of substantial time and money were necessary, ultimately leading to the establishment of merged and expansive mining companies (Durand, 2012; Harrison and Zack, 2012). This fact led to the development of key settlements which have since developed into modern cities such as Kimberley and Johannesburg (Figure 17).



As South Africa's influence in the world economy grew, so did colonial interest. This essentially initiated the first colonial and civil conflicts recorded in the modern history of the country. Essentially, these conflicts involved the British Empire's efforts towards colonising the country, being opposed by Afrikaans Boers and associated powers.



Figure 17: A photograph of Johannesburg from the 1890s (after Chirisa and Matamanda (2019))

The deeper consequence of the mining industry's development was experienced not only at a national level, but also localised. Some historians (Turrell, 1987; Worger, 1987) have contemplated the social impact of South Africa's diamond mining industry. As Kimberley represents the origins of South Africa's early diamond mining industry, the location was characterised by different social phenomena including immigration, industrialisation, and establishment of labour forces. Further, the initial labour conditions of the diamond mining industry had effects on local populations, which can ultimately be argued to have shaped the development of the industry.

D) CONFLICTS OF SOUTH AFRICA

As the country continued to economically expand, several conflicts arose prior to the intense colonial imposition the country was about to face. In the early 1800s, conflict had arisen among Nguni groups, essentially being driven by environmental pressures as well as the injection of trade activities. Shaka Zulu becomes a key figure in what has come to be known as the Mfecane, or the period of "the crushing". The period is marked by the conquests and rise of the Zulu kingdom which essentially had a bearing on the lifestyle and organisation of groups across the country. Given that this conflict had taken place during a period when South Africa was being extensively documented, the events of the Mfecane have formed part of historical records.

Similarly, conflicts west of the Drakensberg including groups such as the Sesotho, Pedi, and Tswana, become more relevant to the interior parts of the country. The conflicts and period in question are referred to as the Difaane. Although the word is often used synonymously with Mfecane, the two words describe different events and repercussions thereof.



Near the turn of the 20th century, conflict between colonial powers took form. One of the most notable of these conflicts was the Anglo-Boer War, or the South African War. Between 1899 and 1902, this war was largely supported by the British Empire's push towards controlling the country and its many smaller colonies. As Thompson (2001) highlights, the war essentially ended in the favour of the British. The influence of the British had since transformed the South African landscape with much of its cultural and colonial history being founded on the Empire's rule. It is important to note this conflict as it presents opportunity in terms of archaeological and cultural heritage resources.

Locations such as Mafikeng (now Mahikeng) have become key in recounts of the South Africa War. The war also led to the movement of people, which has been recorded, for example, Springfontein, which saw the formation of a war refugee camp (Figure 18). As many battle sites have been recorded, key archaeological finds related to these events can still be found. These resources, and in some cases, monuments, tell the story of South Africa's early struggles of colonialism and the origins of racial laws and regulations.

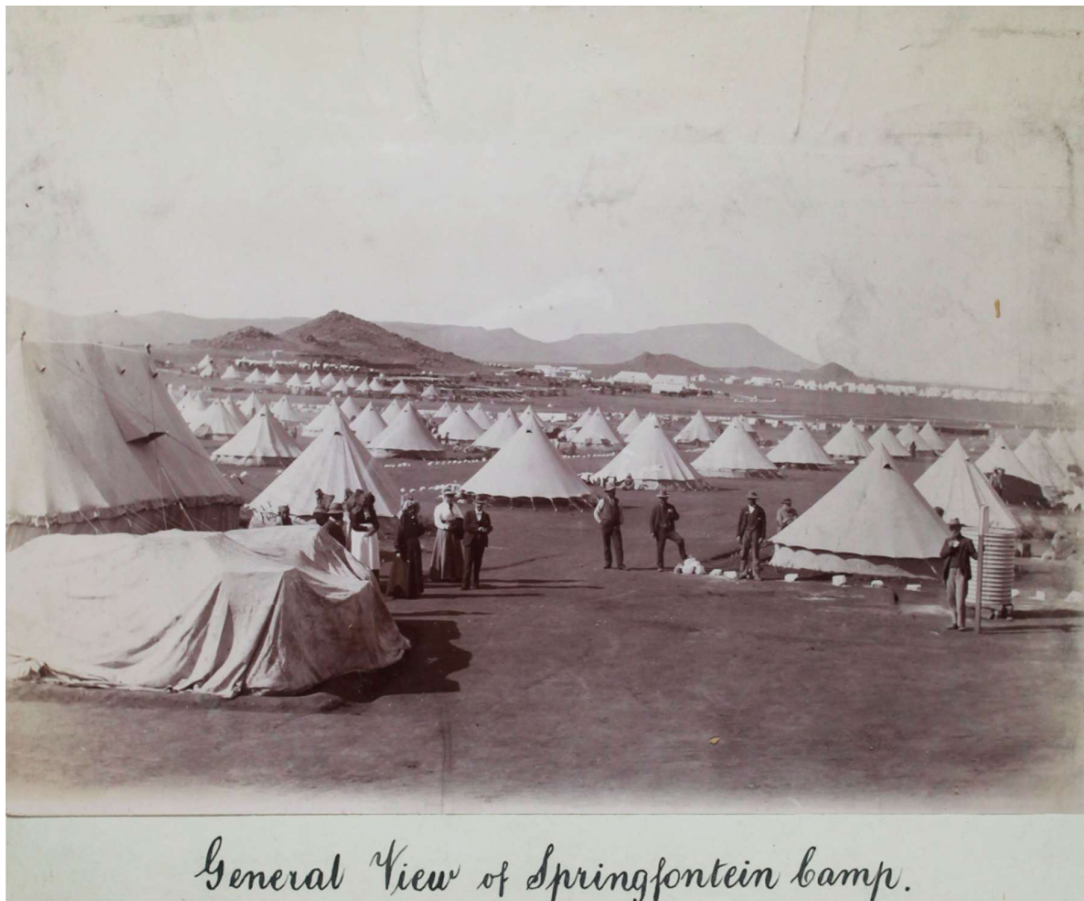


Figure 18: A picture of Springfontein, a refugee war camp which was established as a repercussion of the war's influence (after British National Archives).

While to the north, Mahikeng was a key focus of the South African War, to the South, Kimberley was in the interest of besiegers given its economic importance in South Africa. The Siege of Kimberley is the most notable event having had repercussions on the development and heritage of colonial Northern Cape. While the siege lasted a few months from late 1899 to early 1900, several developments ensued during the war and its aftermath including the establishment of black concentration camps (Benneyworth, 2024). These are argued to contrast with camps such as Springfontein, demonstrating the impact the war had on different groups and their lives. Further, such arguments demonstrate the diverse nature of the social fabric of South Africa, and how it became a means of division as the country developed.



E) APARTHEID AND CONTEMPORARY HISTORY

It was after the Anglo-Boer War that the initial motions towards racial segregation through law and regulation came to be. The establishment and expansion of mining towns led to the marginalisation of different racial groups. By the mid-20th century, the Apartheid regime had been put in place, controlling the movement and settlement of people. For one, new documentation was required for many racially marginalised people to move into areas that were otherwise restricted. Such laws inspired revolutionary responses (Figure 19), ultimately leading to the struggle against apartheid, which has characterised the 20th century of South Africa (Thompson, 2001).

After being abolished in 1994, the legacy of Apartheid has been argued to have had a lasting effect on society. This has been argued beyond the context of history, being observed in social dynamics, contemporary infrastructure, as well as urban growth and development. Leading to contemporary history and modern approaches to development, Apartheid is seen as the most recent event having shaped and formed South Africa as we know it today. Several key figures are associated with the city of Kimberley, including Sol Plaatje and Robert Sobukwe.

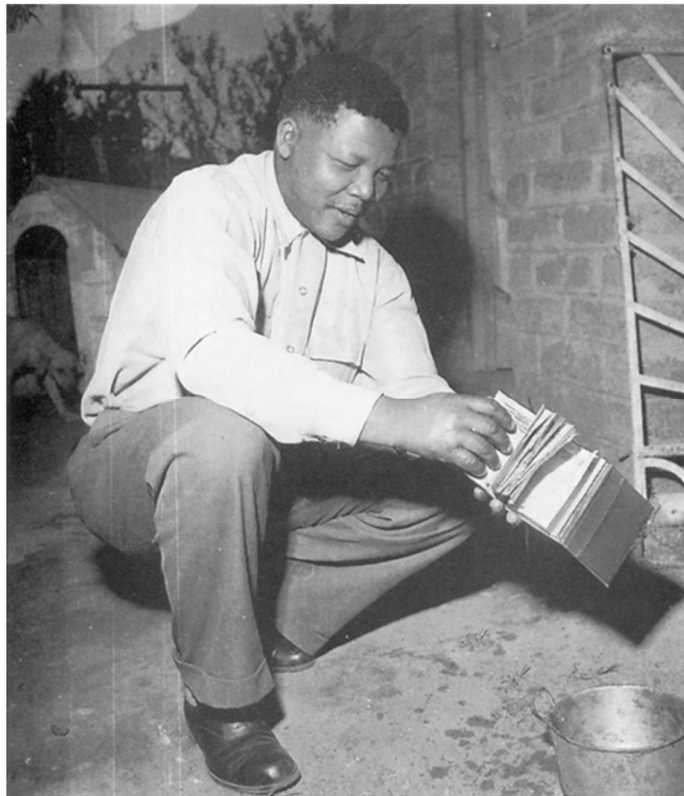


Figure 19: Nelson Mandela burning his pass in 1959. A pass was a requirement for people to move across the country. Such documents have now become items representing the Apartheid regime (Thompson, 2001).

2.2 SITE-SPECIFIC BACKGROUND

The Northern Cape is associated with a long archaeological record that spans across pre-colonial and colonial periods. Most notable is the region's significant role in terms of Hunter-gatherer activity. The closest town to the site in question is Kimberley, which itself embodies rich heritage in relation to the colonial history and modern economic development of South Africa.

