Archaeological Impact Assessment for IGE Solutions' Proposed Waste Treatment Facility, Limeroc Business Park, Farm No. 385 Knopjeslaagte, Centurion, Gauteng Province

Phase 1 Archaeological Impact Assessment

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Declaration of Independence

The report has been compiled by Drs Matt Lotter and Tim Forssman acting as heritage specialists. The results expressed in this report have been collected using standard archaeological procedures and are objective. The authors declare no other conflicting interests in this report.

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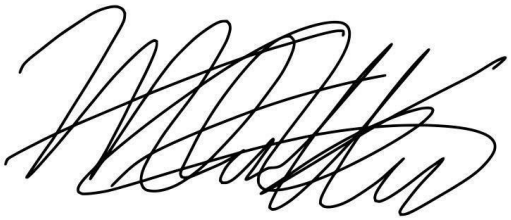

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List of acronyms

AIA	Archaeological Impact Assessment
EIA	Environmental Impact Assessment
ESA	Earlier Stone Age
MSA	Middle Stone Age
POI	Point of Interest
LSA	Later Stone Age

Glossary of terms

Find / Find spot	Either term is used to refer to an isolated find, a single artefact or item of cultural heritage. These may be significant but are not considered sites.
Site	An accumulation of cultural heritage, domestic remains or other human traces of human activity. It is a term used to refer to any area of this nature from very small (a few finds spatially associated with one another) to large and obvious residential or activity areas.

Executive Summary

Introduction

EScience Associates (Pty) Ltd contracted Drs Matt Lotter and Tim Forssman to perform an Archaeological Impact Assessment on two areas of land on Farm Number 385 Knopjeslaagte, within the Limeroc Business Park in Centurion, for the proposed development of a waste treatment facility by IGE Solutions.

Methods

The relevant portions of land were investigated on foot for any surface traces of cultural heritage. Where excavations had taken place on the property, these and their spoil heaps were also examined for any heritage traces. All finds or sites were recorded following standard archaeological procedures. A specially designed site recording form was used to notate any observable traits, including cultural heritage types, deposit information and assemblage or site context, and this was graded following a set rating criteria. All survey routes were GPS recorded and every find was photographed along with the landscape.

Results

The survey identified several factors that might have disturbed any archaeological remains, such as surface clearings, sporadic spoil stockpiles associated with construction and clearing activities underway within the Limeroc Business Park, and vehicle traffic. However, no tangible cultural heritage was found in either the preferred or alternative development locations.

Conclusions

It is anticipated that development will have no impact on cultural heritage in the proposed development areas and no recommendations are put forward. Nonetheless, there may still be cultural heritage subsurface that was not observable or inferable from surface finds, as is always the case. Should any cultural heritage be observed once development commences, a specialist must be consulted to perform an examination of the finds.

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1. Introduction

a. Scope of the study

EScience Associates (Pty) Ltd was appointed to conduct an Environmental Impact Assessment (EIA) for a proposed waste treatment facility on portions 109, 111 and 331 of Farm Number 385 Knopjeslaagte in the Limeroc Business Park, Centurion, for IGE Solutions. Drs Matt Lotter and Tim Forssman were subsequently appointed by EScience Associates to perform an Archaeological Impact Assessment (AIA) of the proposed area, and the relevant portions of land were examined.

b. Project description

The AIA covers all portions of the proposed development. The aim of the study was to identify any tangible cultural heritage present on the land and assess its importance and establish mitigation factors should an identified site or archaeological feature be at risk of destruction or damage. To do so, a survey was performed recording and grading all surface remains. Recording was performed following a standard record form. From these data, finds and sites were graded based on the rating criteria, which includes various conditions. This follows standard archaeological procedures.

c. Specialist expertise

Dr Matt Lotter has undertaken extensive and in-depth research at several Stone Age, Iron Age and rock art localities around southern Africa, as well as internationally in China, Lesotho and Botswana. He has been involved in a number of Phase 1 Heritage and Archaeological Impact Assessments as well as Phase 2 mitigations. He has also published several scientific articles with a focus on Earlier Stone Age technologies and geoarchaeological landscape evolution. He is registered with the Association of Southern African Professional Archaeologists (ASAPA, ID 339).

Dr. Tim Forssman has undertaken extensive and in-depth research at several Stone Age, Iron Age and rock art localities around southern Africa. He has been involved in a number of Phase 1 Heritage and Archaeological Impact Assessments as well as Phase 2 mitigations. He was the Project Leader on the Polihali Project for a year, overseeing the mitigation of 12 Stone Age sites and coordinating several specialists in the Stone Age, rock art, Iron Age and Intangible Cultural Heritage fields. He has also published several scientific articles with a focus on the Later Stone Age, Iron Age, rock art and archaeological methods. He is registered with the Association of Southern African Professional Archaeologists (ASAPA, ID 307).

d. South African legislation

South African legislation (NHRA) dictates that any item of cultural heritage may not be disturbed, interfered with, or destroyed without authorisation from a heritage authority. Following Nema (No 107 of 1998; 23: 2(b)), one should "...identify, predict and evaluate the actual potential impact on the environment, socio-economic conditions and cultural heritage". A specialist is required to perform the correct and appropriate identification, evaluating and assessing of cultural heritage significance following a rating criteria. Requiring and governing this assessment is the following South African legislation:

i. National Environmental Management Act (NEMA) Act 107 of 1998
ii. National Heritage Resources Act (NHRA) Act 25 of 1999
iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002
iv. Development Facilitation Act (DFA) Act 67 of 1995

In each Act, the following sections are applicable in terms of the identification, evaluation and assessment of cultural heritage resources:

i. National Environmental Management Act (NEMA) Act 107 of 1998:
    a. Basic Environmental Assessment (BEA) – Section (23)(2)(d);
    b. Environmental Scoping Report (ESR) – Section (29)(1)(d);
    c. Environmental Impacts Assessment (EIA) – Section (32)(2)(d); and,
    d. EMP (EMP) – Section (34)(b).
ii. National Heritage Resources Act (NHRA) Act 25 of 1999:
    a. Protected Areas – Section 28;
    b. Protection of Heritage Resources – Sections 34 to 36; and,
    c. Heritage Resources Management – Section 38.
iii. Minerals and Petroleum Resources Development Act (MPRDA) Act 28 of 2002:
    a. Section 39(3).

2. **Archaeological and historical background: desktop study**

a. Overview of the local archaeological sequence

Southern Africa has a lengthy archaeological sequence spanning approximately the last two million years. This has been conveniently separated into 'Ages', which themselves are further divided. While there are many issues with doing so, it provides a useful gauge for understanding different techno-complexes, periods, and cultural sequences. We follow this same categorisation here.

i. Stone Age

The Stone Age is composed of three divisions, which are further subdivided (Table 1). These primary divisions are the Earlier, Middle and Later Stone Ages. In southern Africa, the Earlier Stone Age (ESA) begins at approximately 2.1 million years ago. Early tools, which are ascribed to the Oldowan Industry, are large tools most often made from locally available raw materials. Tool form is not yet standardised and artefacts generally retain a limited number of flake removals, which are struck off using a hammerstone (Kuman 2014). The Oldowan is followed by the Acheulean Industry, from c. 1.75 to 0.3 million years ago, which is characterised by the occurrences of handaxes and cleavers, although this is probably over-emphasised since some Acheulean assemblages lack these. While a number of sites are known in southern Africa, they are fairly scarce (Figure 1) (Lotter & Kuman 2018).

