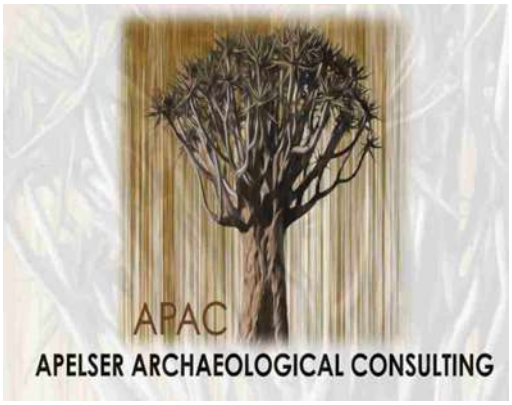


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# A REPORT ON PHASE 2 ARCHAEOLOGICAL MITIGATION WORK ON STONE AGE SITES LOCATED AT THE KATHU EXTENSIONS 6-10 TOWNSHIP ESTABLISHMENT ON PORTIONS 1 & 2 OF THE FARM KALAHARI GHOLF & JAG LANDGOED 775 GAMAGARA LOCAL MUNICIPALITY (KATHU), NORTHERN CAPE PROVINCE

For:

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REPORT: **APAC019/109**

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***November 2019***

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**DISCLAIMER:**

**Although all efforts are made to identify all sites of cultural heritage (archaeological and historical) significance during an assessment of study areas, the nature of archaeological and historical sites are as such that it is always possible that hidden or subterranean sites, features or objects could be overlooked during the study. APELSER Archaeological Consulting can't be held liable for such oversights or for costs incurred as a result thereof.**

**Clients & Developers should not continue with any development actions until SAHRA or one of its subsidiary bodies has provided final comments on this report. Submitting the report to SAHRA is the responsibility of the Client unless required of the Heritage Specialist as part of their appointment and Terms of Reference**

## SUMMARY

APelser Archaeological Consulting (APAC) was appointed by Maxim Planning Solutions in 2018 to undertake a Cultural Heritage Resources Impact Assessment in respect of proposed township establishment (Kathu Extension) on Portions 1 & 2 of the farm Kalahari Gholf & Jag Landgoed 775 in the Gamagara Local Municipality (Kathu) of the Northern Cape Province.

A number of archaeological and recent historical sites and finds were identified in the study area during the January 2018 assessment (**See Report APAC018/04**), and recommendations on their mitigation were provided in this report. In their Final Comments Letter (**dated to the 20th of March 2019**) on the Phase 1 HIA Report for the proposed Kathu Extensions 6-10 Township Establishment (**Case ID# 13135**), SAHRA concurred with the findings of the Heritage Specialist regarding the Phase 2 Archaeological Mitigation Measures required. A permit for the work was issued to APAC cc (**Permit ID#3024 & Case ID#13944**) at the end of September 2019. Dr. David Morris of the McGregor Museum in Kimberley will serve as Principal Investigator for the project, while the McGregor Museum will be the Curating Institute for the cultural material (Stone Age artifacts) recovered and sampled from the area during the field work.

The fieldwork was conducted at the end of October/early November 2019. The results of the fieldwork are discussed in this report. A number of recommendations on the way forward in terms of the continued monitoring of the ongoing development work in the area are provided at the end.

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## 1. INTRODUCTION

APelser Archaeological Consulting (APAC) was appointed by Maxim Planning Solutions in 2018 to undertake a Cultural Heritage Resources Impact Assessment in respect of proposed township establishment (Kathu Extension) on Portions 1 & 2 of the farm Kalahari Gholf & Jag Landgoed 775 in the Gamagara Local Municipality (Kathu) of the Northern Cape Province.

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The client indicated the location and boundaries of the Project Area, and the fieldwork focused on this area and the archaeological sites identified during the 2018 Heritage Impact Assessment.

## 2. TERMS OF REFERENCE

The Terms of Reference for the Kathu Extensions 6-10 Phase 2 Archaeological Mitigation were to (**See SAHRA Permit**):

1. ***Sites 1 and 2 must be appropriately mitigated and a representative sample collected.***

2. ***Construction work around Site 5 must be monitored. Any exposed archaeological deposits must be mapped and sampled.***

3. ***Detailed mapping and recording of all the identified Stone Age archaeological sites must be undertaken as per SAHRA's original recommendations.***

4. ***Due to the close proximity of the development to Kathu Pan Grade 1 site, the excavations related to the construction activities must be continually monitored for archaeological resources.***

5. ***The corridor (Drainage Lines) identified between A - L represented in the Geotechnical Report Map as part of the Environmental Authorization must be monitored by the specialist archaeological team. The extent of the monitoring must be determined in consultation with the specialist archaeological team.***

## 3. LEGISLATIVE REQUIREMENTS

Aspects concerning the conservation of cultural resources are dealt with mainly in two acts. These are the National Heritage Resources Act (Act 25 of 1999) and the National Environmental Management Act (Act 107 of 1998).

### 3.1 The National Heritage Resources Act

According to the above-mentioned act the following is protected as cultural heritage resources:

**a. Archaeological artifacts, structures and sites older than 100 years**
b. Ethnographic art objects (e.g. prehistoric rock art) and ethnography
c. Objects of decorative and visual arts
d. Military objects, structures and sites older than 75 years
e. Historical objects, structures and sites older than 60 years
f. Proclaimed heritage sites
g. Grave yards and graves older than 60 years
h. Meteorites and fossils
**i. Objects, structures and sites of scientific or technological value.**

The National Estate includes the following:

a. Places, buildings, structures and equipment of cultural significance
b. Places to which oral traditions are attached or which are associated with living heritage
c. Historical settlements and townscapes
d. Landscapes and features of cultural significance
e. Geological sites of scientific or cultural importance
f. **Sites of Archaeological and palaeontological importance**
g. Graves and burial grounds
h. Sites of significance relating to the history of slavery
i. **Movable objects (e.g. archaeological, palaeontological, meteorites, geological specimens, military, ethnographic, books etc.)**