2.2.1 EARLY HOMININ SUBSISTENCE BEHAVIOR AND LATER HUNTER-GATHERER ACTIVITY

Stone Age artefacts or finds and sites form a key component of the archaeological record of the Northern Cape. This is related to the extensive hunter-gatherer activity in the area. The Northern Cape Stone Age is defined by



its lithic collection which includes examples of ESA, MSA, and LSA. Key examples of the lithic finds associated with the Northern Cape can be observed at Wonderwerk Cave and Canteen Kopje as previously discussed, and around the Kathu Townlands (Walker *et al.*, 2014). Figure 20 and Figure 21 includes some examples of the lithic finds one can expect associated with early hominin sites in the Northern Cape. The significance of sites such as Kathu and Canteen Kopje have been argued to represent a turning point in stone tool technology from the Acheulean to the Fauresmith, essentially anticipating the MSA (Beaumont and Morris, 1990).

Other finds include the occurrence of graves and human remains as well as rock engravings or petroglyphs. Rock engravings have been observed in areas around the Northern Cape and have been attached to hunter-gatherer activity. Driekopseiland near Kimberley is a key example site including stone engravings in the Northern Cape (Beaumont and Morris, 1990). This site has been extensively studied and interpreted in relation to hunter-gatherer traditions and belief systems (van Riet Lowe, 1952; Deacon, 1997; Morris, 2016, 2022). Further, the petroglyphs observed in the Northern Cape (Figure 22) are but some examples of similar rock art found across the country.

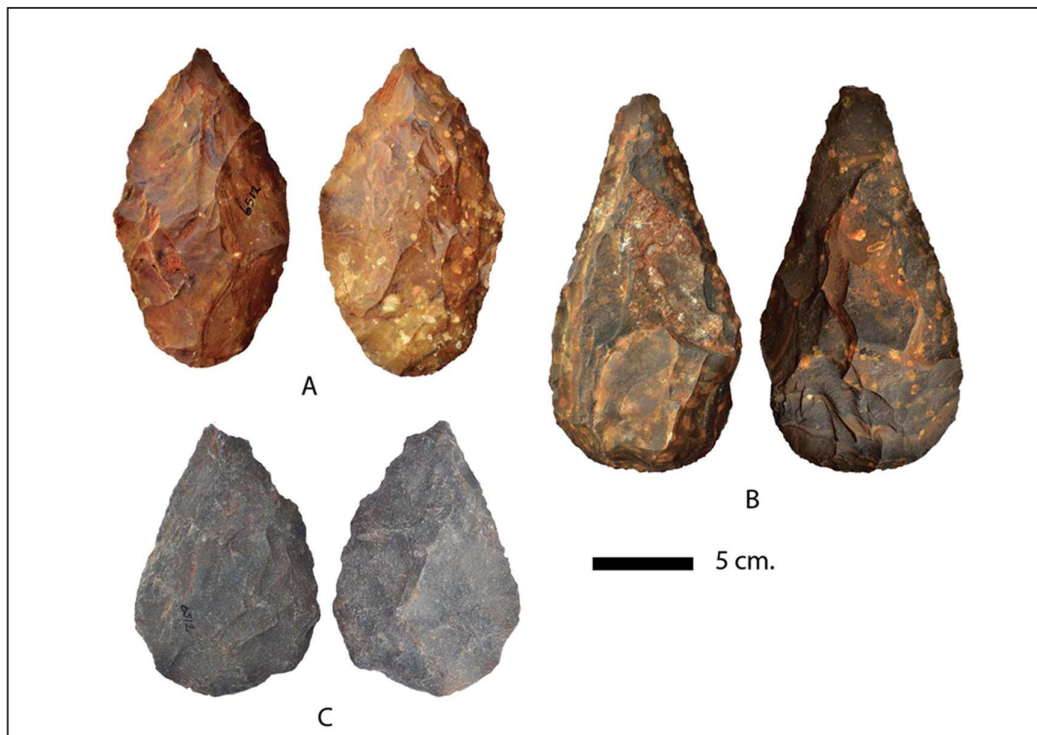


Figure 20: Some key examples of handaxes found near the Kathu Townlands. The examples are banded ironstone (A and B), and Quartzite (C) (After Walker *et al.*, 2014).

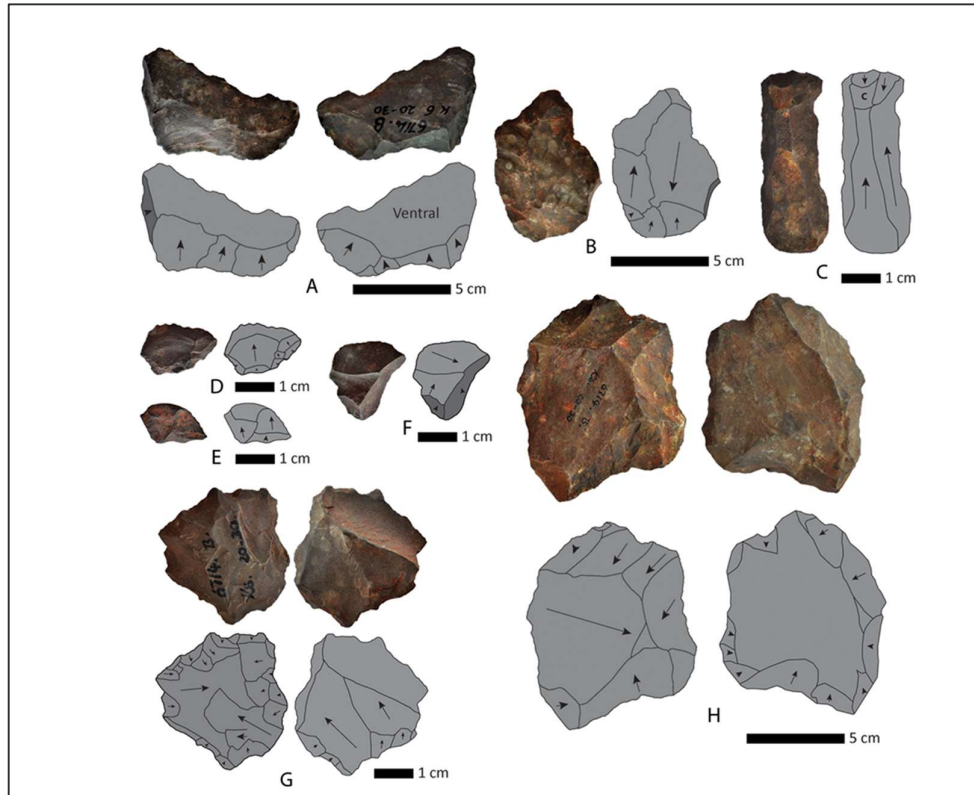


Figure 21: Examples of small flakes and cores. (A) Large flake off of the edge of the core consistent with biface shaping removal, (B) Large flake with dorsal scars (C) Blade (D–F) Small flakes (G–H) Discoidal cores (After Walker *et al.*, 2014).



Figure 22: A photograph taken of engraved motifs forming part of the petroglyphs identified at Driekopseiland near Kimberley, Northern Cape (After Morris, 2022)



2.2.2 CULTURAL HISTORY OF KIMBERLEY

The closest town or city to the site of interest is Kimberley. Kimberley has a rich cultural history being one of the main early mining towns of South Africa. The city was founded following the discovery of diamonds between the late 1860s and early 1870s. Kimberley was originally a mining camp called “New Rush” which was later then incorporated into the Cape Colony. Later in its history, Kimberley became a key player in the South African War given its economic standpoint in the country.

Kimberley has become a tourist destination founded on its cultural heritage value. Several monuments and points of interest can be found in the city, which include statues of colonial figures such as Cecil Rhodes. An iconic monument is Kimberley’s Big Hole. The Big Hole is considered the world’s largest hand-excavated open-pit diamond mine.

2.3 DATABASES AND COLLECTIONS

A key source of information and material on the finds and sites of the Northern Cape is housed by the McGregor Museum in Kimberley. The museum hosts both pre-colonial and colonial archaeological collections. Further, the museum also hosts geological and palaeontological collections. Specifically, the museum houses key examples of lithic artefacts, as well as examples of fossils found in the Northern Cape.

2.4 PREVIOUS RELEVANT IMPACT ASSESSMENTS

In the context of the current assessment, a background examination of previous historical finds and associations was conducted. Considering available information through the SAHRIS database and previous Archaeological assessments of the area, the following key reports on finds have come to light:

Phase 1 Archaeological Impact Assessment Report on Mining Zones 0 – 24 and Abutting areas on the remaining extent of Farm Schmidtsdrift 248, at Schmidtsdrift, Pixley ka Seme District Municipality, Northern Cape Province.

This report was compiled as part of the Environmental assessment and the Mining Right application of New Diamond Corporation (NDC) who have been prospecting for diamonds along the west bank of the Vaal River in the Schmidtsdrift vicinity. The site in question is located across the river, to the west of the current study area. Several heritage features were identified during the assessment including 45 graves, stone walling, as well as lithic artefacts.

Phase 1 Impact Assessment Report and associated Heritage Management Plan for the Proposed prospecting and mining rights on the Farm Jakhalsfontein (Portion 1 of the Farm Schmidtsdrift 248) near Schmidtsdrift, Northern Cape.

A Heritage Impact Assessment was requested in relation to an approved EA for Prospecting and Mining Rights for farms approximately 5kms northwest from the current study site. Several finds and sites were highlighted, most notably finds related to more recent military activity in the area. Items such as bullets, grenades, and unexploded explosives were identified associated with the occupation of the area of the South African Defence Force between 1968 and 1990. This was beyond the other heritage finds and sites identified including graves as well as Stone Age lithic pieces. Caution was advised relating to dangerous items identified such as bombshells and unexploded grenades.

3 ENVIRONMENTAL ATTRIBUTES AND BASELINE ENVIRONMENT

This section discusses the overall environmental attributes of the site in question. This includes key aspects of the landscape and general conditions associated with the area.

3.1 CLIMATE

The climate of the Northern Cape is characterized by extreme temperatures, with hot summers and very cold winters. The rainy season usually occurs from late summer through to autumn, with the months of January to April being particularly notable for precipitation. Temperature and precipitation vary significantly across the



region, with the eastern and mountainous areas receiving rainfall of about 200-400 mm per annum, while the arid western areas receive less than 100 mm per annum.

The climate in the Northern Cape is mostly semi-arid to arid, characterized by hot and dry summers during the months of November to February and cold winters starting from May to August. The region experiences occasional thunderstorms in the late summer months, and the winter season sees little to no precipitation.

Figure 23 provides an understanding of the general climatic conditions of the area, including an understanding of monthly temperatures and rainfall.