The Middle Stone Age (MSA) follows and begins between 300 and 250 thousand years ago and gradually disappears between 40 and 20 thousand years ago. Assemblages older than 130 thousand years are rare, and from this time onwards more MSA sites are known. Assemblages from these sites are generally thought to be characterised by blade technology, prepared cores, formal tools exhibiting secondary retouch and a range of ornaments, jewellery and symbolic devices, such as engraved ochre slabs. It must be noted that there is variability between regions and time periods from 130 thousand years ago and the period has been divided into several phases. Notably, the Howieson's Poort Industry is one that is marked by smaller formal tools and segmented artefacts; it is a unique development and an early example of what came to characterise the following Later Stone Age (LSA). Assemblages dating between c. 100 and 50 thousand years ago are generally thought to possess cultural traits that indicate the appearance of modern thought or cognition, sometimes called complexity (Wadley 2015).

Table 1: The Stone Age in southern Africa (from Lombard et al. 2012: 125).

Period	SAL technocomplex	Also known as (including regional variants)
Later Stone Age <40 ka	*ceramic final Later Stone Age* <2 ka	ceramic post-classic Wilton, Late Holocene with pottery (Doornfontein, Swartkop)
	final Later Stone Age 0.1–4 ka	post-classic Wilton, Holocene microlithic (Smithfield, Kabeljous, Wilton)
	Wilton 4–8 ka	Holocene microlithic (Springbokoog)
	Oakhurst 7–12 ka	Terminal Pleistocene/early Holocene non-microlithic (Albany, Lockshoek, Kuruman)
	Robberg 12–18 ka	Late Pleistocene microlithic
	early Later Stone Age 18–40 ka	(informal designation); Late Pleistocene microlithic
Middle Stone Age >20 to <300 ka	*final Middle Stone Age* 20–40 ka	(informal designation) MSA IV at Klasies River, MSA 4 generally
	Sibudu 45–58 ka	late MSA/post-Howieson's Poort or MSA III at Klasies and MSA 3 generally (all informal designations)
	Howieson's Poort 58–66 ka	
	Still Bay 70–77 ka	
	pre-Still Bay 72–96 ka	(informal designation)
	Mossel Bay 77–105 ka	MSA II at Klasies River, MSA 2b generally (Pietersburg, Orangian)
	Klasies River 105–130 ka	MSA I at Klasies River, MSA 2a generally (Pietersburg)
	early Middle Stone Age 130–300 ka	(informal designation)
Earlier Stone Age >200 ka	*ESA-MSA transition* >200–600 ka	(informal designation) (Fauresmith, Sangoan)
	Acheulean 300 ka-1.5 Ma	
	Oldowan 1.5–2 Ma	

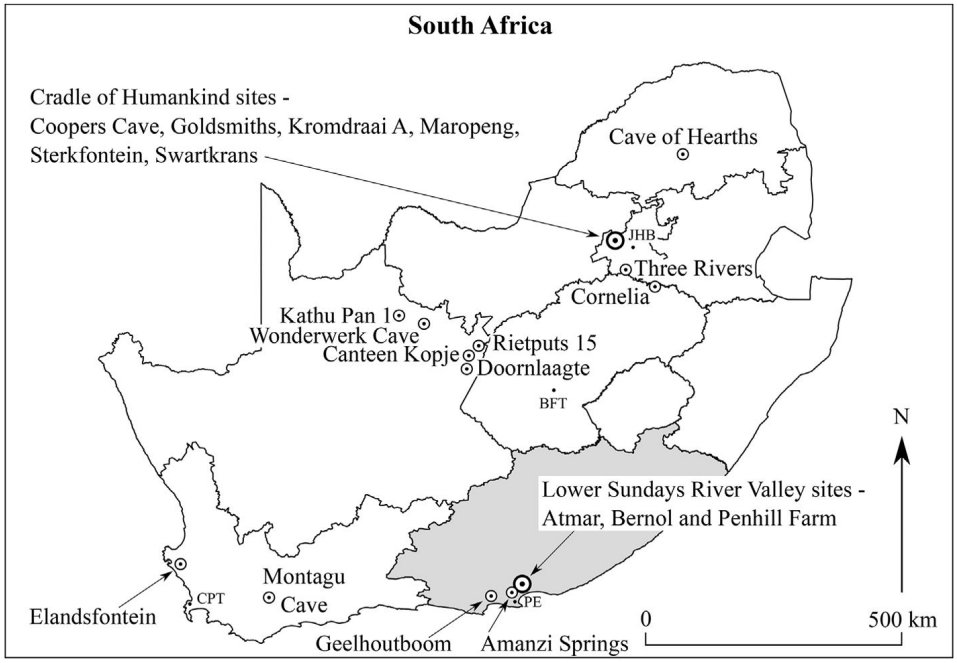

Figure 1: The distribution of Acheulean sites >0.5 million years in South Africa (from Lotter & Kuman 2018: 44).

The LSA is the final Age and begins during the transition from the MSA between 40 and 20 thousand years ago. This early period, though, is characterised by considerable variability that only gives way to a regionally standardised toolkit from after 20 thousand years ago. Small bladelets characterised this initial phase, which, around 12 thousand years ago, was replaced by a larger tool industry characterised by scrapers and adzes. Following this, the Wilton arose around eight thousand years ago and represents a highly standardised period of scraper, backed tool and adze production, although several phases are known, and includes a wide range of ornaments, jewellery, bone tools and rock art (Lombard et al. 2012). LSA-producing foragers, or hunter-gatherers, lived in almost every landscape in southern Africa and are represented today by Bushman or San[1] communities (Mitchell 2002).

Rock art was produced by many communities, but the best known is the rock art of hunter-gatherers who were also the producers of the LSA. The art typically captures trance experiences, which is when a shaman enters the spirit world through a trance dance. While in it, he or she will heal the sick, control game, ward off evil spirits and travel to neighbours or to God's village, as well as perform other tasks. Rock art generally depicts these scenes as well as folklore and mythology (Forssman & Gutteridge 2012). Khoekhoe herders had their own painting tradition, which is less well-understood, although at least some of it relates to girls' initiation. Bantu-language speaking groups also painted and generally their depictions are to do with initiation and conflict during the colonial era (Mitchell 2002). While their art is fairly well-studied, it is their occupation sequence of southern Africa that has dominated Iron Age research.

ii. Iron Age

Iron Age farmers began arriving in southern Africa little more than two thousand years ago. This was initially from Angola, through southern Zambia, the Caprivi Strip in Namibia, northern Zimbabwe and Botswana to settle in the central southern African region (Figure 2). Early settlements just north of the Limpopo River date to around AD 200. Soon afterwards, they entered what is now South Africa (Mitchell & Whitelaw 2005).