A Heritage Impact Assessment (HIA) is the process to be followed in order to determine whether any heritage resources are located within the area to be developed as well as the possible impact of the proposed development thereon. An Archaeological Impact Assessment (AIA) only looks at archaeological resources. An HIA must be done under the following circumstances:

a. The construction of a linear development (road, wall, power line, canal etc.) exceeding 300m in length
b. The construction of a bridge or similar structure exceeding 50m in length
c. Any development or other activity that will change the character of a site and exceed 5 000$m^2$ or involve three or more existing erven or subdivisions thereof
d. Re-zoning of a site exceeding 10 000 $m^2$
e. Any other category provided for in the regulations of SAHRA or a provincial heritage authority

***Structures***

Section 34 (1) of the mentioned act states that no person may demolish any structure or part thereof which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

A structure means any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith.

Alter means any action affecting the structure, appearance or physical properties of a place or object, whether by way of structural or other works, by painting, plastering or the decoration or any other means.

***Archaeology, palaeontology and meteorites***

Section 35(4) of this act deals with archaeology, palaeontology and meteorites. The act states that no person may, without a permit issued by the responsible heritage resources authority (national or provincial)

a. destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

b. destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

c. trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

d. bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment that assists in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

e. alter or demolish any structure or part of a structure which is older than 60 years as protected.

**The above mentioned may only be disturbed or moved by an archaeologist, after receiving a permit from the South African Heritage Resources Agency (SAHRA). In order to demolish such a site or structure, a destruction permit from SAHRA will also be needed.**

***Human remains***

Graves and burial grounds are divided into the following:

a. ancestral graves
b. royal graves and graves of traditional leaders
c. graves of victims of conflict

d. graves designated by the Minister
e. historical graves and cemeteries
f. human remains

In terms of Section 36(3) of the National Heritage Resources Act, no person may, without a permit issued by the relevant heritage resources authority:

a. destroy, damage, alter, exhume or remove from its original position of otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;

b. destroy, damage, alter, exhume or remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority; or

c. bring onto or use at a burial ground or grave referred to in paragraph (a) or (b) any excavation, or any equipment which assists in the detection or recovery of metals.

Human remains that are less than 60 years old are subject to provisions of the Human Tissue Act (Act 65 of 1983) and to local regulations. Exhumation of graves must conform to the standards set out in the **Ordinance on Excavations** (**Ordinance no. 12 of 1980**) (replacing the old Transvaal Ordinance no. 7 of 1925).

Permission must also be gained from the descendants (where known), the National Department of Health, Provincial Department of Health, Premier of the Province and local police. Furthermore, permission must also be gained from the various landowners (i.e. where the graves are located and where they are to be relocated to) before exhumation can take place.

Human remains can only be handled by a registered undertaker or an institution declared under the **Human Tissues Act** (**Act 65 of 1983 as amended**).

### 3.2 The National Environmental Management Act

This act states that a survey and evaluation of cultural resources must be done in areas where development projects, that will change the face of the environment, will be undertaken. The impact of the development on these resources should be determined and proposals for the mitigation thereof are made.

Environmental management should also take the cultural and social needs of people into account. Any disturbance of landscapes and sites that constitute the nation's cultural heritage should be avoided as far as possible and where this is not possible the disturbance should be minimized and remedied.

## 4. METHODOLOGY

### **4.1** Survey of Literature

A survey of available literature was undertaken in order to place the development area in an archaeological and historical context. The sources utilized in this regard are indicated in the bibliography.

### **4.2** Field Survey/Mapping/Sampling of Material

All the Stone Age sites (including Sites 1, 2 & 5) were revisited and mapped onto a Site/Development Map, while new localities were also recorded. The corridor (drainage lines) between Points A-L on the development's Geotechnical Report Map was also re-assessed, while the trenches and roads (newly dug and cleared as part of the Services being implemented by Barzani Civils for the Kathu Extensions 6-10 Development were inspected for exposed archaeological sites and material. All new sites and finds were also mapped by GPS and photographed. Sites 1 & 2 were sampled as required, while further samples were taken from the old tar road section located in the development area as well as from the trenches and new road sections in the area.

### **4.3** Oral Histories

People from local communities are sometimes interviewed in order to obtain information relating to the surveyed area. It needs to be stated that this is not applicable under all circumstances. When applicable, the information is included in the text and referred to in the bibliography.

### **4.4** Documentation

All sites, objects, features and structures identified are documented according to a general set of minimum standards. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality. The sampled archaeological material (stone tools) will be properly recorded photographically and provided with accession number that will be given by the McGregor Museum in Kimberly for inclusion and curating in their Archaeological Collection.

## 5. DESCRIPTION OF THE AREA

APelser Archaeological Consulting (APAC) was appointed by Maxim Planning Solutions to undertake a Cultural Heritage Resources Impact Assessment in respect of proposed township establishment (Kathu Extension) on Portions 1 & 2 of the farm Kalahari Gholf & Jag Landgoed 775 in the Gamagara Local Municipality (Kathu) of the Northern Cape Province.

The topography of the study area is relatively flat, with few if any rocky outcrops. The vegetation cover consists of low shrubs and thorn trees and very little grass cover. The area is characterized by stretches of white and red sands (Aeolian) and calcrete outcrops. An old dry streambed runs roughly from east to west through the area, while a section of the old (tarred) Sishen-Kuruman road runs from north to south on the eastern side of the area. The old (now

dysfunctional) Khai Appel Recreational Resort/Caravan Park is located on its western boundary, while new residential (township) developments are found on its eastern boundary. A number of old dry pans are located in the larger area, as well as recent quarries for various materials in some areas. A small section close its eastern boundary has also been recently cleared of trees. The area is however not heavily disturbed by past agricultural activities and rural/urban developments. The Sishen Iron Mine is located a few kilometers to the south of the area.