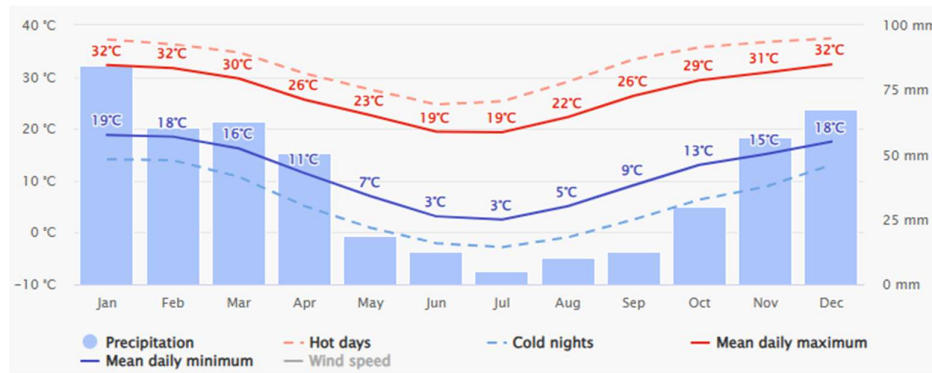


Figure 23: Annual Climatic conditions typical of the Northern Cape (considering data from Kimberley, after www.meteoblue.com/en/weather/historyclimate/climatemodelled/kimberley_south-africa_990930)

3.2 TOPOGRAPHY

The development area falls in an area between 1000 and 1080 m above sea-level in elevation. The landscape slopes towards to the west, where the Vaal River is located. The landscape is flat, with a hill located to the south of the proposed area. See Figure 24 for an overview of the topography of the site to be developed and surrounding areas.

3.3 DRAINAGE AND CATCHMENT

The closest river to the site is the Vaal, less than a kilometre from the proposed activities. The proposed development falls within the C92B Quaternary Catchment.

3.4 GEOLOGY

The overall geology of the site is characterised by the Gordonia aeolian sands and sand dunes. Some instances of calcrete and surface limestone is noted to the south near the area where Pivot 8 is located, and where old diggings can be noted and observed. Figure 27 is a simplified overview of the geology of the site and surrounding areas.

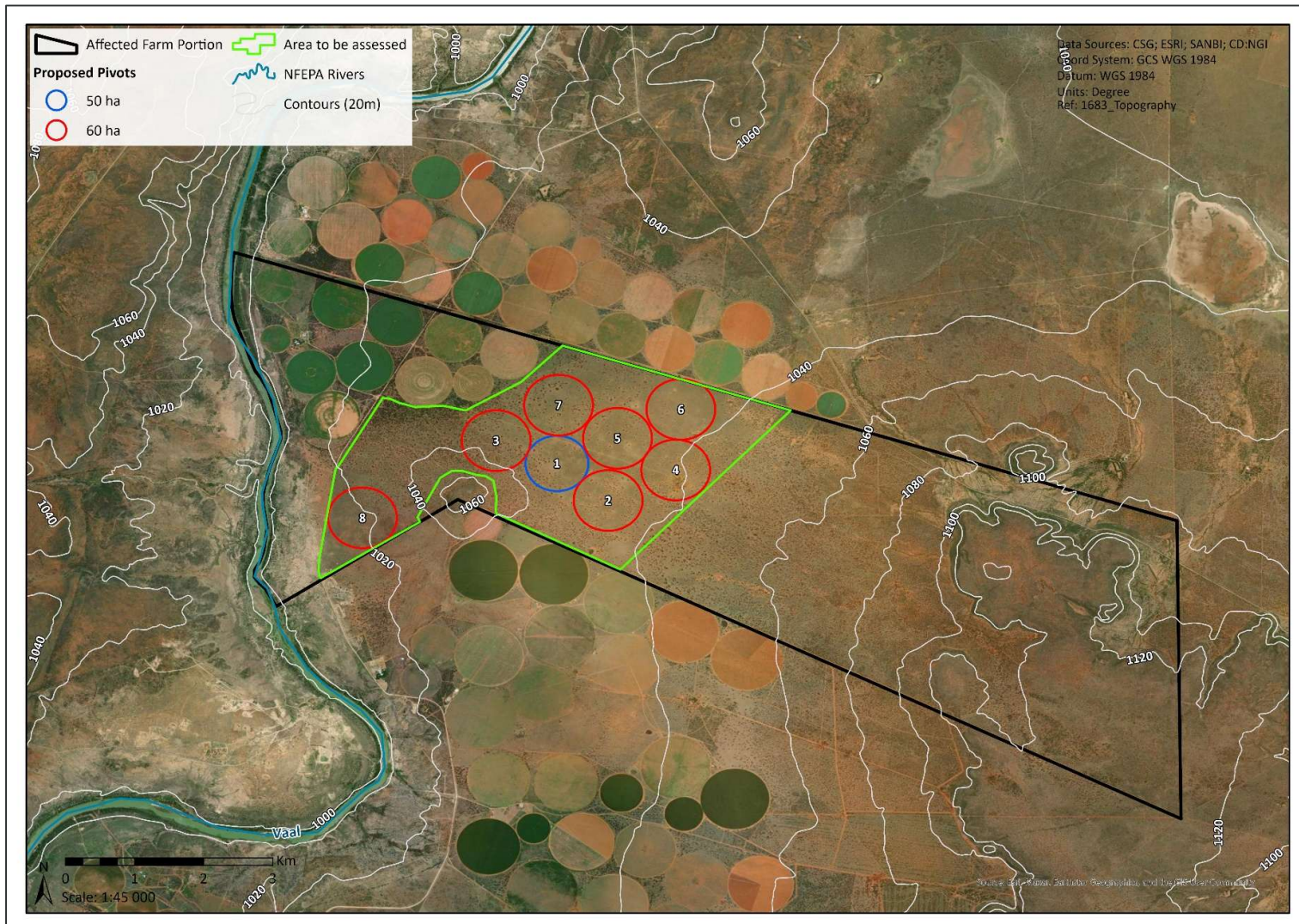


Figure 24: Topography Map of the site and surrounding areas.

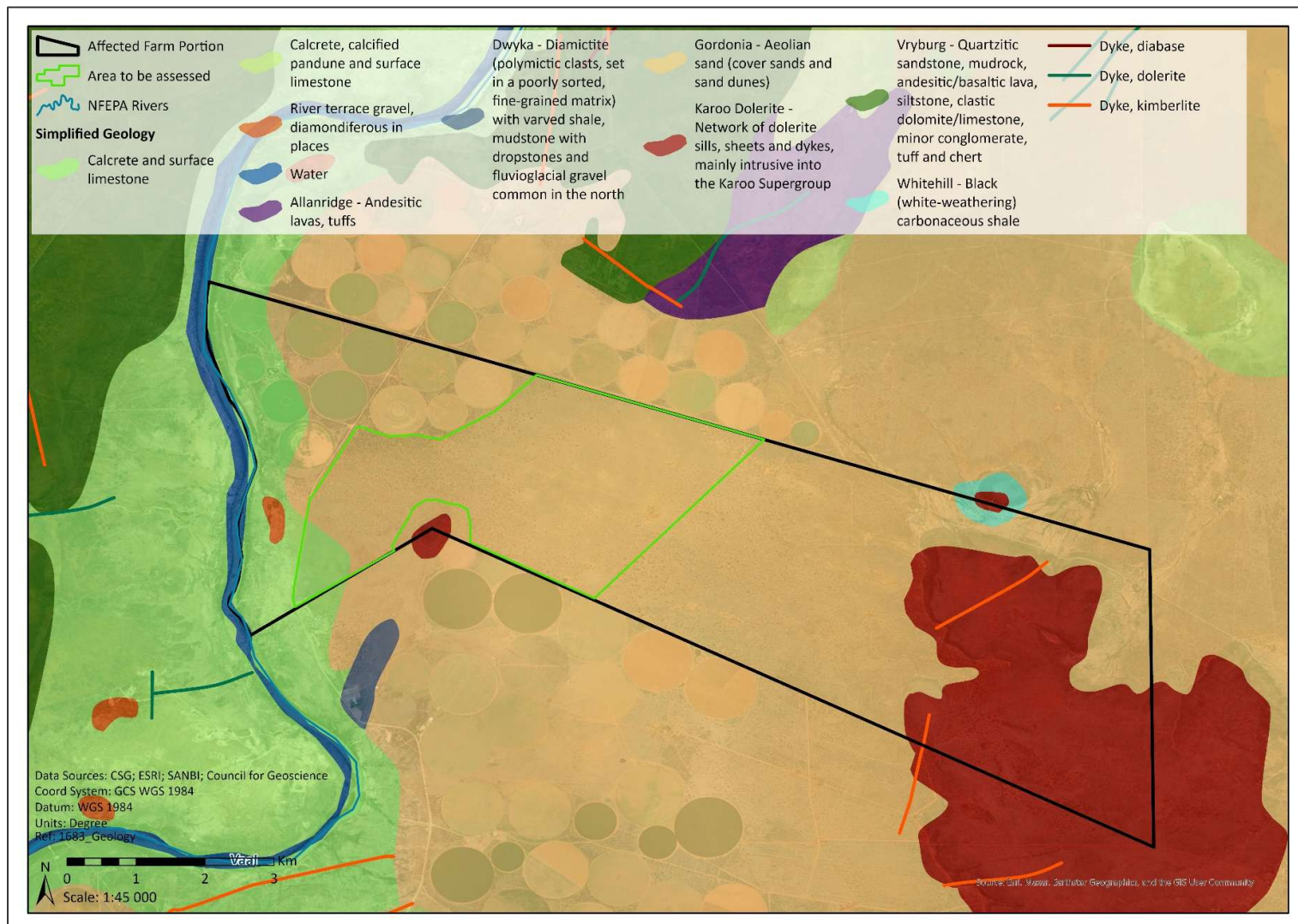


Figure 25: Map of the geology of the site and surrounding areas.



4 METHODOLOGY

The following section describes the methodology used to gather information on potential heritage resources and impacts in this report. Firstly, an initial desktop assessment was conducted to identify key areas of heritage sensitivity and potential features identified in the past. A field survey was then conducted to verify the significance of any identified features as well as identify any additional features.