The most significant developments that occurred in the southern African region, at least at first, were those that began around AD 900 in northern South Africa. Here, farmers began exchanging local trade wealth for exotic items like glass beads from the Mozambique coastline where travelling merchants from the north based themselves. These items supported the local

[1] The terms Bushman and San have been used derogatorily in the past. Modern communities who draw their identity from present and past hunter-gatherers have requested that these terms be used to identify them when not referring to language groups. We do so here with the utmost respect and do not invoke any pejorative connotations.

growth of wealth, which was initially based on cattle and on locally sourced value items. This growth led to the beginning of elite communities based at what came to be prominent settlements. These then developed into political centres where social stratification appeared. Around AD 1220, these developments, along with several others, resulted in the establishment of Mapungubwe, southern Africa's first state-level society. When it declined, around AD 1300, Great Zimbabwe rose to prominence, which was succeeded by Khami and Thulamela (Huffman 2009). Although this gives the impression of a fairly straight-forward developmental process, it was in fact fairly heterogeneous.

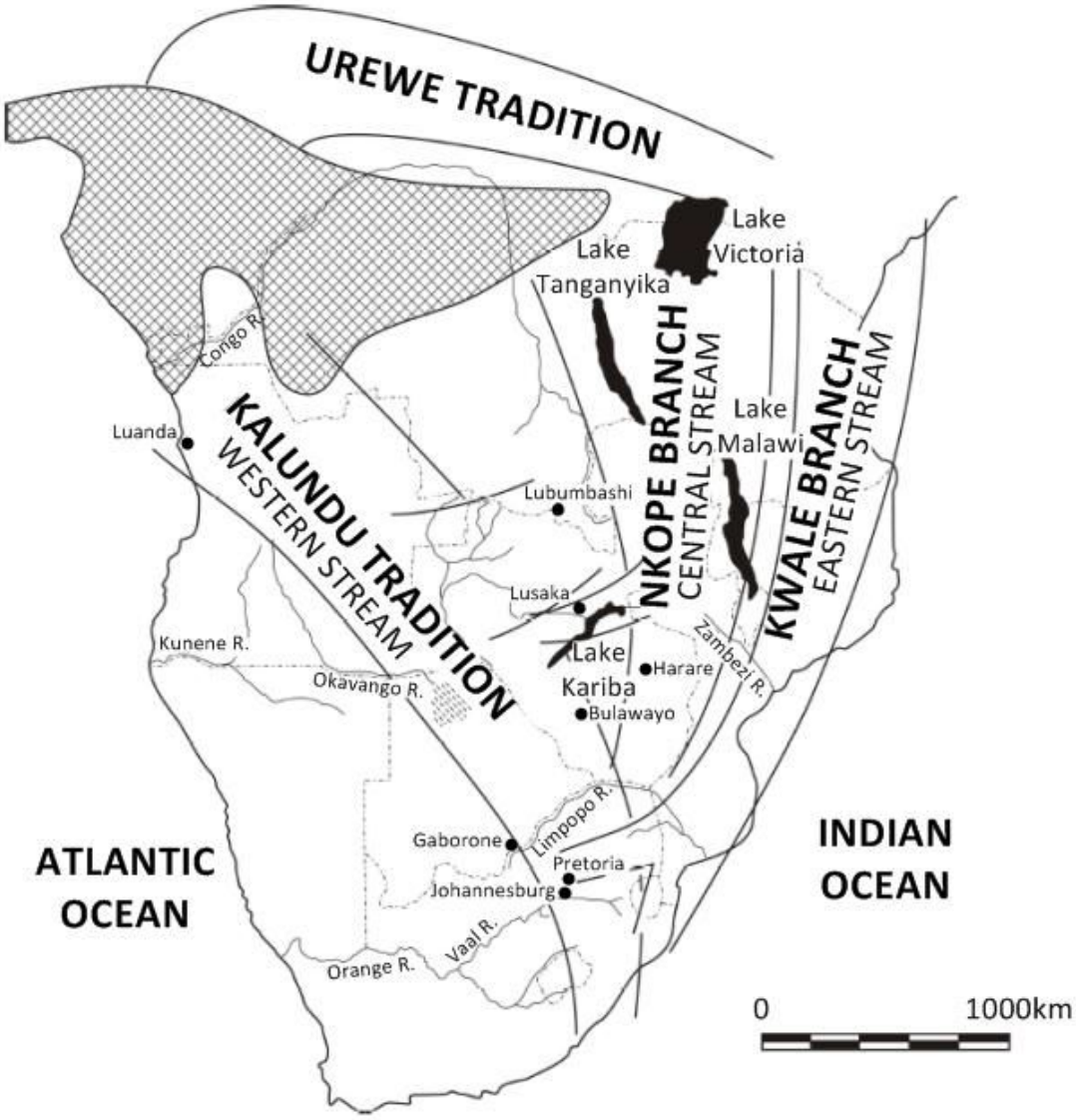

Figure 2: The appearance of farmer communities (Bantu-language speaking groups) in southern Africa (from Huffman 2007: 336).

Around the mid-second millennium AD, groups from the north, known by their ceramics called Ntsuanatsatsi, moved south into the North-West Province region. Here they established political control, around AD 1450 to 1500, and became the Tswana empire. These communities established massive urban centres, some over 3km in length, with complex political authorities (Pistorius 1994). Many are known through missionary and traveller accounts, such as those from William Burchell or Robert Moffatt in the 1800s, who encountered these capitals. The Tswana polity, which was made up of several totems, spread as far as modern-day Gauteng where they encountered Pedi, eSwati and Zulu communities (Sadr 2019).

Sometime between the 1810s and 1830s, the Difaqane (Sotho) or Mfecane (Zulu/Xhosa) took place. This was a period marked by conflict, raiding, food insecurity, and warfare. Although having its origins largely in KwaZulu-Natal, its impact was felt through-out much of eastern southern Africa and further north. At this time, different Zulu groups were covering vast regions and attacking settlements and villages taking resources, food, slaves and livestock. Some were driven as far north as Uganda. The impact of the conflict resulted in new settlement patterns, large-scale movements of people, and critical shortages of subsistence resources. It marked a tumultuous period in southern Africa's prehistory with the likely death of many thousands of people (Wright 1989).

The Iron Age is a notably diverse and complex period. Many different identities interacted, traded, fought, created alliances, and intermixed during this period. Thorough reviews exist but are not necessary in the context of this report; only some key events or histories have been discussed above (e.g. Huffman 2007). During this period, not only were farmer communities living in the region and meeting one another, but foragers and herders were also present. These three different communities had regular encounters that caused significant changes in one another's lifeways. The Iron Age also overlaps with the entire colonial period; even today many people practice a subsistence-based farming much as they did in the past. In the extended region, Iron Age settlements are located in the Magaliesburg and Rustenburg areas (Huffman 2002) and further west in the Cradle of Humankind.

iii. Colonial period

Prior to the Dutch establishing a refreshment station in what is now the Western Cape in 1652, Portuguese traders and travellers had made contact with local communities. Trading along almost the entirety of southern Africa's coastline for supplies and what to them was exotica, they encountered many of the communities mentioned in the text here. Their interactions included often detailed note taking and mapping of certain regions, which are hugely valuable to this day in terms of understanding the local social landscape. For example, their accounts of Sofala are highly valuable since this immensely influential trading post on the Mozambique

coastline has not been re-discovered. The Portuguese and also Arabic records are all we have of its existence and role in local economies (Wood 2000). From the settlement of the Western Cape, though, the influence of European colonisation was increasingly felt.