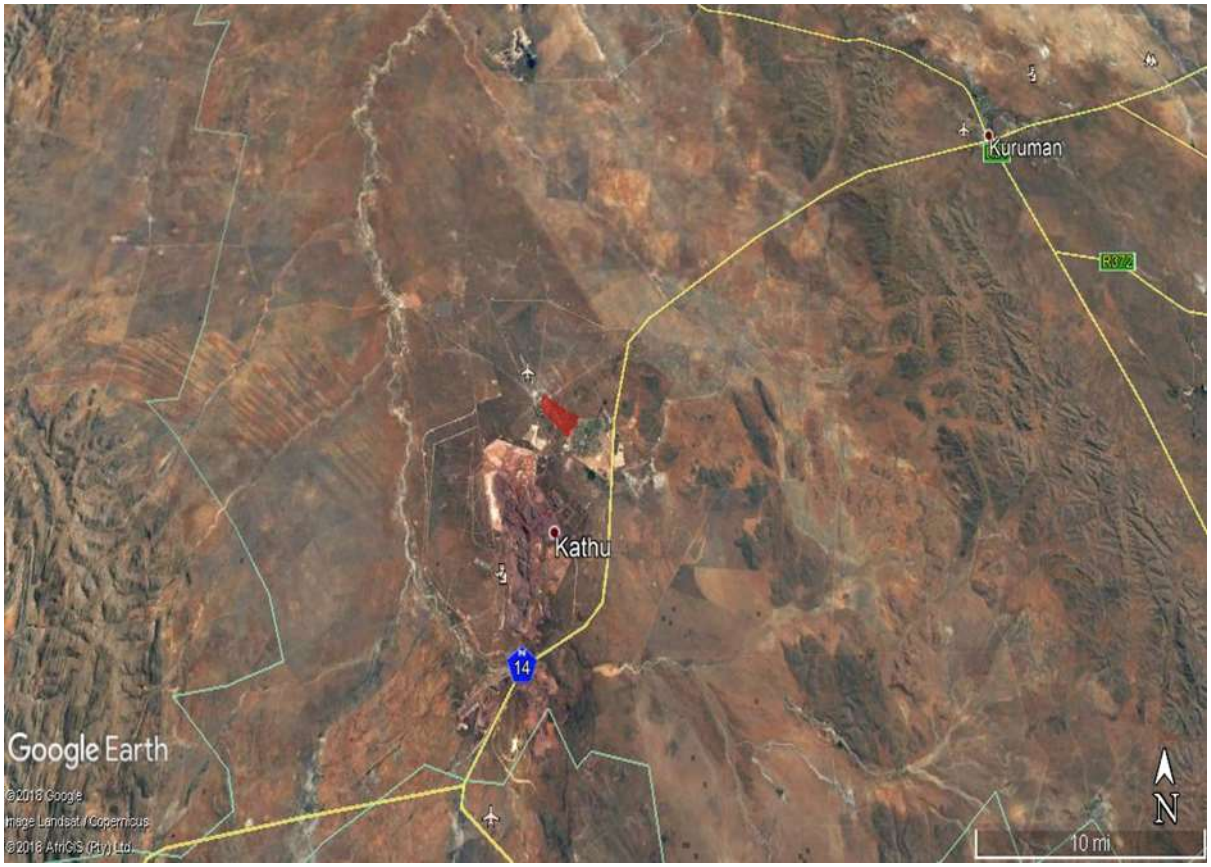


**Figure 1: General location of study area (Google Earth 2018).**

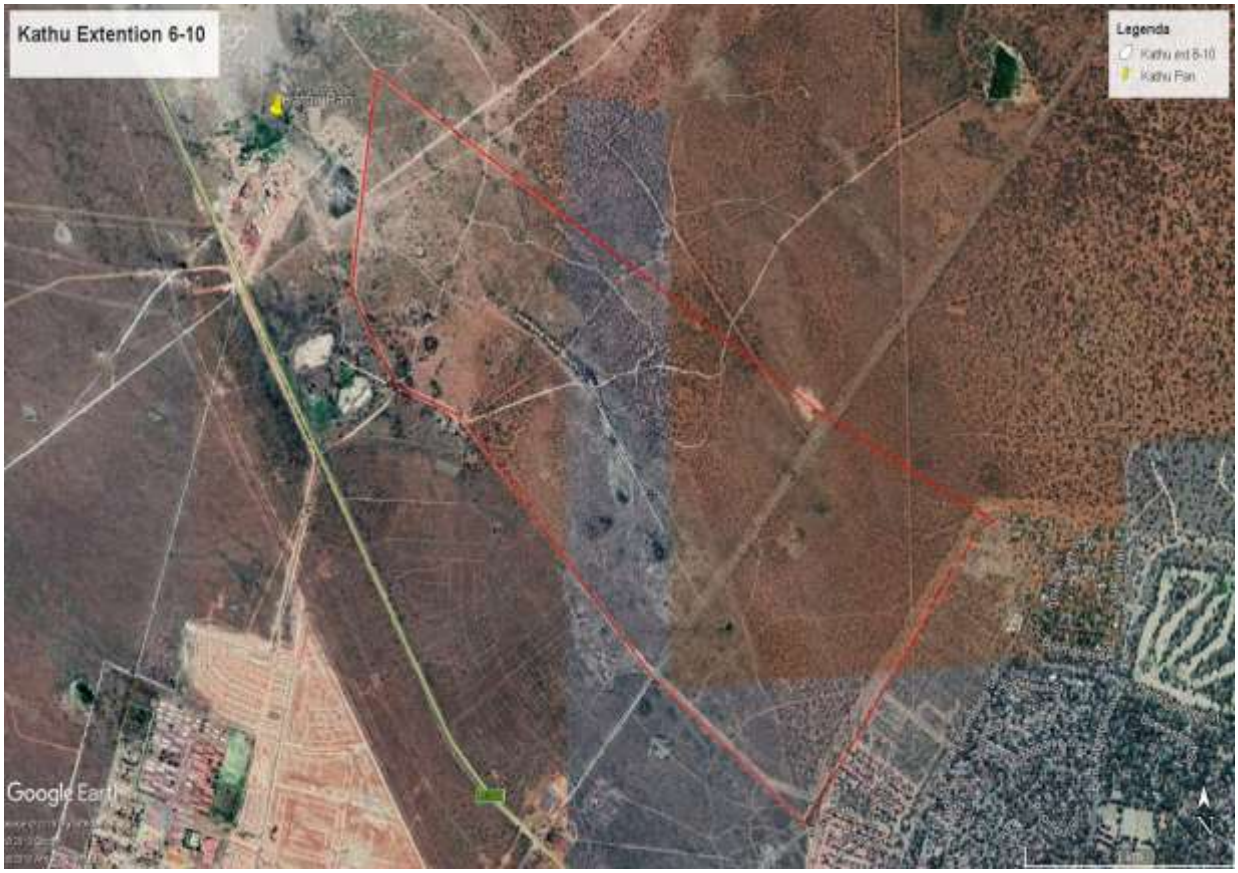


**Figure 2: Closer view of study area. The significant Archaelogical Site of Kathu Pan is situated to the north-west of the area (Google Earth 2019).**


**Figure 3: Detailed Layout Plan for Kathu Extensions 6-10 (courtesy Maxim Planning Solutions).**

**Figure 4: View of the old Sishen-Kuruman tar road running partially through the area.**

**Figure 5: A partial view of the old river bed (drainage line) in the area.**

**Figure 6: A view of the red Aeolian (Kalahari) sands characterizing large sections of the study area.**

## 6. DISCUSSION

*"The Kathu Archaeological Complex is a cluster of significant archaeological, principally Stone Age, exposures situated in and near Kathu. The sites include a suite of sinkhole exposures, the Kathu Pan sites, north west of the town, the immensely rich spread of artifacts at what is referred to as Kathu Townlands on the eastern side of Kathu (now surrounded by urban development), and surface and subsurface horizons including handaxes on farms further eastward. These are subject to on-going archaeological research.*

*At Kathu Pan, north-west of the town, evidence of early hominin occupation has been observed at multiple sinkhole sites within the pan. The locality known as Kathu Pan 1 has Earlier Stone Age deposits (Stratum 4b) characterized by well-made handaxes. Above it, Stratum 4a is dated by a combination of OSL and ESR/U-series dating to circa 500 000 years Before Present. The stone artifact assemblage from Stratum 4a is characterized by a prepared core technology that produced both blades and points, and has been attributed to the Fauresmith industry.*

*In a paper published in Science in November 2012, Jayne Wilkins and colleagues reveal evidence of 500 000 year-old stone points (excavated by Peter Beaumont in 1979-1982), argued to represent the earliest stone-tipped spears yet found. This conclusion, based partly on experimental comparison of use wear, is taken to indicate that human ancestors used stone-tipped weapons for hunting 200 000 years earlier than previously thought. Wilkins is quoted as saying that "the find does more than simply extend the prehistory of stone-tipped spears – it puts those first spears firmly in the hands of Homo heidelbergensis. Modern*

*foragers use such tools to take down large game as part of cooperative, strategic hunts. Perhaps our ancestor did so too"* (www.wikipedia.org)..