4.1 INITIAL DESKTOP ASSESSMENT

To evaluate the overall sensitivity and extent of Archaeological and Heritage features within and around the development footprint, a desktop assessment of the area was conducted. The desktop assessment involved making use of existing information related to heritage resources of the area.

As an initial step, the Screening Tool of the Department of Forestry, Fisheries and the Environment was consulted. The Screening Tool includes a geospatial database of recorded and identified sensitivities relating to Archaeological and Cultural Heritage sites or finds. The information available through the Screening Tool provided a basis which informed further desktop assessments and the extent to which the field survey would be conducted. This information was then corroborated with information available through the South African Heritage Resources Information System (SAHRIS), Chief Directorate: National Geospatial Information (CD:NGI), as well as Google Earth Imagery. Various aerial photographs and 1st Edition Topographic maps were consulted to verify the extent of heritage and archaeological sensitivity in and around the development footprint. Altogether, the data consulted included geospatial records dating as far back as 1967.

4.2 FIELD SURVEY

To verify and add to the observations made through the desktop assessment, a single-day field survey was conducted by Dr Lucien James on 18 March 2025. The field survey involved traversing the proposed development footprint, with a focus on assessing areas which appear to be undisturbed. The survey also included consulting personnel on site, to gather more insight on any known archaeological sites and finds. While most of the area is already disturbed by different land uses including agriculture, a site survey was necessary to evaluate the overall sensitivity of the area, as well as identify archaeological sites and objects which may not have been identified since.

The Archaeologist surveyed key areas of the development footprint, as well as key areas immediately outside of the development footprint, for example, some surrounding roads. A Garmin eTrex 10 was used to record track logs of the extent of the survey itself.

4.3 DOCUMENTATION AND ANALYSIS

All observations gathered through the desktop assessment as well as the field survey were documented and analysed in terms of their significance. Through remote sensing, any sites noted through the Screening Tool and SAHRIS were documented in relation to the proposed development. During the field survey, the location of larger Archaeological and Heritage finds was recorded. Smaller Archaeological and Heritage finds were recorded in situ. Appropriate buffers would then be recommended depending on the importance of the feature identified.

Geotagged photographs were taken throughout the survey. This included the photographing of finds, as well as the surrounding environment. Physical scales were included in all photographs which require an understanding of dimensions, sizes and the colour of finds. For larger finds, a 1,5-meter scale divided into 10cm segments was used. For smaller finds, an IFRAO Standard Scale (Figure 26) was used.



Figure 26: IFRAO Standard Scale used for photography of Archaeological finds.

The appointed Archaeologist also kept written notes about the different findings as well as their context. These were recorded in the Archaeologist's personal field journal.

Sites and finds were subsequently analysed in terms of their significance. Several criteria were used to assess the significance of finds and their bearing on the overall heritage significance and sensitivity of the affected area. Table 2 provides a list of the different criteria considered when assessing the significance of finds and or site. In relation to each criterion, different questions were embedded in the analysis of sites and finds.

Table 2: Different criteria and questions which guided the analysis of Archaeological and Heritage finds or sites.

Criterion	Questions which guided analysis
Overall Integrity or condition	<ol style="list-style-type: none"> 1. Is the find or site recognisable beyond initial identification? 2. Is the find or site well or poorly preserved? 3. Has the find or site been disturbed or removed from their original context? 4. Has the find been exposed to severe post-depositional damage or disturbance? 5. What types of meteorological and geomorphological events may have disturbed or compromised the integrity of the find or site?
Context	<ol style="list-style-type: none"> 1. Has the surrounding area been highly disturbed? 2. Is it likely that the find has been removed from its original context? 3. Have other individual finds been located within 15 meters of the find, meriting the description of the find as part of a site? 4. Does the find form part of a collection of more than 3 finds located within 15 meters of each other? 5. Could the find form part of a larger, chronologically or contextually related collection of finds in the area?
Spatial relation to other sites	<ol style="list-style-type: none"> 1. Are there any identified sites located near the find or site? 2. To what extent can the find or site be related to all other sites identified? 3. How close are the other sites to the site or find? 4. Does the occurrence of this site or find change the regional heritage or archaeological narrative?
Prehistoric and historical provenance	<ol style="list-style-type: none"> 1. Can the find or site be identified in terms of which period it relates to, i.e. Stone Age, Iron Age, or Historical?



	<ol style="list-style-type: none"> 2. Does the find corroborate or correlate with general understandings of the period it relates to? 3. Does the find or site fit into the heritage narrative of the region or province? 4. Does this find or site add new insight to contemporary understandings of the period it relates to? 5. Does this find or site add new insight to contemporary understandings of Archaeology in South Africa?
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4.4 CLASSIFICATION OF SITES

Considering the above-described documentation and analysis methods, heritage finds and sites were classified or graded according to the SAHRA Minimum Standards (2007) recommendations. The grading system adopted in this report is captured in Table 3.

Table 3: Classification of heritage sites as per the SAHRA Minimum Standards (2007) and adopted in this report

Level	Grade	Significance	Action
National	I	High	Nominate for Field Rating/Grade I
Provincial	II	High	Nominate for Field Rating/Grade II
Local	IIIA	High	Retain as heritage register site, no mitigation advised
Local	IIIB	High	Mitigate and retain as heritage register site
General Protection A	IV A	High/Medium	Mitigate before destruction
General Protection B	IV B	Medium	Record before destruction
General Protection C	IV C	Low	No further recording required

The different criteria considered when analysing finds and sites allowed for subsequent grading and classification. In this regard, prehistoric and historic provenance, spatial relations to other sites, and context allowed for the identification of the level of importance of the site or find. In this regard, finds and sites were graded according to if they were of National, Provincial, Local or General significance. Overall Integrity or condition and context guided the advised mitigation action.

4.5 LIMITATIONS

This section details the different limitations associated with the implemented methodology of this assessment. Approaches to mitigate these limitations are therefore presented.

4.5.1 GENERAL LIMITATIONS

Several limitations were expected and encountered while implementing the above-described methodology. Some of these limitations relate to the project itself, while some are more general, relating to the implementation of the methodology itself.

Firstly, such investigations are limited to desktop and field surveys from which findings are drawn. In this regard, the findings presented here are limited to surface observations. Below-ground archaeological contexts would only apply in cases where the methodology includes components involving excavations and test pits. To mitigate this limitation, this report advises the application of heritage procedures adopted by the developer in cases where construction activities lead to the identification of unexpected finds.



The field survey conducted for this report does not account for any finds further than immediate surrounding areas which are not potentially affected by the proposed development. To mitigate this, the initial desktop assessment considers surrounding pre-identified heritage resources and prior heritage studies done in the area.

Although an extensive methodology was adopted to address the desktop assessment and field survey, one must remain cognisant of the fact that this assessment may not identify all heritage features possibly existing. For this reason, mitigation measures have been proposed to accommodate for chance finds as well as features that may not have been encountered and identified through the implementation of this study's methodology.

4.5.2 PROJECT-SPECIFIC LIMITATIONS

The field survey itself was limited to a single-day site visit which may present as a limitation to the extent of the investigation. However, strategic points were identified prior to the survey to ensure that an adequate representation of the site could be obtained through the site visit.

5 FINDINGS

The following section presents the findings of both the desktop assessment as well as the field survey. In summary, 8 Heritage features were identified through the field survey as well as 2 finds of contemporary origin.

5.1 DESKTOP ASSESSMENT RESULTS

An initial desktop assessment was undertaken to ascertain the overall sensitivity of the area in terms of heritage features. The DFFE Screening Tool was used as an initial point of reference in this regard. The Screening Tool suggested that the area to be developed is of Low Sensitivity as captured in Figure 27.

The DFFE Screening Tool highlighted no heritage features within or in close proximity of the area to be affected by the proposed activities.

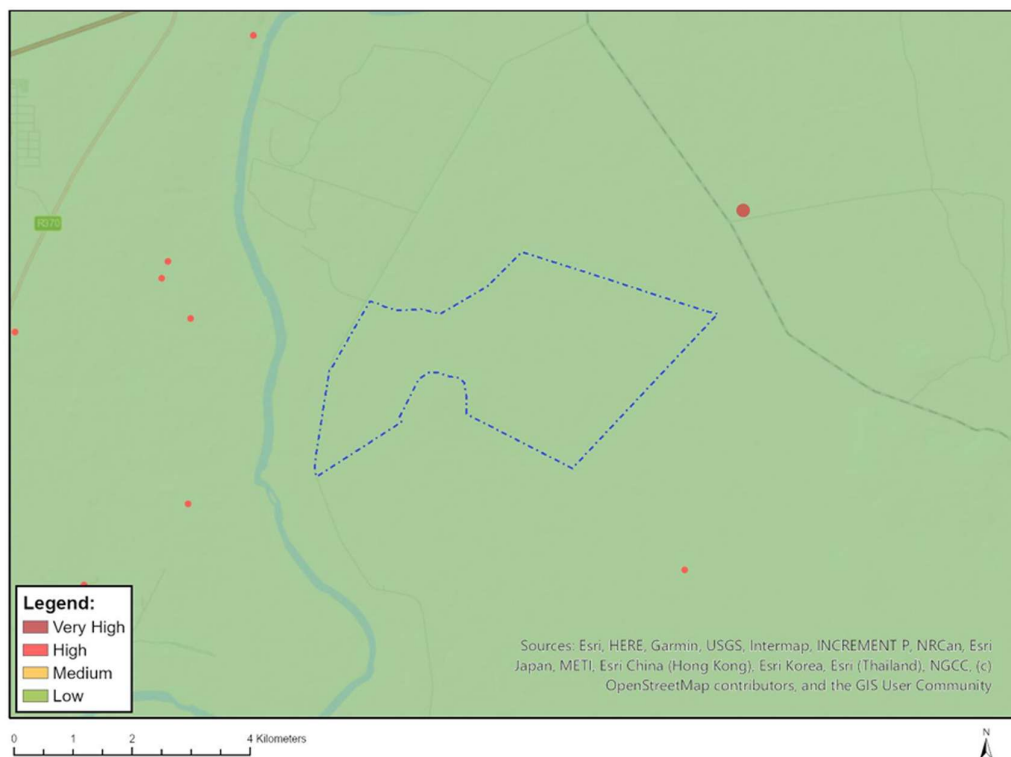


Figure 27: Map of relative Archaeological and Cultural Heritage Sensitivity (DFFE Screening Tool)

The affected area was assessed using Google Earth as well as available surveys and mapping resources via the CD:NGI Geospatial Portal (<http://www.cdngiportal.co.za/cdngiportal/>). A First Edition Topographic map



(2824CC) of the area was analysed. As the map was drawn in 1969, it would include information on observations within the footprint of the development. An assessment of the map revealed the presence of two points demarcated as windmill structures (MI001 and MI002). MI001 consists of a kraal area.