Settlement progressed slowly through southern Africa. At first, it was restricted to the fairly amicable Cape region with missionaries, travellers, biologists and explorers travelling inland. Contact with local herders and foragers was regular and there is evidence of some living or trading regularly with forts and outposts (Schrire 2014). Slaves were also taken and at some of the more prominent farms, such as Simon van der Stel's Vergelegen, a slave lodge was uncovered (Figure 3) (Markell et al. 1995). Interactions with local communities were highly nuanced and variable.

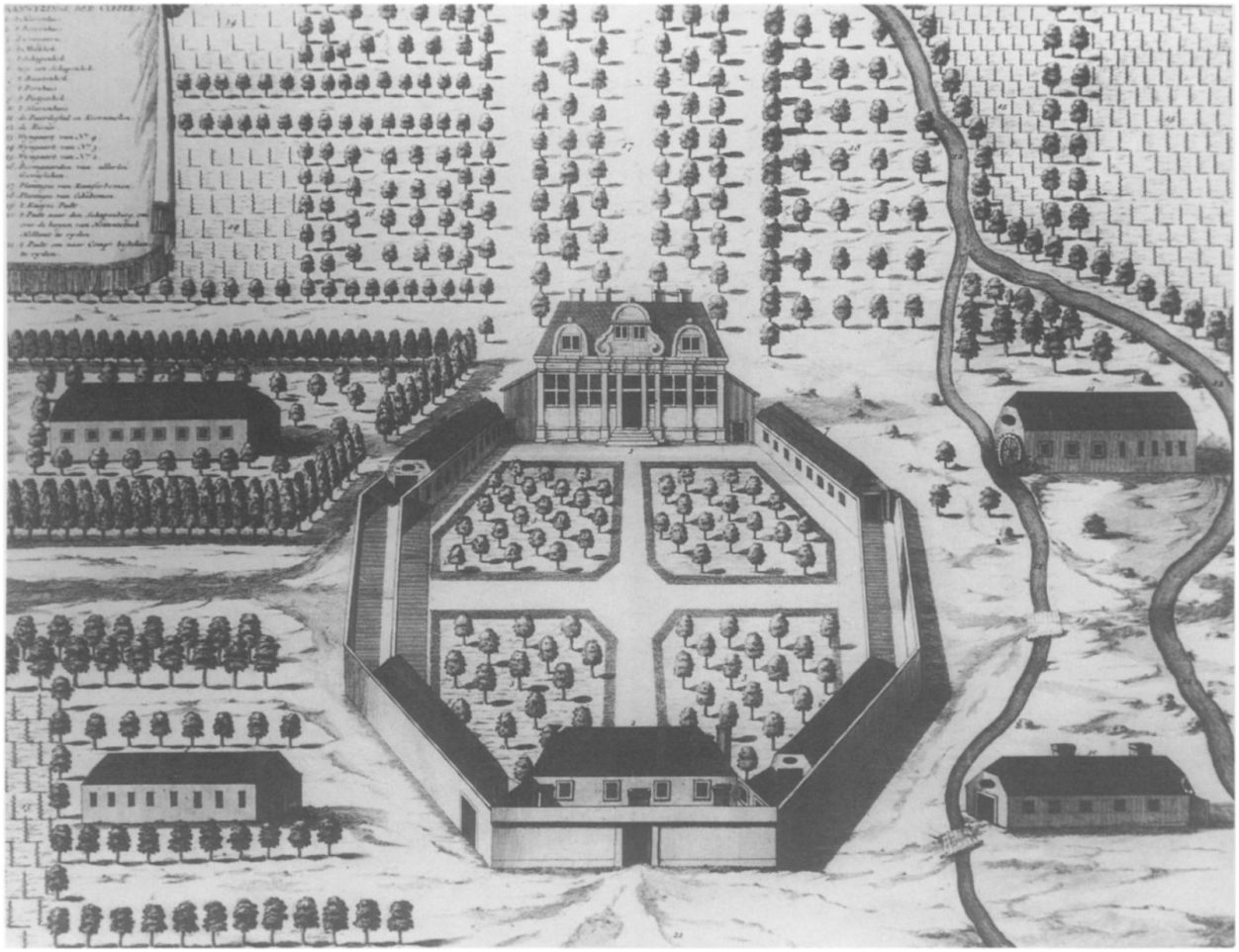

Figure 3: A depiction of Simon van der Stel's Vergelegen compound with the surrounding lodges (from Markell et al. 1995: 14).

The British took control of the Cape Colony in 1795 after the Battle of Muizenberg. This began a process of social disintegration with many European locals unwilling to contribute to the British

government and crown (although from 1803 to 1806 the Dutch regained authority temporarily). The end result was the Great Trek. In 1832, Dr Andrew Smith and William Berg, an Englishman and a Boer, set-off on an early exploratory trek along the coast towards what is now KwaZulu-Natal. On returning, they convinced Boer leaders of the potential the land held for farming, livestock and settlement. After a larger exploratory trek in 1834, the first wave of trekkers left in 1835 followed in 1836 by more. About 6000 people in total left on the trek led by now historically recognised figures such as Louis Tregerdt, Hans van Renburg and Hendrik Potgieter, among others. This led to the widespread settlement of Boers and others in the eastern and northern territories of South Africa, as well as conflicts with the Matabele and Zulu; a notable battle was held at the contested Ncome/Blood River site (Ngobese & Mukhuba 2018).

In the late 1800s, when the Zuid Afrika Republic and Oranje Vrijstaat (Orange Free State) states had been established, gold was discovered in the Transvaal (d. 1886). By this time, *uitlanders* (European foreigners) were living among the local Boer community and working in Johannesburg and Pretoria as well as paying taxes, for which they received less than the local Boers. Tension between the British and Boer states arose. With the discovery of gold the British saw it fit to attempt to take over the two states in order to protect their people living under Boer rule and also to thwart a German attempt at taking control of large parts of Africa. While this is hotly contested, and an over-simplification, it contributed to the South African War (formerly Boer War) from 1899 to 1902. The war ultimately claimed the lives of probably over 50,000 Boer and black (from several communities) people as well as many British soldiers and those from the colonies. The Boer's ceded in May 1902 and the British formed the South African Republic. Boers continued living in the new republic although many resisted and wished to continue fighting. If it were not for the work of Jan Smuts and others, persistent warfare and angst may have continued (Judd & Surridge 2013).