The fieldwork was undertaken during the last week of October and beginning of November 2019. Development work for the Kathu Extensions 6-10 Township Establishment had already commenced, with the installation of services such as water and sewerage pipe lines and roads. Bush clearance has also been done in sections. As a result large areas have been impacted already (through activities such as the digging of trenches and placement of pipes). However, the known archaeological sites recorded during the 2018 HIA were still intact. The development activities – although impacting on the archaeology – provided the specialist team with the opportunity to identify previously unknown sites and material that would otherwise have been impossible.

The archaeological mitigation work, as recommended in the SAHRA Permit, is as follows:

1. Sites 1 and 2 must be appropriately mitigated and a representative sample collected.

2. Construction work around Site 5 must be monitored. Any exposed archaeological deposits must be mapped and sampled.

3. Detailed mapping and recording of all the identified Stone Age archaeological sites must be undertaken as per SAHRA's original recommendations.

4. Due to the close proximity of the development to Kathu Pan Grade 1 site, the excavations related to the construction activities must be continually monitored for archaeological resources.

5. The corridor (Drainage Lines) identified between A - L represented in the Geotechnical Report Map as part of the Environmental Authorization must be monitored by the specialist archaeological team. The extent of the monitoring must be determined in consultation with the specialist archaeological team.

The results of the work undertaken is discussed in detail below

**Results of the October/November 2019 Fieldwork**

*Mitigation of Sites 1 & 2 and Sampling of Stone Age material*

Sites 1 & 2 are very close to each other and are situated next to the old tar road and in the road reserve. During the 2018 HIA stone tools were found scattered amongst gravel used for the road construction and included cores, handaxes, possible choppers, broken blades, flakes and waste. When the rest of the tar road section was assessed it became clear that these types of tools are located only close to and in the road reserve (an approximately 15m section both sides). Beyond that hardly any material occurred. At the time it was thought that it was highly likely that this Stone Age material came from a secondary source (i.e. a quarry from which the road building material was sourced) and is not in situ. However it was believed that the range of material found here made the "road site" relatively significant and if the road were to be impacted (re-used/removed) it was recommended that possible surface sampling of representative material should be undertaken undertaken. A further recommendation was that

the source of the material should also be traced and the Stone Age material mapped along the road.