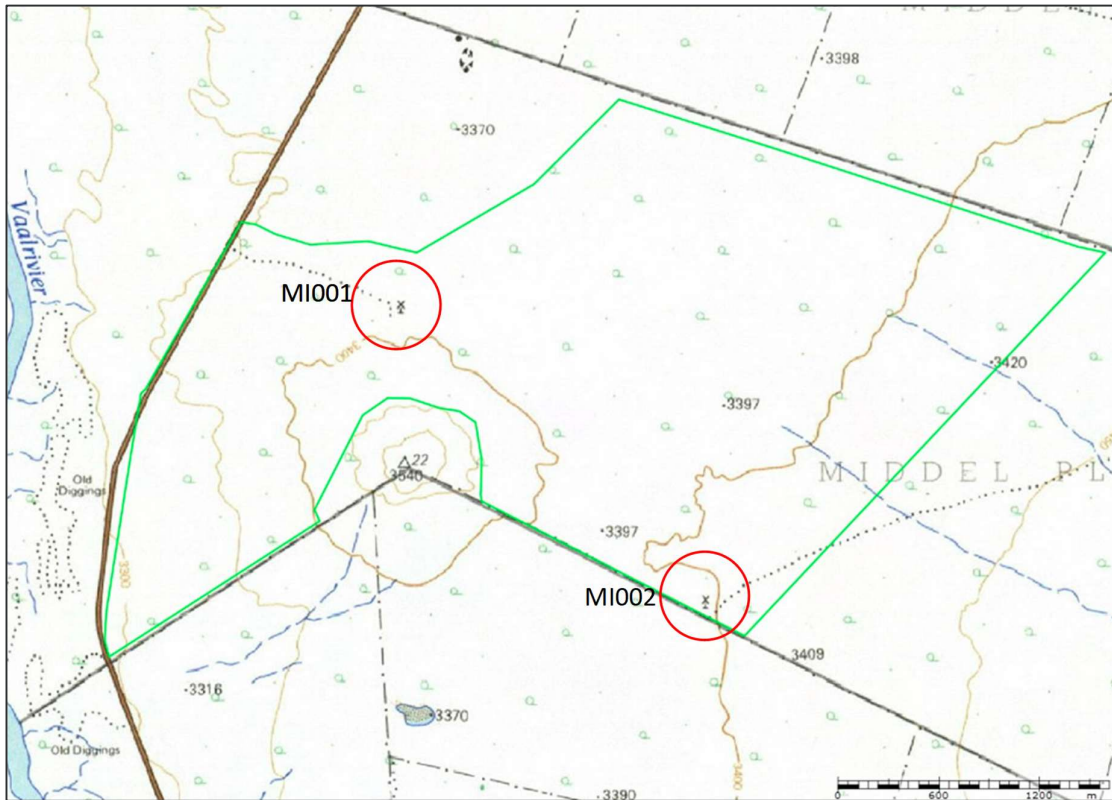


Figure 28: Extract of the 2824CC First Edition Topographic Map of 1969. Map indicates the location of the two windmill features identified (circled in red) within the project area (in green).

No other features were identified within the study area. However, to the west of the area, extensive old diggings were noted. These stretch along the Vaal River. This observation was important as it provided a background to further observations made during the field assessment.

An aerial photograph of 1967 was also consulted to confirm the presence of the identified features. The aerial photograph suggests that the features were not present in 1967 (Figure 29). This suggests that the features are not older than 60 years and hence are not yet protected by the NHRA. Aerial photography did not reveal any sign or marker of any additional heritage features, and therefore, on-site verification would be necessary to determine the presence and significance of any additional features or items.



Figure 29: Aerial photograph taken in 1967. No features are evident within the project area (in green).

5.2 FIELD ASSESSMENT RESULTS

The appointed Archaeologist surveyed the various areas which fall within the proposed development footprint. The survey covered the extent of the area to be developed with the intention to identify sensitivities in terms of heritage significance. Figure 30 is a map of all the areas surveyed, specifically including the paths tracked out by the Archaeologist. The field survey was conducted on a day during Autumn.

5.2.1 GENERAL OBSERVATIONS

The area of the proposed development includes mostly open farmlands. The landscape is covered in different types of grass species, with scattered well-vegetated patches. A small hill is located to the south of the area, however, the hill falls outside of the area of interest, and a distance away from the proposed pivot infrastructure.

Pertaining to the general heritage significance of the area, the area lies some kilometres from Kimberley itself. Some observations were made of surrounding features including far off sites which were used by the South African Defence Force. Apart from observations and following engagement with stakeholders, there appeared to be very little perceivable heritage significance associated with the landscape itself.

5.2.2 ARCHAEOLOGICAL FINDS

Some archaeological finds were discovered during the field survey conducted. These included the identification Stone Age finds and collective sites.

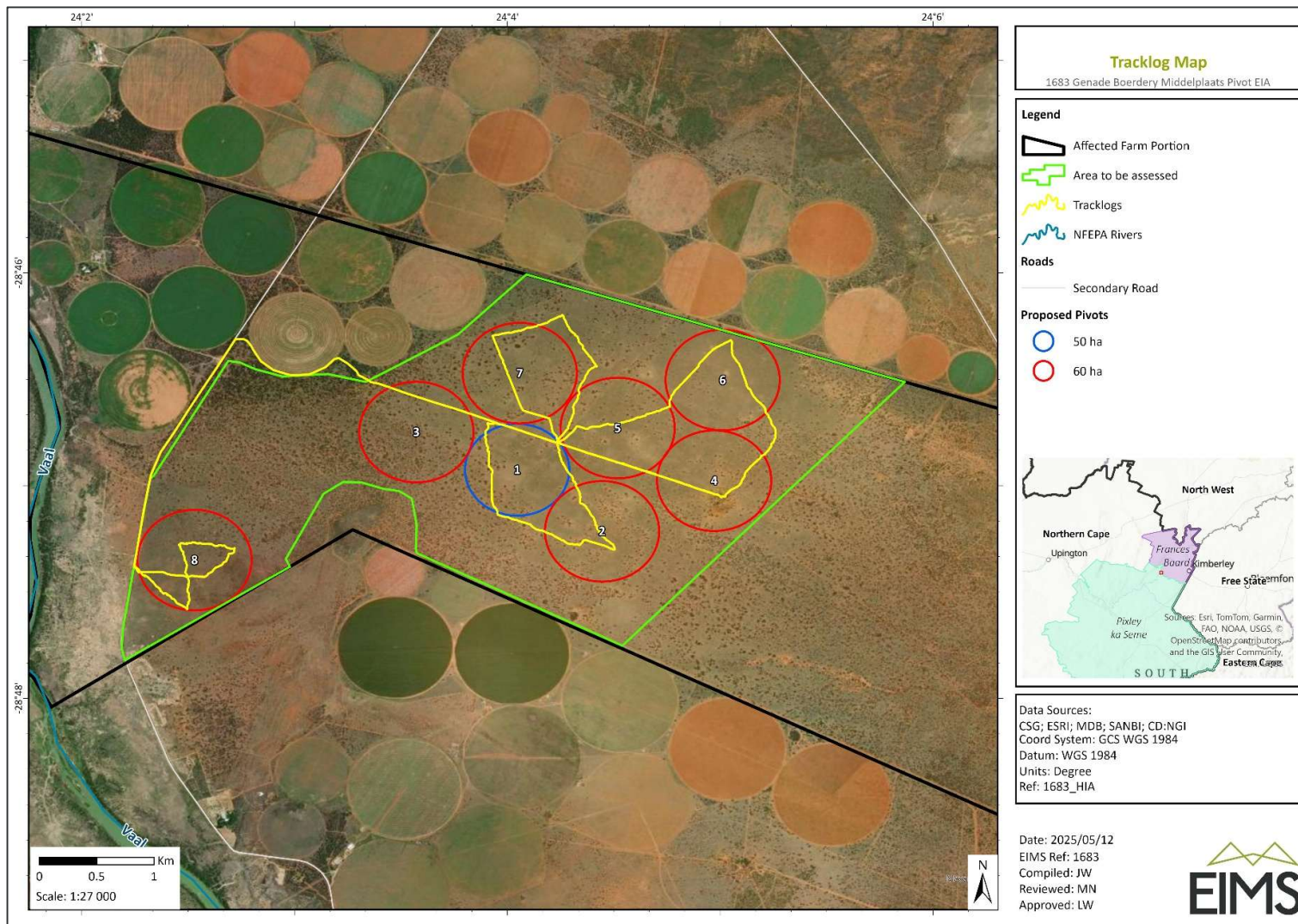


Figure 30: Map of areas surveyed and tracked.



A) STONE AGE FINDS

Stone Age artefacts were the primary set of finds identified during the site visit. Individual stone tool finds as well as stone age sites. These are presented below.

MI003 (Figure 31), a single stone tool flake was identified within the footprint of Pivot 1. The flake was no more than 3cm in size and showed some signs of retouch. The find was located along an existing, and eroded dirt path.



Figure 31: MI003 - LSA retouched flake.

While MI005 included examples of LSA lithic artefacts (Figure 32) located within the footprint of Pivot 8, the site also exhibited signs indicating that waste rock was dumped in the area potentially originating from the nearby diggings. The old diggings are noted to have been in the area since no later than 1969, as illustrated on the First Edition Topographic map. Further signs of disturbance were noted south from where the site was located, identified as a potential source or depositional site along an old path or channel (See MI005 DEP STE – Figure 33).



Figure 32: MI005 - LSA tools and flakes.



MI006 and MI007 appear to be related, being both associated with the same drainage channel. MI006 is an LSA site including several examples of small lithic artefacts such as retouched flakes (Figure 34). MI007 includes several lithic pieces along the channel (Figure 35). Like MI005, these sites were found within the footprint of Pivot 8.