While southern African archaeology and history is a complex matter, what is presented here is an overview and somewhat narrow summary of certain key events in the region's prehistory before about 1900. For a thorough review, see Mitchell (2002).

b. Archaeology and history of the study area and surrounds

Both ESA and MSA assemblages are known in the wider region, nearer Pretoria, but few LSA sites have been investigated. The former two Stone Ages have been identified at several locations in the Cradle of Humankind (Lombard et al. 2012), which is also where the nearest LSA sites have been studied (Wadley 1989). However, with regard to ESA traces, Mason (1962) investigated a number of nearby sites including in Wonderboom, approximately 30km northeast of the development area. Some of the sites he investigated have yielded large and impressive assemblages that may provide significant insights into the local Stone Age sequence.

It is conceivable that other areas in this region also contain impressive Stone Age assemblages. No rock art is known of in the vicinity around Pretoria or Centurion, and the nearest site that has received research attention is near Bronkhorstspruit (Forssman & Louw 2018).

The history of the Gauteng region is dominated by a single event; the discovery of gold in 1886. The succeeding South African War was very much linked to the industry that developed after the initial identification of gold reserves. Soon after its discovery, many individuals and enterprises sought to gain their riches through gold mining activities. This is often termed 'The Gold Rush'. It led to a great influx of people into the Zuid Afrika Republic including many European foreigners, and eventually led to British interference (Judd & Surridge 2013). However, it was later realised that not only was gold available, but also many other minerals and resources. Mining developed into a massive industry in the early 1900s and still is to this day.

In the vicinity of Pretoria, silver was mined. Soon after 'The Gold Rush', silver mining began in various areas. However, the market for silver varied from that of gold, which was far more valuable and stable. Silver mining, for this reason, fluctuated between 1885 and the mid-twentieth century. Reserves were found in many areas of eastern Pretoria and silver veins extended throughout the wider region allowing mines to be set up in a number of locations (Figure 4). Silverton, for example, was named as such because of the cluster of mines known in the area. These mines largely belonged to prominent Randlords and businessmen and some became their residential areas, such as at The Willows (Reeks 2012).

The potential for there being remains from any one of these periods or events in the Centurion area, or within the proposed development area, exists. Moreover, the presence of Iron Age people in the extended region and the Stone Age traces found in the Pretoria area, at sites such as Wonderboom, make the possibility of finding these traces also high. However, based on reports from the immediate area, the local preservation of these traces is unlikely.

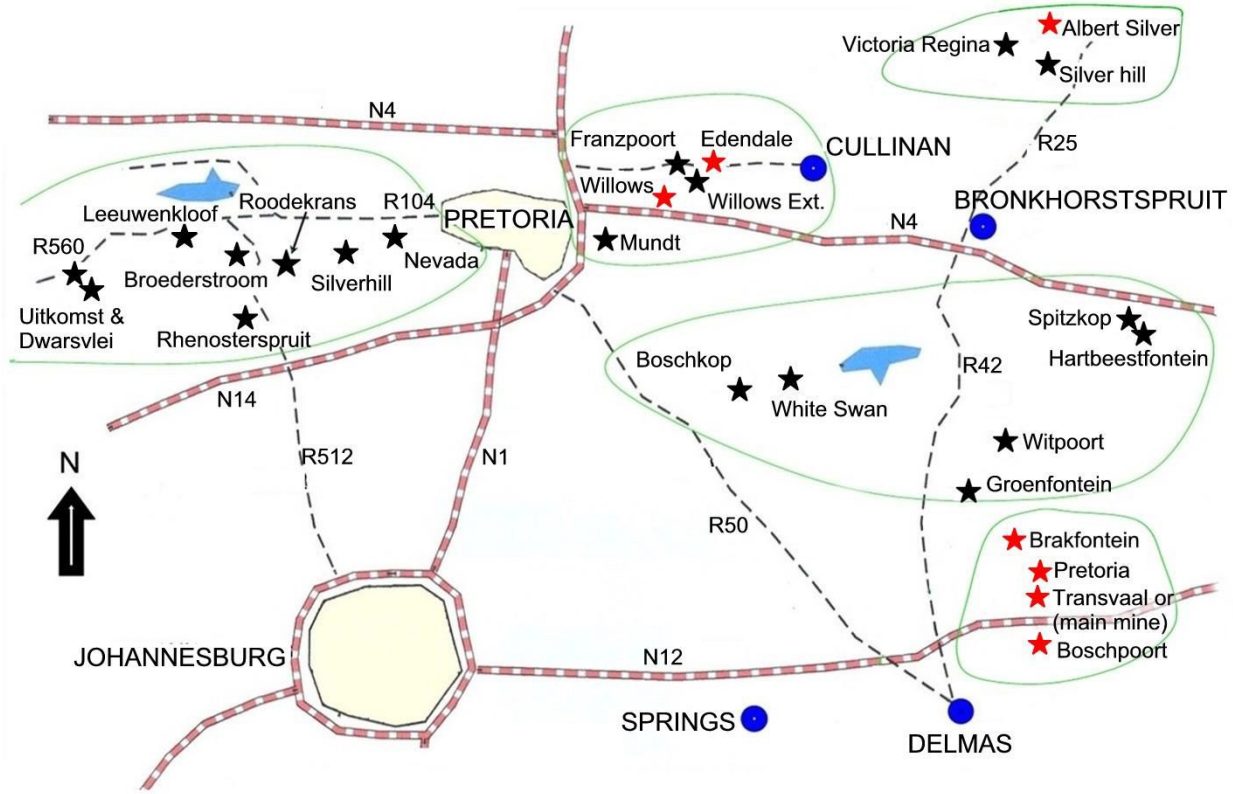

Figure 4: Principle gold and silver mines in the Gauteng region (from Reeks 2012: xvi).

a. Database consulted

The South African Heritage and Resources Agency's (SAHRA) online database, SAHRIS, was consulted. Several reports from the vicinity were examined and these include impact assessments, scoping reports and basic assessments. It should be noted that these reports are generally from within 10km of the Limeroc Business Park, but studies from areas beyond this, which are numerous, are only included here when they provide a significant contribution to this assessment. Of greatest relevance though are two Phase 1 Heritage Impact Assessments that were completed on the property in 2017, within the Limeroc Business Park boundary.

These assessments comprised part of portion 109 and a part of the remainder of portion 331 (Marais-Botes 2017a), and portion 111 (Marais-Botes 2017b). For the former (Marais-Botes 2017a), the survey was required prior to the proposed Peach Tree X 23 Development, which would consist of a Light Industrial Township. Farming and previous infrastructural developments were noted to have affected the two property portions, and no tangible or intangible heritage sites were identified. Similarly, for the latter (Marais-Botes 2017b), a survey was required prior to the proposed Industrial Extension 1 and 2 for the Peach Tree X 25

Development, during which it was also noted that the survey area was disturbed in a similar fashion to the other portions (i.e., previous farming and infrastructure activities). No tangible or intangible heritage sites were identified on portion 111 (Marais-Botes 2017b).

On the southern boundary of the N14 and located a short distance away from the Limeroc Business Park, an 89ha portion of the Farm Diepsloot 388JR was surveyed ahead of development. No archaeological or heritage traces were recorded but a single mud-stone multi-room building was identified. It was recorded and no further recommendations for any preservation or mitigation were made (Coetzee 2008). Given the close proximity of this survey area and its archaeological sparseness, this supports the results contained in this report.