**GPS Location of Sites:** S27 41 13.40 E23 01 36.90 (1); S27 41 12.80 E23 01 37.00 (2)

**Figure 7: View of a section of the tar road in October 2019.**

**Figure 8: View of a part of the road reserve in October 2019. The reserve has been cleared.**

**Figure 9: Another section of the road showing spoil heaps from trenches dug next to the road for pipelines.**

**Figure 10: Another view of a section of the road showing trenches and pipe sections ready for laying.**

The sample strategy followed was as follows:

i. 5 Blocks of 10m x 5m was laid out a intervals of between 300m and 400m along the tar road section that is located in the development footprint. The blocks were measures out alternately on the left and right of the road

ii. Block A was next to the trench dug by the developer for a pipeline, with Block B next to the road section into the road reserve. Block C was laid next to the tar road, with one half in a disturbed section of the road reserve and the other half in an "undisturbed" section. Block D was again next to the road, with Block E in the proximity of Sites 1 & 2 but on the opposite site of where they were recorded.

iii. All the Stone Age material (tools/flakes/cores/waste) in each block was selected photographed, counted and bagged for removal. The material will be analyzed in detail later and accessioned as part of the McGregor Museum's Archaeological Collection

iv. The stratigraphic layering in the exposed trenches next the road was also photographed as part of the process and will be briefly discussed further on in this section.

Detailed analysis of the material will be done at a later stage by Dr. David Morris (the appointed Principal Investigator for the project) of the McGregor Museum in Kimberley and presented in a Final Report to SAHRA. A total of 254 artifacts were sampled in the 5 Blocks,

which taking into account that 250 square meters were sampled is not very dense. However it needs to be stated that only material visible to the naked eye was collected (on the surface of each block) and that no digging was undertaken. There might therefore be many more artifacts in these areas that were covered by debris from the recent trenching and the old road construction activities. Most of the artifacts are on quartzite/banded iron stone material.

***Block A – S27 40 42.40 E23 02 03.80***

In this block a total of 27 ESA/MSA artifacts were recovered, including waste/debitage, core tools and unfinished handaxes.

***Block B – S27 40 50.30 E23 01 57.80***

A total of 40 ESA/MSA artifacts were recovered from this block. Again this consisted of a waste/debitage, core and flake tools, worked flakes and a possible chopper/chopping tool.

***Block C – S27 41 00.40 E23 01 47.20***

A total of 49 artifacts were sampled from Block C. This included once again waste/debitage, core tools (including hand axes), flakes and flake tools.

***Block D – S27 41 07.90 E23 01 41.50***

This block produced a total of 67 artifacts that included waste/debitage, core and flake tools, "unfinished" handaxes and some broken blades.

***Block E - S27 41 12.10 E23 01 36.70***

Block E, situated close to Sites 1 & 2, produced the most artifacts, with a total of 71 recovered. This consisted of waste/debitage, core tools (handaxe, choppers/chopping tools, possible cleaver) and flake tools (scrapers and blades).

**It needs to be noted here that the number of artifacts recovered from the blocks, increased the further away from the current trenching next to the road the team moved. Soil and other debris from this could have covered much more material than what was visible on the surface. Furthermore it should be mentioned that the largest concentration of Stone Age material in these blocks were found between the tar edge and a few meters into the road reserve. The further away from the edge one moves the more artifact density decreases.**


**Figure 11: Aerial view showing the tar road with the sample blocks (A-E) and Sites 1 & 2 (Google Earth 2019).**

**Figure 12: Block A.**

**Figure 13: The artifacts sampled from Block A.**

**Figure 14: A view of Block B.**

**Figure 15: The artifacts sampled from Block B.**

**Figure 16: A view of Block C.**

**Figure 17: Some of the artifacts from Block C.**

**Figure 18: More of the sampled artifacts from Block C.**

**Figure 19: Block D.**

**Figure 20: Artifacts from Block D.**

**Figure 21: More artifacts from Block D.**

**Figure 22: Block E.**

**Figure 23: Some of the Block E artifacts.**

**Figure 24: More of the artifacts sampled in Block E.**

The trenches dug around the tar road section in the development were also inspected for possible in situ Stone Age material and to determine the stratigraphic layering present here. A section of trench dug directly at the northern end of the tar road (**See Figure 25**) showed the following stratigraphy:

1. Tar layer (around 02-05cm)
2. Gravel/rocky layer with possible Stone Age material (20 - 30cm)
3. Compacted gravel/soil/disturbed calcrete base of road (between 40 & 70cm in places)
4. Natural calcrete bank (between 1m and 1.50m in places

A section of trench on the western edge of the road (**See Figure 26**) showed the following:

1. Debris from the trench digging (around 10cm)
2. Sand with pebbles, gravel, disturbed caclrete chunks and possible Stone Age material (between 30 & 40cm)
3. Natural calcrete bank

A section of dug trench on the eastern edge of the road was also investigated and photographed but the stratigraphy was very disturbed (**See Figure 27**).