Figure 33: MI005 DEP STE – Identified depositional site related to MI005 finds



Figure 34: MI006 - LSA Site including retouched tools and small flakes.



Figure 35: MI007 - location including some examples of LSA lithic artefacts as deposited in channel.

Also located within the same Pivot's footprint, MI008 included some examples of LSA lithic artefacts, both cores and formal tools such as scrapers (Figure 36). Although the site was approximately 50 meters from an identified dirt track, it was further away from MI006 and MI007, suggesting it may be a unique depositional site.



Figure 36: Some examples of stone tools identified at MI008.

MI011 and MI013 (Figure 37) exhibited similar traits to the other sites identified in the general area and footprint of Pivot 8 (i.e. MI005, MI006, MI007 and MI008). Several LSA tools and retouched flakes were identified at the sites with MI013 noted as an area where material would have been deposited through alluvial processes (Figure 38). A core was identified at MI012 (Figure 39). It can be argued that the identified core at MI012 is part of the overall LSA site identified as MI011.



Figure 37: MI011 - LSA Site. Small flakes recorded as examples of material found.



Figure 38: MI013 - Depositional site associated with MI011 and finds in the area.



Figure 39: MI012 - Single core identified. Potentially related to other finds in proximity.

The context of all the Stone Age finds identified were limited to interpretations related to landscape disturbance and post-depositional processes. For instance, no knapping or occupational sites were identified in proximity to any of the finds, indicating that the finds could have originated from the nearby diggings and the material being transported along the dirt path, or deposited on the area as noted. Further, drainage channels of the area appear to have dispersed the material located within the footprint of Pivot 8, leading to the area including spread-out examples of similar lithic pieces. For this reason, the identified Stone Age finds have been allocated the field rating of Grade IV B. In this respect, it is recommended that although the finds and sites may not be of contextual value, the developer must remain cognisant of their presence and ensure that during development, other examples which may be identified during construction be recorded.

B) HISTORICAL AND CONTEMPORARY FINDS

A partial ungulate skull (MI004) (Figure 40) was located within the footprint of Pivot 7. This is associated with the game and/or cattle kept on site at the present moment. This find was of no heritage significance, and therefore, was only noted as part of surface findings.

In a similar way, a single glass bottle fragment was identified in the footprint of Pivot 8 (MI009) (Figure 41). The fragment appeared to be that of a modern as opposed to an older glass bottle. It is argued here that the fragment could have been part of the deposit associated with the old diggings and the dirt path which it was located along. This find was of no heritage significance and therefore was only noted.



Figure 40: MI004 - Ungulate skull identified.



Figure 41: MI009 – Glass fragment identified.

Finally, although not a site or find, MI010 was earmarked as an example where rock and rubble were noted (Figure 42). This was to provide context in terms of associated finds.



Figure 42: MI010 - Some rock and rubble noted along a path

C) GRAVES

No graves were identified during the field assessment.

5.3 SUMMARY OF FINDINGS

Following a desktop assessment, some potential heritage features or sensitivities were identified, however, none were of confirmed heritage significance as the structures identified (MI001 and MI002) were not older than 60 years. Through the field survey, 8 new finds and sites were identified which hold heritage significance or value. This consisted of stone age finds. Figure 43 presents a visual summary of the different findings and their locations. Table 4 provides a summary of the different features identified, a description of the feature, as well as the coordinates of where the feature is located or a relative central point associated with a site.

Table 4: Summary of different finds and sites identified.

Feature No.	Description	Rating and Significance	Coordinate
MI001	Identified Kraal area – identified on 1969 First Edition Topographic Map.	N/A	28°46'29.59"S 24° 3'18.77"E
MI002	Identified farm infrastructure – identified on 1969 First Edition Topographic Map.	N/A	28°47'35.98"S 24° 4'18.82"E
MI003	Single stone tool find – Flake including signs of retouch	Grade IV B Low	28°46'55.11"S 24° 3'55.29"E
MI004	Faunal (ungulate) remains (skull)	N/A	28°46'16.57"S 24° 4'2.02"E
MI005	LSA Stone tool site. Includes examples of mainly debitage and cores. Note that finds were scattered around an identified drainage channel/path	Grade IV B Low	28°47'24.31"S 24° 2'16.53"E



MI006	LSA Stone tool site. Includes examples of small lithic pieces such as retouched flakes.	Grade IV B Low	28°47'29.70"S 24° 2'22.24"E
MI007	LSA Stone tool site. Note that finds were scattered around an identified drainage channel.	Grade IV B Low	28°47'30.70"S 24° 2'24.12"E
MI008	LSA Stone tool site. Includes examples of cores and formal tools.	Grade IV B Low	28°47'32.79"S 24° 2'30.09"E
MI009	Single glass bottle fragment of contemporary origin	N/A	28°47'28.11"S 24° 2'30.10"E
MI010	Area including rubble and rock potentially originating from old diggings	N/A	28°47'27.58"S 24° 2'30.14"E
MI011	LSA Stone tool site. Includes examples of small lithic pieces such as retouched flakes.	Grade IV B Low	28°47'16.44"S 24° 2'27.81"E
MI012	Single stone tool core – potentially originating from MI011	Grade IV B Low	28°47'16.21"S 24° 2'29.52"E
MI013	LSA Stone tool site. Includes examples of small lithic pieces such as retouched flakes.	Grade IV B Low	28°47'21.90"S 24° 2'39.80"E

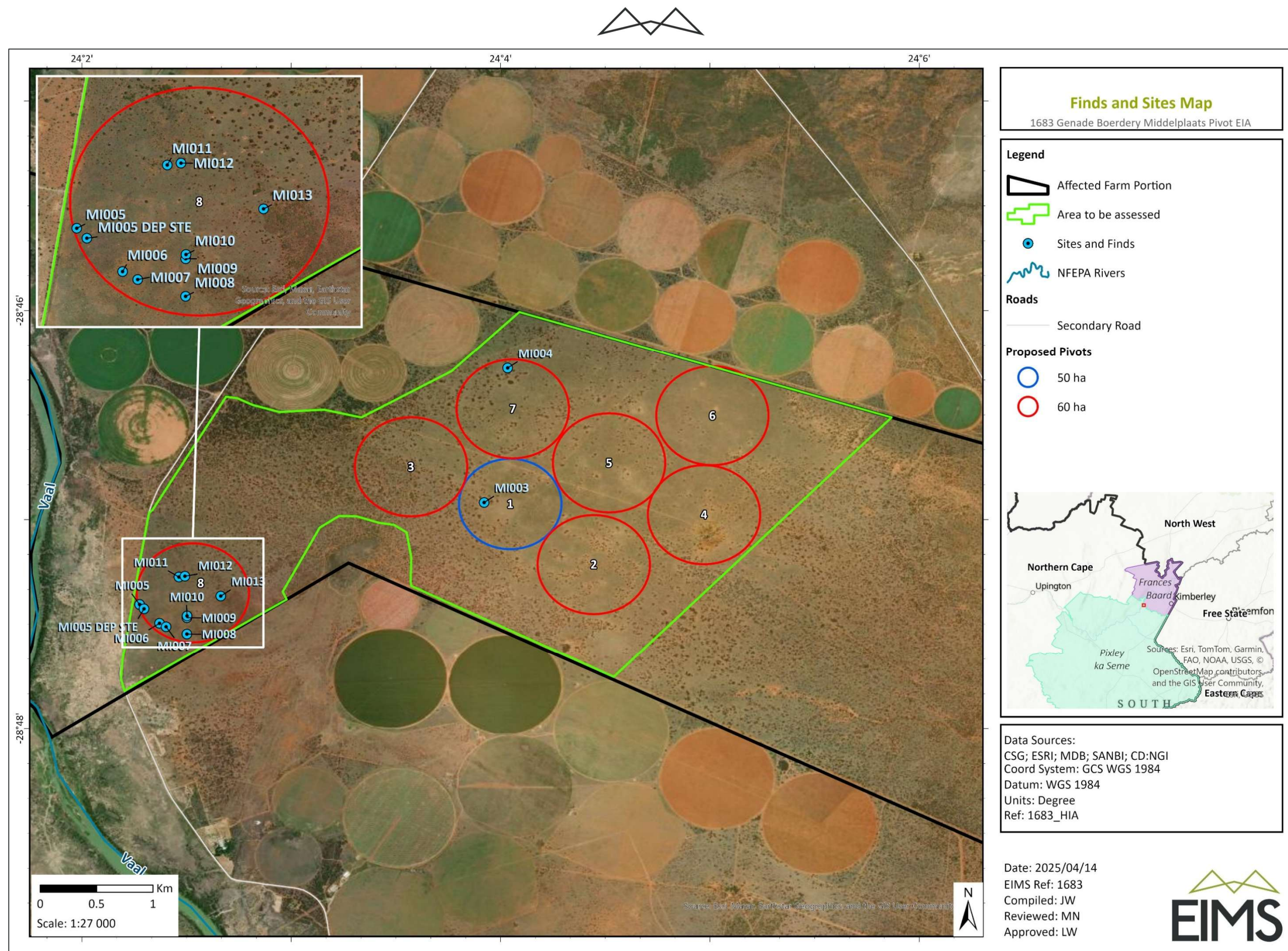


Figure 43: Map of the different finds and sites of interest identified during the field survey.



6 IMPACT ASSESSMENT

This section describes the impact assessment methodology adopted, and the impacts identified during the Heritage Impact Assessment.

6.1 IMPACT ASSESSMENT METHODOLOGY

The impact significance rating methodology, as presented herein and utilised for all EIMS Impact Assessment Projects, is guided by the requirements of the NEMA EIA Regulations 2014 (as amended). The approach may be altered or substituted on a case-by-case basis if the specific aspect being assessed requires such- such instances require prior EIMS Project Manager approval. The broad approach to the significance rating methodology is to determine the significance (S) of an environmental risk or impact by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relating this to the probability/likelihood (P) of the impact occurring. The S is determined for the pre- and post-mitigation scenario. In addition, other factors, including cumulative impacts and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the S to determine the overall final significance rating (FS). The impact assessment will be applied to all identified alternatives.

The final significance (FS) of an impact or risk is determined by applying a prioritisation factor (PF) to the post-mitigation environmental significance. The significance is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and Reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E + D + M + R) * N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 5 below.

Table 5: Criteria for Determining Impact Consequence.