Beyond this, stretching in a south to southeastern arc and at its furthest point 7.7km away from the development area, is the Lulamisa-Diepsloot East-Blue Hills-Crowthorne 88kV powerline. A heritage assessment along this powerline resulted in no finds of any significance. Although this survey examined only the development area and a buffer around it in a transect-like survey design, thus missing large portions of the landscape with high occupation or activity potential, it does provide insight into the localised distribution of heritage resources in the area (van Schalkwyk 2018).

Archaeology Africa conducted a Phase 1 survey of the Cedar Park Development in Portions 5 and 64 of Bultfontein 533JQ, 9.5km southwest of the proposed development area (along the N14). Four sites were identified: a cemetery and three historic multi-component sites, which may also contain graves. It was recommended that the sites be preserved or mitigated should they be impacted (Birkholtz 2007). As of 16 July 2020, it appears that development has not been initiated.

Directly west, in the Blair Atholl Country Estate (12.2km), an archaeological assessment identified Earlier and Middle Stone Age tools in a secondary/disturbed context. The area also contained two stone-walled kraals from the last c. 500 years. None of these finds were recommended for mitigation (van Schalkwyk 2004).

The National Cultural History Museum have conducted several surveys in the immediate and extended region of the proposed development area. On the Farm Olifantsfontein 410JR in Midrand, approximately 13km southeast, 14 sites were identified, all of which would be impacted by developments. Here, it was noted that streams and rivers were used during Stone Age times (van Schalkwyk 2002a). If a local trend, it might indicate that an area of concern would be the watercourse to the east of the Business Park, which is not on the premises. Nonetheless, any settlement nearby might have utilised a portion of the Farm Number 385 Knopjeslaagte.

Approximately 5km southwest from the Olifantsfontein Farm, the National Cultural History Museum also surveyed an area of the Zonk'izizwe Property alongside the Grand Central Airport, Midrand. No pre-colonial cultural remains were noted, but a racetrack with grandstands was recorded and was not recommended for mitigation (van Schalkwyk 2007).

The following reports were consulted but none identified any archaeological or heritage remains (arranged from nearest to furthest; approximate distances in parenthesis are from the proposed development area, followed by direction):

- A survey of cultural resources for Laezonia, Centurion (van Schalkwyk 2002b): 1-4km, west.
- Basic Cultural Heritage Assessment for the proposed Diepsloot East Power Line and new substation, Gauteng Province (van Schalkwyk 2013a): 3.2km, southeast.
- Scoping report for the aggregate and sand mining right application by Carocode (Pty) Ltd. (Isowel Trading and Project (Pty) Ltd. 2017): 4.2km, west (this is a scoping report and an Archaeological Impact Assessment is forthcoming).
- Archaeological survey of Blue Hills Farm, Midrand (Huffman 1999): 6.2km, southeast.
- Basic Cultural Heritage Assessment for the proposed bulk water supply pipeline between Lanseria and Cosmos City, Gauteng Province (van Schalkwyk 2013b): 15km, southwest.

Based on this review of the available reports on SAHRIS, it appears that there are heritage remains in the area and these include pre-colonial material culture and historic activities, such as farming, track racing and other developments, as well as Earlier and Middle Stone Age tools in the wider area. However, of the identified tangible cultural heritage, only a small proportion has been recommended for preservation or mitigation and this is mostly when graves are involved.

2. Materials and methods

a. Site location and description

The proposed waste treatment facility is currently earmarked for portions 109, 111 and 331 of Farm Number 385 Knopjeslaagte, within the Limeroc Business Park, which is located in Centurion and within the Tshwane Municipality (Figure 5). South of the proposed development area is the N14 Highway and beyond this is Timsrand. To the west is the R511 and Laezonia and east is Knoppieslaagte. Forming the northern boundary is the R114 (25° 54’ 19” S; 28° 02’ 05” E) (Figure 5). Two specific development areas have been proposed, one of which is in the eastern (25° 54’ 12” S; 28° 02’ 16” E, co-ordinates approximately from the centre of the development area) and the other is in the western (25° 54’ 22” S; 28° 01’ 48” E) portion of the property. The eastern portion is the preferred location (portion 111 of Farm Number 385 Knopjeslaagte) and the western area is the alternative location (portions 109 and 331 of Farm Number 385 Knopjeslaagte; referred to as such henceforth).

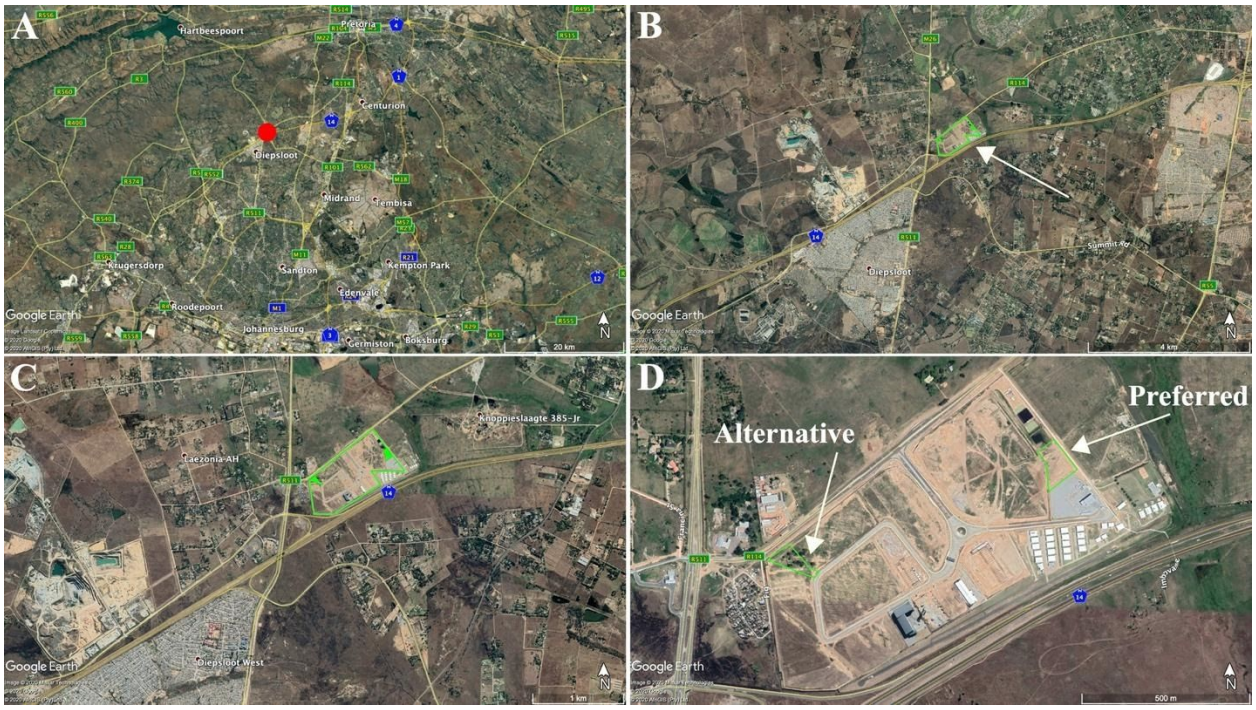

Figure 5: Google Earth map showing the study area: The study area’s context within Gauteng (A; red circle=site location), Pretoria, Johannesburg and Centurion (B; white arrow pointing towards Limeroc Business Park, which is outlined in green) and Diepsloot (C; showing Business Park boundary and the two proposed development locations which are shown by the opaque green polygons) and a bird’s eye view of the study area itself (D; with preferred and alternative development locations indicated).