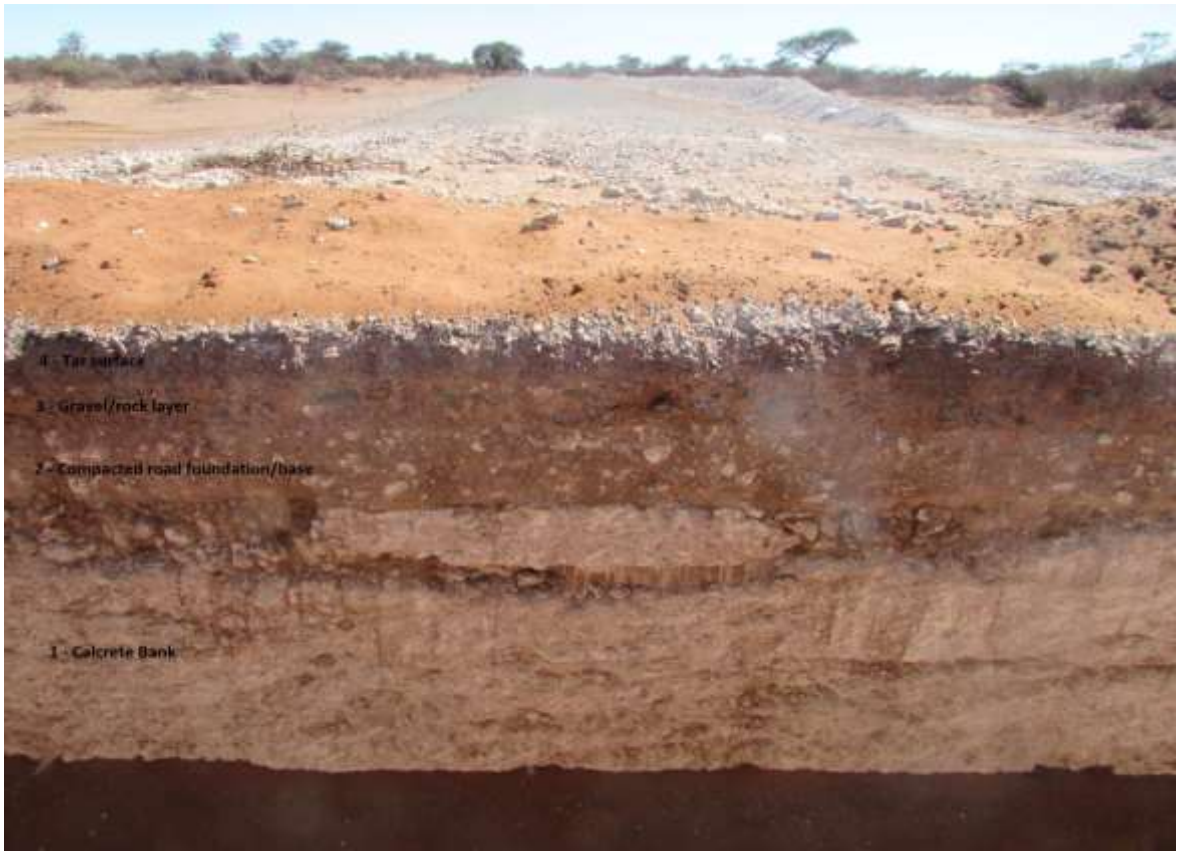


**Figure 25: Trench through northern section of tar road.**


**Figure 26: View of section of trench on western edge of tar road.**

**Figure 27: View of trench on eastern side of tar road.**

The Stone Age material identified and sampled next to the tar road section in the development area is similar to those found at the Kathu Townlands site and discussed in a 2014 article by Walker et.al.

"*Kathu Townlands is a site situated between the Kuruman Hills to the east and the Langberge mountains to the west on a low hill and is covered with a dense surface of lithics interspersed with exposures of bedrock, calcrete, and sand. Dense and broadly distributed archaeological deposits pose methodological and management challenges. The town of Kathu is rapidly expanding and this development is directly threatening Kathu Townlands. The site was designated a Grade 1 National Heritage site in 2013. However, the threat to deposits beyond the declared area remains acute*.

*The bedrock lithology is Precambrian, with exposures of banded iron formation (BIF), which belong to the Kuruman Formation within the late Archean to earliest Paleoproterozoic Transvaal Supergroup. There is a wide degree of variability within the BIF in the Kuruman Formation both in terms of the scale of banding and the percentage of chert (SiO2) relative to iron-rich minerals. The outcroppings at Kathu Townlands (sometimes designated as jaspellite) are dominated by chert and show no fine-scale banding. As a result the structure of these rocks is ideal for stone tool manufacture and it is likely that the availability of high quality raw material is a major reason for repeated exploitation of the resource and the high density of stone tool and knapping debris at Kathu Townlands. Circular white to grey fossil traces are characteristic of the raw material found at Kathu Townlands. Outcroppings of raw material with similar fossil traces have not been identified in the surrounding region.*

*The Kuruman Hills are today drained by a series of ephemeral streams that flow northwest. None of these streams pass through the research area, the closest drainage is the Vermulsleegte, to the north of the site. There is evidence for far more substantial drainage systems at some point in the geological past in the area around Kathu. At the Bestwood site the archaeological horizon is underlain by at least ten meters of river gravels and similar deposits are known from other localities in the region, although no such deposits are known at Kathu Townlands. Calcretes are a common feature in the area around Kathu and figure significantly in the deposits in the vicinity of Kathu Townlands. Calcretes develop in arid or semi-arid environments as the result of lateral and vertical movement of carbonates in solution but the diagenetic process causing the development of these deposits can vary depending on local conditions. At the Mamatwan Mine near Hotazel, a calcrete horizon approximately 2 meters thick produced optically stimulated luminescence ages of 113,000 and 108,000 years ago. Without detailed analysis it is not possible to determine the age of the calcrete deposits at Kathu Townlands. A sand sheet, derived from the Kalahari, is found across the surface at Kathu Townlands and comprises the matrix within which most of the artefacts are found. As with calcretes, there were likely multiple cycles of sand accumulation in the Kathu area. Research at Wonderwerk Cave has demonstrated that Kalahari sands were blowing into this region by 2 million years ago and it is likely that the sands at the base of Kathu Pan 1 are of such an early age. At the Bestwood 1 site, sands overlie the archaeological horizon and are thus of a younger age. At the Mamatwan Mine the Kalahari sands produced optically stimulated luminescence ages ranging from 62–44,000 years ago.*