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e. Highly localised, limited to the area applicable to the specific activity)
	2	Site (i.e. within the development property or site boundary, or the area within a few hundred meters of the site)
	3	Local (i.e. beyond the site boundary within the Local administrative boundary (e.g. Local Municipality) or within consistent local geographical features, or the area within 5 km of the site)
	4	Regional (i.e. Far beyond the site boundary, beyond the Local administrative boundaries within the Regional administrative boundaries (e.g. District Municipality), or extends into different distinct geographical features, or extends between 5 and 50 km from the site).
	5	Provincial / National / International (i.e. extends into numerous distinct geographical features, or extends beyond 50 km from the site).
Duration	1	Immediate (<1 year, quickly reversible)



	2	Short term (1-5 years, less than project lifespan)
	3	Medium term (6-15 years)
	4	Long term (15-65 years, the impact will cease after the operational life span of the project)
	5	Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction/ operation/ decommissioning).
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural and social functions and processes are slightly affected, or affected environmental components are already degraded)
	3	Moderate (where the affected environment is altered but natural, cultural and social functions and processes continue albeit in a modified way; moderate improvement for +ve impacts; or where change affects area of potential conservation or other value, or use of resources).
	4	High (where natural, cultural or social functions or processes are altered to the extent that it will temporarily cease; high improvement for +ve impacts; or where change affects high conservation value areas or species of conservation concern)
	5	Very high / don't know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts; or disturbance to pristine areas of critical conservation value or critically endangered species)
Reversibility	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring very high time and cost.
	5	Irreversible Impact.

Once the C has been determined, the significance is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/ scored as per Table 6.

It is noted that both environmental risks as well as environmental impacts should be identified and assessed. Environmental Risk can be regarded as the potential for something harmful to happen to the environment, and in many instances is not regarded as something that is expected to occur during normal operations or events (e.g. unplanned fuel or oil spills at a construction site). Probability and likelihood are key determinants or variables of environmental risk. Environmental Impact can be regarded as the actual effect or change that happens to the environment because of an activity and is typically an effect that is expected from normal operations or events (e.g. vegetation clearance from site development results in loss of species of concern). Typically the probability of an unmitigated environmental impact is regarded as highly likely or certain



(management and mitigation measures would ideally aim to reduce this likelihood where possible). In summary, environmental risk is about what could happen, while environmental impact is about what does happen.

Table 6: Probability Scoring.

Probability	1	Improbable (Rare, the event may occur only in exceptional circumstances, the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <5% chance).
	2	Low probability (Unlikely, impact could occur but not realistically expected; >5% and <20% chance).
	3	Medium probability (Possible, the impact may occur; >20% and <50% chance).
	4	High probability (Likely, it is most probable that the impact will occur- > 50 and <90% chance).
	5	Definite (Almost certain, the impact is expected to, or will, occur, >90% chance).

The result is a qualitative representation of relative significance associated with the impact. Significance is therefore calculated as follows:

$$S = C \times P$$

Table 7: Determination of Risk.

Consequence	5- Very High ¹	5	10	15	20	25
	4- High	4	8	12	16	20
	3- Medium	3	6	9	12	15
	2- Low	2	4	6	8	10
	1- Very low	1	2	3	4	5
		1- Improbable	2- Low	3- Medium/ Possible	4- High/ Probable	5- Highly likely/ Definite
	Probability					

The outcome of the risk assessment will result in a range of scores, ranging from 1 through to 25. These R scores are then grouped into respective classes as described in Table 8.

Table 8: Significance Classes.

S Score	Description
≤4.25	Low (i.e. where this impact is unlikely to be a significant environmental risk/ reward).
>4.25, ≤8.5	Low-Medium (i.e. where the impact could have a significant environmental risk/ reward).
>8.5, ≤13.75	High-Medium (i.e. where the impact could have a significant environmental risk/ reward).

¹ In the event that an impact or risk has very high or catastrophic consequences, but the likelihood/ probability is low, then the resultant significance would be Low-medium. This does in certain instances detract from the relative important of this impact or risk and must consequently be flagged for further specific consideration, management, mitigation, or contingency planning.



S Score	Description
>13.75	High (i.e. where the impact will have a significant environmental risk/ reward).

The impact significance will be determined for each impact without relevant management and mitigation measures (pre-mitigation significance), as well as post implementation of relevant management and mitigation measures (post-mitigation significance). This allows for a prediction in the degree to which the impact can be managed/mitigated.

Further to the assessment criteria presented in the section above, it is necessary to assess each potentially significant impact in terms of:

1. Cumulative impacts; and
2. The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impacts' post-mitigation significance (post-mitigation). This prioritisation factor does not aim to detract from the significance ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the post-mitigation significance based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 9: Criteria for Determining Prioritisation.

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/ definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable Loss of Resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.
	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).

The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in Table 9. The impact priority is therefore determined as follows:

$$\text{Priority} = \text{CI} + \text{LR}$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (refer to Table 10).



Table 10: Determination of Prioritisation Factor.

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

In order to determine the final impact significance (FS), the PF is multiplied by the post-mitigation significance scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e. if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a higher significance).

Table 11: Final Significance Rating.

Significance Rating	Description
<-25	Very High (Impacts in this class are extremely significant and pose a very high environmental risk. In certain instances these may represent a fatal flaw. They are likely to have a major influence on the decision and may be difficult or impossible to mitigate. Offset's may be necessary.
<-13.75 to -25	High negative (These impacts are significant and must be carefully considered in the decision-making process. They have a high environmental risk or impact and require extensive mitigation measures).
-8.5 to -13.75	Medium-High negative (i.e. Impacts in this class are more substantial and could have a significant environmental risk. They may influence the decision to develop in the area and require more robust mitigation measures).
<-4.25 to <-8.5	Medium- Low negative (i.e. These impacts are slightly more significant than low impacts but still do not pose a major environmental risk. They might require some mitigation measures but are generally manageable).
-1 to -4.25	Low negative (i.e. Impacts in this class are minor and unlikely to have a significant environmental risk. They do not influence the decision to develop in the area and are typically easily mitigated.
0	No impact
1 to 4.25	Low positive
>4.25 to <8.5	Medium-Low positive
8.5 to 13.75	Medium-High positive



Significance Rating	Description
>13.75	High positive

The significance ratings and additional considerations applied to each impact will be used to provide a quantitative comparative assessment of the alternatives being considered. In addition, professional expertise and opinion of the specialists (in this case, the Archaeologist) and the environmental consultants will be applied to provide a qualitative comparison of the alternatives under consideration. This process will identify the best alternative for the proposed project.

6.2 IDENTIFIED HERITAGE IMPACTS

Table 12 provides a breakdown of the potential impacts identified through this assessment, considering the above-cited and adopted methodology.

The proposed activities will have an impact on heritage features, particularly those located within the footprint of Pivot 8. Although these features (mainly stone tool sites and scatters) are of low significance, their sprawl across the area is of noted concern. It is expected that should development take place, these finds will be destroyed or displaced. As previously discussed, no knapping or occupational sites were noted and can be related to the stone tool sites and singular finds. This suggests that these were deposited across the area through various processes both natural and as a byproduct of other activities in the area such as those associated with the old diggings nearby. Further, the finds and sites identified exhibit similar traits to similar sites of the area, with low potential to yield any new information in terms of the heritage significance of the wider area. It is here suggested that the developer maintain vigilance during construction activities. Should surface finds become more densely concentrated (e.g. more than 20 finds/m²), an Archaeologist and SAHRA must be alerted before construction continues.

While the features identified represent markers of heritage significance (in particular, the stone age finds), the occurrence of below-ground heritage finds may be possible. For this reason, as a mitigation measure proposed, a Heritage Finds or Chance Find Procedure for addressing heritage finds must be adopted as part of construction processes. Should finds of an alarming significance, for example, a grave or high density of small finds be discovered during construction, this procedure will inform the next steps taken to ensure the documentation of these finds, and further action to be taken should a heritage professional deem necessary.

Altogether, post-mitigation of the identified heritage impacts is rated a Low Negative, given that the impacts to be expected will be on already-disturbed and displaced features, and the potential for a heritage procedure to allow for the documentation, recording, and further assessment of undiscovered finds and sites. A heritage procedure can present opportunity to limit the impact of development on heritage finds to construction activities, with the potential to document and further assess finds should they be related to broader sites. This ultimately presents opportunity to reverse the adverse effects of development of heritage finds, given that their value can be evaluated through documentation. This also presents opportunity to better understand the heritage significance of the area to be developed.



Table 12: Archaeological Impact Assessment

Impact Description				Pre-Mitigation									Post Mitigation										Priority Factor Criteria				
Identifier	Impact	Alternative	Phase	Pre-Nature	Pre-Extent	Pre-Duration	Pre-Magnitude	Pre-Reversibility	Consequence	Pre-Probability	Pre-mitigation Significance Score	Pre-Mitigation Significance	Post-Nature	Post-Extent	Post-Duration	Post-Magnitude	Post-Reversibility	Consequence	Post-Probability	Post-mitigation Significance Score	Post-Mitigation Significance2	Confidence	Cumulative Impact	Irreplaceable loss	Priority Factor	Final Score	Final Score Significance
Stone Tool Sites	Destruction or disturbance of identified stone tool sites and finds.	Alternative 1	Construction	-1	1	5	1	2	-2,25	5	-11,25	Medium to high -	-1	1	1	2	2	-1,5	2	-3	Low -	Medium	1	2	1,13	-3,38	Low -
Unidentified below-ground heritage features	Destruction or disturbance of undiscovered below-ground heritage features.	Alternative 1	Construction	-1	1	5	4	5	-3,75	2	-7,5	Medium to low -	-1	1	1	2	3	-1,75	2	-3,5	Low -	Medium	1	2	1,13	-3,94	Low -



7 RECOMMENDATIONS AND MITIGATIONS

Considering the Impact Assessment above, the following presents a list of mitigations proposed in light of the identified impacts.

7.1 SITE-SPECIFIC RECOMMENDATIONS AND MITIGATIONS

Table 13 provides a breakdown of recommendations and mitigations to be considered for inclusion in the Environmental Management Programme (EMPr) related to this project. These mitigations are associated with construction phase which may involve clearing of vegetation and removal of topsoil for proposed pivot agriculture activities. The mitigation measures recommended serves to address the potential of further discoveries advising for the implementation or recognition of a heritage protocol and chance find procedure as contemplated in Section 7.3.