The preferred development area (approximately 0.9ha) occurs towards the east of the Business Park on gently sloping land that continues down towards a nearby drainage line (beyond the Business Park perimeter boundary). This area is extensively modified and contains minimal surface vegetation (sporadic clumps of grass along the boundaries) and un-modified (natural) surface sediments. The area is currently a high-traffic zone due to nearby construction activities.

The alternative development area to the west is approximately 0.6ha and comprises an open, flat landscape that is covered in short grasses and occasional trees. The northern boundary comprises a gravel road, stockpiled sediments and some associated shallow diggings. In the central area, sporadic trees are clustered together around which there are other minor surface disturbances and some sporadic associated debris.

b. Study methods

i. Archival study: background literature review

An archival and heritage desktop study was performed. Literary sources from previous archaeological, anthropological and historical studies from the region were consulted, as well as previous impact assessment from the area. The results from this study are presented in **Section 2: Archaeological and Historical Background: desktop study**.

ii. Site visit and survey

The site visit was conducted by Dr Matt Lotter on Tuesday, July 14th, 2020. This involved a foot survey across the property as indicated by supplied location information (within both of the relevant proposed delineations). A systematic sampling method was employed during the survey, in which high profile areas and areas most likely to contain preserved archaeology were visited. All archaeological occurrences were sufficiently recorded, photographed and described and a GPS (Garmin 64s) was used to record the surveyed tracks.

The following equipment was utilised during the field assessment:

- Garmin GPS 64s
- Canon D70 DSLR camera
- Samsung Note tablet
- Field journal and stationery
- Photographic scales
- Compass

- Cellular telephones
- Tape measures

To record heritage remains, a standard site recording form designed by the consultants was relied on in order to ensure consistency. This form records: location, site and deposit context, human and animal interference, cultural material, chronological markers, deposit depth and cultural material diversity. From this, each recording is provided a grading which is then combined to generate an overall site rating out of 10. Sites above six are considered important and assessed further in order to determine what mitigation, if any, is required.

Points of interest (POI) were also recorded. These are locations that have some item of interest, although in the case of this report, these did not have any cultural heritage significance.

iii. Reporting

All finds are reported herein. Every detail recorded in the site recording form is presented along with the location of the find or site and photographs, where applicable. The results from the grading assessment, with their justification, are also presented alongside the find or site data. In cases where no finds or sites are made, such an assessment is not provided.

c. Constraints and limitations

As listed in **4. Results and discussion** (below), several factors have contributed to the potential disturbance of archaeological remains, namely: surface clearings, sporadic spoil stockpiles associated with construction and clearing activities underway within the Limeroc Business Park, and vehicle traffic. The gravel road and stockpiled sediments in the alternative development area may also have had a negative impact on the preservation and context of archaeological remains, although on inspecting these no cultural material was identified.

Furthermore, as with all archaeological surveys, the primary goal is to identify cultural material exposed on the surface. From this, one is able to make inferences about what may also lie below the surface. However, without actual test trenches or geotrenches, it is not possible to be certain what is represented underground. Moreover, underground heritage remains may not be represented on the surface making their identification impossible. This serves as a considerable limitation. Should any cultural heritage be identified when the development begins, a specialist must be consulted to examine the finds.

4. Results and discussion

The entire portion of both the preferred and alternative development areas was surveyed as shown in Figure 6. Therefore, from the survey, an accurate and inclusive assessment was possible and the results apply to the entirety of each location. Since the survey was restricted to these areas only, the findings cannot be applied to any area outside of the development impact areas within the confines of the Limeroc Business Park.

Figure 6: Survey tracklog indicated in red while the green polygons demarcate the development area boundaries (A). The alternative development area to the west (B) and the preferred development area to the east (C) are also indicated.

Both the preferred and alternative development areas are disturbed. For example, in the preferred area to the east, historic imagery in Google Earth indicates that it was largely

vegetated in early 2018, but thereafter and until early to mid-2019 there have been considerable changes to the landscape. Currently, the area receives heavy traffic from construction vehicles (Figure 7). As a result of this largely modified landscape, it is currently not possible to determine what impact these activities have had on preserved heritage in the area (if any, given its current complete absence). Part of the alternative development area appears to have been agricultural fields within the last 10 years. Presently, there are sporadic spoil stockpiles associated with construction and clearing activities and the landscape surface is largely deflated (Figure 8).