*Kathu Townlands is a component of a grouping of ESA localities designated as the Kathu Complex. This complex also includes the excavated sites of Kathu Pan1 (KP1) and Bestwood 1. At Kathu Pan, evidence of early hominin occupation has been observed at multiple locations within the pan, but ESA deposits have only been excavated at KP 1. Stratum 4a at KP1 is dated by a combination of OSL and ESR/U-series to ca. 500 k BP. The lithic assemblage from St. 4a is characterized by a prepared core technology that produced both blades and points, and has been attributed to the Fauresmith industry. The lithic assemblage of the underlying St. 4b at Kathu Pan 1 is characterized by well-made handaxes. At BW 1, located to the east of Kathu Townlands in a valley between two small hills, mining of sand has revealed a horizon at the interface of gravels and the overlying sands that contains abundant lithic artefacts. These are characterized by bifaces, blades, and prepared cores and are dispersed over a very large area. Excavation at BW1 in 2012 exposed a surface of 36 m2 with over 1000 piece plotted artefacts recovered. All artefacts were observed lying flat on at the interface between the sands and gravels. The extremely fresh condition of the lithic artefacts at Bestwood 1 argues against this accumulation being a palimpsest deposited over a long period, or as the result of deflation. The possibility that the concentration of artefacts in a single horizon is the result of bioturbation also seems unlikely. The excavated area is apparently representative of an extensive occupation covering several hectares.*

*The archaeological deposit at Kathu Townlands was brought to the attention of archaeologists in 1980 by Naas Viljoen, the manager of the property. The site was first described in a permit report submitted to the National Monuments Council outlining the results of a large scale survey for archaeological resources in the region. Shortly afterwards, the outcropping of ironstone (and the tremendous amount of artefacts) was used as a source of road gravel. Mr Viljoen notified Mr Beaumont (who was excavating at KP1 at the time) that he had observed workmen using gravel that was composed primarily of artefacts to repair roads. Excavations at the site were conducted by Beaumont in 1982, and then again in*

*1990. Unfortunately, the precise location of these excavations was not reported. There has also been a general lack of clarity regarding of the extent of the deposit. The initial reports identified an area north of Frikkie Meyer Street. Since at least 1990 the deposit has been known to exist south of this road. The total extent of the deposit, particularly beneath the surface sands, remains to be determined"***(Walker et.al 2014:p.1-3).**

The Kathu Extension 6 – 10 development area is located a few kilometers to the north-west of Kathu Townlands. The Stone Age material found next to the tar road section in the study area is similar to that found at Kathu Townlands. The artifacts are mainly on banded iron stone material. Detailed analysis of the material from Kathu Extensions 6 – 10 still needs to be undertaken, but it is highly likely that these will be of similar age and range as the assemblage from Kathu Townlands.

What is important to note however in regards to the material found and sampled in the tar road section is that these only occur next to the road and into the road reserve section. Similar material (stone tools) is not found in high numbers away from the road and across the study area, with mainly middle to later Stone Age material identified. The initial hypotheses after the Phase 1 HIA was that the material at the tar road came from a another sources and that it might have been used in the construction of the Kathu-Sishen tar road (of which the section in the study area forms part) seems to hold true, taking into consideration the reference in the Walker article ***that the outcropping of ironstone (and the tremendous amount of artefacts) was used as a source of road gravel. Mr Viljoen notified Mr Beaumont (who was excavating at KP1 at the time) that he had observed workmen using gravel that was composed primarily of artefacts to repair roads"***. It is therefore very possible that the material found here could have originated from Kathu Townlands or a similar source. It can then also be concluded that the Stone Age material along the tar road in the Kathu Extension 6 -10 Development Area is not in a primary context.

***Monitoring Site 5***

One of the recommendations in the SAHRA Permit was that construction work around Site 5 must be monitored and that any exposed archaeological deposits must be mapped and sampled.

In the 2018 HIA Report by Pelser Site 5 is described as being located along a road in the study area. This was a dirt road that had been graded through a section of red aeolian sands and MSA & LSA artifacts (scrapers, blades, flakes) have been exposed in the road and next to it. The area around the road (in the red sands) most likely also contain scatters of tools that will be exposed eventually through natural erosion and care should be taken should development occur here that if material is uncovered an expert be called in to investigate.

**GPS Location of Site 5**: S27 40 27.90 E23 01 49.00.

During the November 2019 mitigation work it was however clear that Site 5 is situated outside of the boundary of the development area and that the site will therefore not be impacted by any construction work and work related to the Kathu Extensions 6 – 10 Development. No further mitigation work is therefore required.