Table 13: List of site-specific mitigations and recommendations

Activities	Phase	Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Time Period for Implementation
Construction which may involve clearing of land	Construction	Destruction or disturbance of stone tool sites and finds	<ul style="list-style-type: none"> The Developer must remain vigilant of heritage resources during the installation of the pivots, especially in the area around Pivot 8. SAHRA and an Archaeologist must be alerted should stone tool finds be found in higher densities (More than 20 finds/m²). The Heritage Protocol or Chance Find Procedure as described in 7.3 is advised to be followed should additional heritage finds or sites be encountered. 	NHRA	During construction activities
Construction which may involve clearing of land	Construction	Unidentified below-ground heritage features	A Heritage Procedure is advised to be followed should additional heritage finds or sites be encountered.	NHRA	During construction activities



7.2 OVERALL RECOMMENDATIONS

The site to be developed holds several heritage resources, mainly stone tool finds and sites. Should the development continue as proposed, these features will be destroyed or displaced. Through observation, it was ascertained that the context of the finds and sites were defined by processes which had displaced, disturbed, or altered their original context. Therefore, it is argued that the further disturbance or displacement of the finds will not result in the degradation of the heritage value of the site or area. Therefore, recommendation is given for the development to continue. The developer is further reminded to remain cognizant of the potential to discover unidentified above-ground and below-ground finds and sites. For instance, the stone tool finds and sites may be associated with an unidentified knapping or occupational site worth further investigation and conservation. For this reason, upon discovery of any additional heritage finds of an alarming significance, for example, graves or high density of small finds, a Heritage Finds or Chance Find Procedure should be followed.

7.3 HERITAGE PROTOCOL AND CHANCE FINDS

A heritage procedure is applicable where finds are identified during the initiation of the proposed activities. This procedure is guided by the NHRA but should correspond with the overall EMP_r drafted for the development. The following is a guideline on how a Heritage or Chance Find Procedure can be structured:

- In the event of a chance find which appears of significant value to the lay person, all development activities must be temporarily halted.
- Finds should not be displaced. Instead, their location should be recorded, and a short description prepared for further evaluation to follow.
- A qualified Archaeologist must be consulted to, firstly, record the find and evaluate its heritage significance. The Archaeologist should provide recommendations on how to approach the finds moving forward. This may include recommendations for the mitigation of impacts on the heritage resources in question.
- Should the Archaeologist recommend, development can resume following the application of recommendations and mitigation measures.

The above should act as a brief guideline which should form an intrinsic element of current or future Heritage Procedures or Protocols adopted by the developer of the project in question.

8 CONCLUSION

This report was prepared as part of a Phase 1 Heritage Impact Assessment for the proposed Genade Boerdery Middelplaats Pivot Agriculture Project. As part of this assessment, a desktop as well as an on-site evaluation of heritage impacts was conducted.

Through the methodology adopted as part of this assessment, heritage features were identified which can be avoided during the implementation of the proposed activities. Apart from unassessed chance finds and the disturbance of stone tool sites and finds, a Low impact on heritage features can be expected should the proposed mitigation measures be followed. Therefore, from an Archaeological perspective, the development will not have significant foreseeable impacts and can proceed as long as the recommended mitigation measures are implemented.



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Appendix 1: CV of the Archaeologist

CURRICULUM VITAE

Name:	Lucien Nicolas James
Nationality:	South African
Date of Birth:	4 May 1993
Profession:	Environmental Consultant and Archaeologist
Professional Qualification/ Training:	BA (Archaeology and Geography); Wits University, 2017
	BSc (Hons) Geography, Archaeology and Environmental Studies; Wits University, 2018
	MSc (Geography); Wits University, 2021
	Ph. D. (Geography); Wits University, 2024
Professional Membership/ Registrations:	Registered Candidate Environmental Assessment Practitioner (EAPASA reg. no. 2023/6772)
	Accredited Professional Archaeologist (ASAPA member no. 0619)
Publications:	James, L. & Simatele, M.D. 2024. Bystanders or active participants? Mobilising meaningful participation in River Basin Management: Lessons from the Gauteng Province, South Africa. <i>International Journal of River Basin Management</i> . https://doi.org/10.1080/15715124.2024.2417405 .
Current Employer:	Environmental Impact Management Services (Pty) Ltd.

KEY EXPERIENCE

Lucien James is an environmental consultant and archaeologist with experience in different fields across the Arts, Social Science, Natural Science, and academia in general. He has been employed by EIMS as an environmental consultant since March 2023 working on several projects under various roles. He is registered with EAPASA as a Candidate EAP. Lucien has obtained a BSc (Hons) in Geography, Archaeology and Environmental Studies (Archaeology-focused) and is accredited as a Professional Archaeologist with Association of South African Professional Archaeologists (ASAPA). He holds a MSc in Geography having done research on phytoremediation and the mining industry. In 2024, he completed his Ph.D. through research with a focus on collaborative River Basin Management in South Africa. He has worked as a Teaching Assistant (TA) and researcher since 2018 and engages in academic work through publications and conferences. He has taught 1st year, 2nd year, 3rd year and Honour's Archaeology and Geography courses. His research has been funded by the National Research Foundation (NRF) and the Water Research Commission (WRC). He has also published his research in an international academic journal. He has presented his research at a national level through various conferences in South Africa and has participated in other conferences and workshops on Climate Change and Climate Change Adaptation.



CAREER SUMMARY

Period: Current	Organisation: EIMS	Position: Environmental Consultant and Archaeologist
Key Projects/Assignments	<p><u>Project experience:</u></p> <ul style="list-style-type: none"> • AEMFC Herbert Prospecting Basic Assessment – Public Participation • Aries-Kronos 400kV Powerline Upgrade – Project Assistance, on-site specialist oversight, Water Use License • Block 3B/4B Oil and Gas Offshore Exploration EIA – Public Participation • ENEL Solar PV – External Audit • Harmony Freddie's to Target Pipeline Part 1 EA Amendment and WUL Amendment – Project Management • Harmony FSN Pipeline Basic Assessment – Public Participation • Harmony Kusasaletu Pipeline Basic Assessment – Public Participation • Harmony Mispah Pipeline Basic Assessment – Public Participation • Harmony Nooitgedacht TSF EIA – Public Participation • Harmony Valley TSF EIA – Public Participation • Kusile Power Station Temporary Stacks MES Postponement and AEL Variation Application • Mine Waste Solutions Kareerand Pipeline Basic Assessment – Public Participation • Mooiplaats WUL Amendment – Project Management • Mulilo Struisbult PV2 EMPr Amendment – Public Participation • Mulilo Struisbult PV2 Grid Connection Basic Assessment – Public Participation • Selkirk Avenue Development Pipeline Basic Assessment and EMPr – Project Assistance • Sibanye KDT1 Remining EIA – Public Participation and Heritage Impact Assessment (Exemption) • Sibanye Western Limb Tailings Re-treatment Facility Retrofitting Basic Assessment – Public Participation • Tetra4 Cluster 2 Gas Production EIA – Public Participation • Tetra4 Powerline Basic Assessment – Public Participation • Thungela Lephalale CBM EIA – Public Participation and Water Use License 	
Heritage Project/ Assignments	<ul style="list-style-type: none"> • Motouane RBD12 Pre-drill Survey Heritage Reporting 	



	<ul style="list-style-type: none">• Glencore RCM Phase 1 HIA• BMM Sandgat Prospecting Desktop HIA• BMM Oubip Prospecting Desktop HIA• Aqua Farming Droogfontein Pivot Agriculture HIA
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LANGUAGE CAPABILITY

Language	Speak	Read	Write
English	Excellent	Excellent	Excellent
Afrikaans	Basic	Intermediate	Intermediate
French	Excellent	Excellent	Excellent
Spanish	Basic	Intermediate	Intermediate
Latin	N/A	Basic	Basic

DECLARATION

I confirm that the above information contained in the CV is an accurate description of my experience and qualifications at the time of signature.


Signature of Staff Member

24/01/2025

Date



Appendix 2: Specialist Declaration

		SPECIALIST DECLARATION	
EIMS Ref	1683	Project Name	Genade Boerdery Middelplaats Pivot EIA

Project Details

Project Name	Genade Boerdery Middelplaats Pivot EIA
Applicant	Genade Boerdery (Pty) Ltd
Competent Authority	Northern Cape Department of Environment and Nature Conservation


Specialist Details

Specialist Company	Environmental Impact Management Services (Pty) Ltd			
Specialist Name	Lucien James			
Contact details	Tel	0117897170	Cell	0812376735
	E-mail	lucien@eims.co.za		
	Postal Address	PO Box 2083, Pinegowrie 2123, South Africa		
	Physical Address	8 Dalmeny Road, Pine Park, Randburg		

General Declaration

By signing this form, I hereby declare that:

- I act as an independent specialist in this application.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant.
- I declare that there are no circumstances that may compromise my objectivity in performing such work.
- I have expertise in conducting undertaking the specialist work as required, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity.
- I will comply with the Act, Regulations, and all other applicable legislation.
- I have not, and will not engage in, conflicting interest in the undertaking of the activity.
- I understand to disclose to the applicant and 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.
- I have taken into account, to the extent possible, the matters referred to in Regulation 18 when preparing the report, plan or document.
- I will provide the competent authority with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not.
- All the particulars furnished by me this form are true and correct.

		SPECIALIST DECLARATION	
EIMS Ref	1683	Project Name	Genade Boerdery Middelplaats Pivot EIA

- I will perform all other obligations as expected from an environmental assessment practitioner in terms of the Regulations.
- I am aware of what constitutes an offence in terms of Regulation 48 and that a person convicted of an offence in terms of Regulation 48(1) is liable to the penalties as contemplated in Section 49B of the Act.

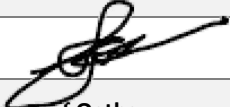
Disclosure of Vested Interest

- I do not have and will not have any vested interest (either business, financial, personal or other) in the proposed activity proceeding other than remunerative for work performed in terms of the Regulations.

Undertaking Under Oath/Affirmation

By signing this form, I swear under oath/affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signatures

Specialist					
Name	Lucien James	Signature		Date	11/03/2025
Commissioner of Oaths					
Name		Signature		Date	
Commissioner of Oaths Official Stamp					