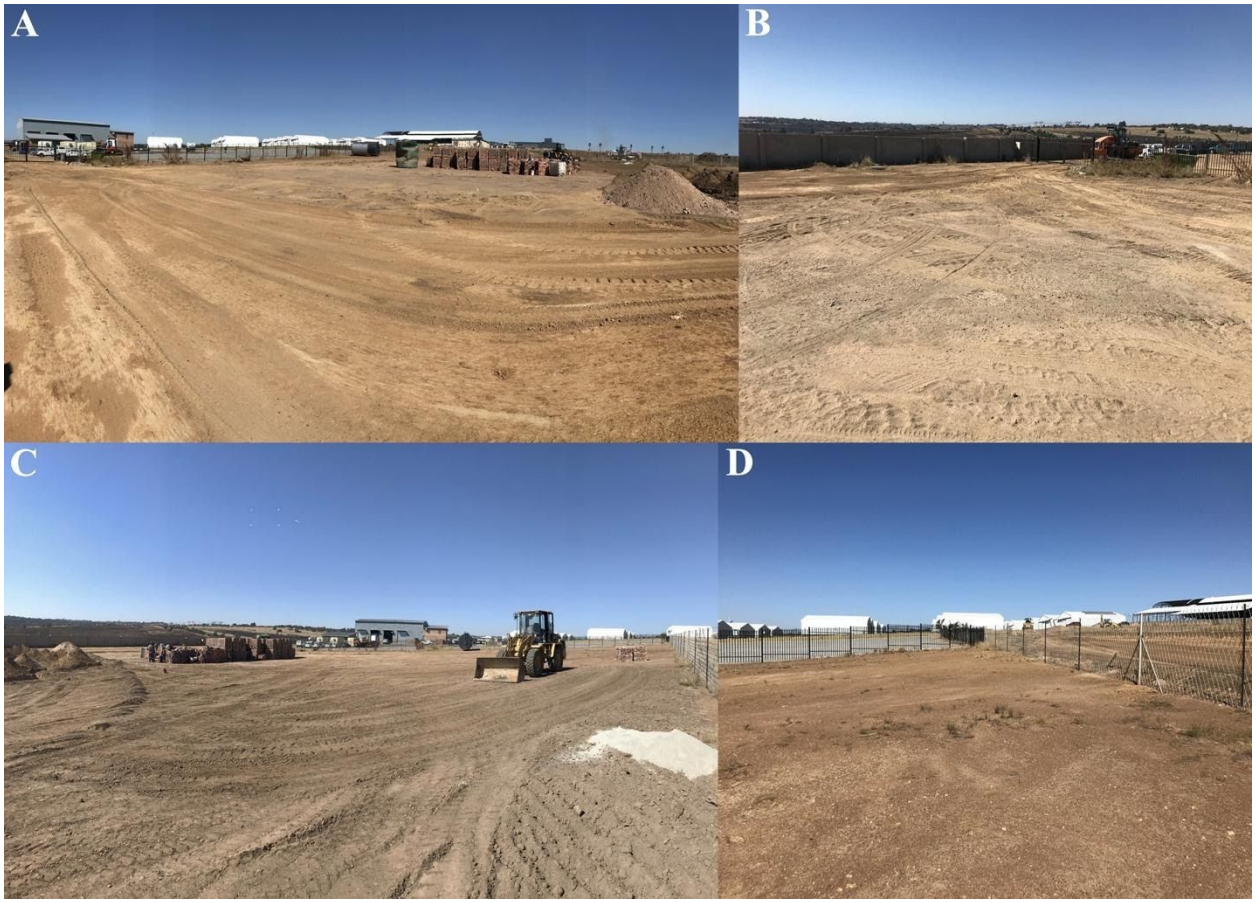

Figure 7: Various images of the preferred location looking southwest (A), east (B), southeast (C) and south (D). All the images show the impact of surface clearing and vehicle traffic (save for D), which may have impacted tangible cultural material if it was present.

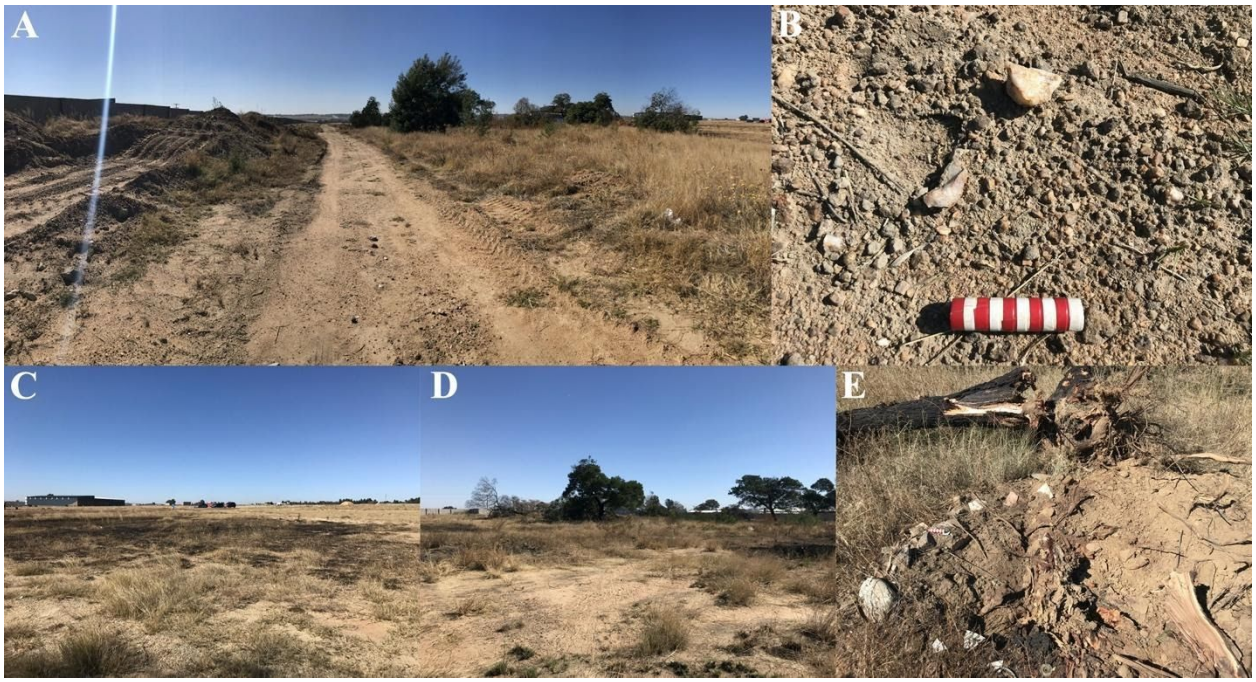

Figure 8: Various images of the alternative development location. This flat parcel of land has a gravel road and stockpiled sediment along its northwestern boundary (A). Natural quartz geofacts (chucks) are frequently found at the surface (B; scale=10cm). General views of this location (C and D) and additional surface disturbances (E) are also indicated.

No cultural heritage was located on the surface in either the preferred or alternative development areas; this supports the observations made in 2017 by Marais-Botes (2017a,b). The stockpiled sediment in the alternative area provided a potential view for what may lie below the surface, in conjunction with the associated shallow diggings adjacent to the gravel road, but no tangible cultural material was noted within these deposits (Figure 8A). Sporadic natural geofacts were also located, comprising quartz chunks and fragments, but these are non-artefactual and non-archaeological (Figure 8B).

Although there are certain limitations that may have inhibited identification (**2.c. Constraints and limitations**), it is highly unlikely that any surface archaeology was not identified.

5. Development impact and proposed mitigation

a. Development impact

The development within the limits of the proposed impact areas are not anticipated to have any impact on cultural heritage. In addition, given the sparseness of archaeological sites and material within the immediate area, based on a review of relevant heritage reports on SAHRIS and the results of two prior HIA surveys on portions 109, 111 and 331 as reported by Marais-Botes (2017a,b), it is unlikely that the proposed development will have any significant impact on cultural heritage.

b. Recommendations

No heritage finds of any significance were identified in the impact footprint of the proposed waste treatment facility. Therefore, regarding the visible cultural heritage, there are no recommendations.

However, developers should be cognisant of the possibility that once development commences, cultural heritage buried underground may be exposed. Should this occur, the development in the vicinity of the find should be halted and a specialist must be consulted to examine the finds.

6. Conclusions

Escience Associates contracted Drs Matt Lotter and Tim Forssman to perform an Archaeological Impact Assessment on portions 109, 111 and 331 of Farm Number 385 Knopjeslaagte, within the Limeroc Business Park, Centurion, to assess the impact that a proposed waste treatment facility may have on any heritage. The relevant portions of land were investigated for surface traces of cultural heritage. Where sporadic, shallow surface diggings had taken place on the property, these and their spoil heaps were also examined for any heritage traces. None were found. Despite this, there may still be cultural heritage subsurface that was not observable or inferable from surface finds, as is always the case. Should any cultural heritage be observed once development commences, a specialist must be consulted to perform an examination of the finds. It is, nonetheless, anticipated that development will have no impact on cultural heritage in the proposed development area and no recommendations are put forward.

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