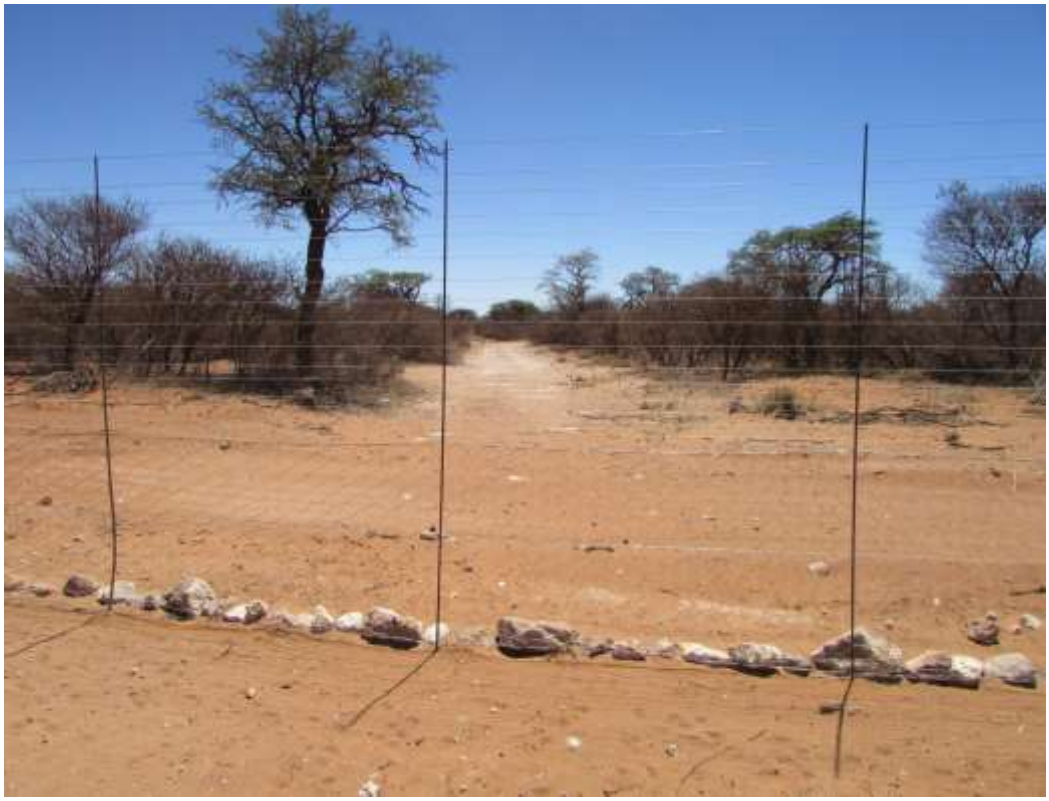

**Figure 28: A view towards Site 5. The boundary fence of the development is visible.**

**Figure 29: Another view of the boundary fence close to Site 5.**

***Detailed Mapping and Recording of all the identified Stone Age archaeological sites***

This included Sites 3, 4, 8 & 9 identified in 2018 but excludes Site 6 which represents the drainage line corridor (Condition 5 in the SAHRA Permit) that has to be monitored.

Sites 3, 4, 8 & 9 were all surface sites containing single or denser scatter of MSA/LSA tools (blades, scrapers, cores, flakes and waste) on them. One of these sites (Site 9) falls outside the footprint of study area and is located in an old dry pan area.

It was indicated in the 2018 HIA Report that it is highly likely that many more similar surface sites and scatters of Stone Age material are located in the study area but that they might not be visible. Material is/was covered by the red aeolian sands and will erode out over time. It was therefore deemed possible that development actions could uncover more sites and material. It was recommended in 2018 that more detailed mapping and assessment of the Stone Age of the study area should be undertaken. This aspect will be dealt with later on in this report.

**GPS Location of Sites:** S27 41 25.60 E23 01 55.40 (3); S27 40 35.50 E23 01 57.00 (4); S27 40 02.70 E23 00 55.70 (8); S27 39 56.20 E23 01 11.80 (9).

Sites 3 & 4 were re-visited in November 2019 and it was clear that both sites are represented by low density scatters of fairly weathered MSA/LSA artifacts including cores, flakes and flake tools. The general areas around these sites have been impacted to some degree already by the clearing of the area for new internal roads related to the development. No further sites were identified in proximity to these sites.

The specialist team could not locate Site 8 during the November 2019 mitigation work. The digging of trenches and grading of new internal roads made accessing certain areas difficult. The site is also located fairly close to the outer boundary of the development and it is possible that it might be located outside of the area. Site 9 was not assessed again, as it falls outside of the development area and will not be impacted by the current Kathu Extensions 6 – 10 Development.

**Figure 30: General view of Site 3 and the surrounding area. Note the new road.**

**Figure 31: Stone Age material on Site 3.**

**Figure 32: General view around Site 4.**

**Figure 33: The stone tool from Site 4.**

***Monitoring the corridor (drainage line – Site 6) represented in the Geotechnical Report***

It was clear that the area around the drainage line and in some instances in it has been impacted by the current development actions related to the implementation of services for the Kathu Extensions 6 – 10 Township Development. This included grading of internals road, trenching for pipe lines and areas that are being prepared for blasting as part of ground works. In the main the drainage line is however left intact as recommended.

A number of sites and scatters of Stone Age material were identified in the area during the November 2019 mitigation. Some of these were in the drainage line corridor area, while some material was found exposed in the scraped roads. It is clear that the archaeological material is situated just below the red Kalahari sands that characterize the area here and that they get exposed by wind erosion and in this case when the sands are scraped away for the roads. The material is located between the sand layer and the bedrock/calcrete layer that underlies this sand. The Stone Age artifacts include mostly cores, flakes, flake tools such as scrapers, blades and points, as well as waste from micro-debitage. Preliminary this dates the material to the late Pleistocene/early Holocene. Detailed analysis of sampled material from the drainage line still needs to be completed however, while no dating of the Aeolian sands and calcretes from the area has been undertaken obviously.

7 new sites and areas with scatters of material (exposed by development work) were recorded in and around the drainage line corridor in November 2019. Some material was sampled as part of the mitigation work. A total of around 110 artifacts were identified. There is high likelihood that many more sites and scatters of material would be located in the drainage line corridor.

**GPS Locations:** S27 40 40.60 E23 01 28.00 (1); S27 40 41.70 E23 01 28.00 (2); S27 40 42.70 E23 01 26.90 (3); S27 40 42.90 E23 01 25.10 (4); S27 40 40.50 E23 01 26.00 (5); S27 40 40.20 E23 01 26.50 (6) & S27 40 37.20 E23 01 26.20 (7).

**Figure 34: General view of drainage line corridor.**

**Figure 35: A view of the area around the corridor showing the impact of the development work.**

**Figure 36: One of the new roads in the area.**

**Figure 37: An area prepared for blasting.**

**Figure 38: Close-up of new road surface after grading.**

**Figure 39: Another view of the drainage line corridor.**

**Figure 40: Stone Age artifacts from Site 1.**

**Figure 41: Material from Site 2.**

**Figure 42: Material from Site 3.**

**Figure 43: Site 4 material.**

**Figure 44: Site 5 material.**

**Figure 45: The Stone Age material from Site 6 (graded road surface).**

**Figure 46: Site 7 material.**


**Figure 47: Drainage line corridor sites (Google Earth 2019).**

***Further Mitigation and Sampling Work done in November 2019***

Due to the close proximity of the development to the Kathu Pan Grade 1 site, SAHRA recommended (Condition No.4 in the permit) that the excavations related to the construction activities must be continually monitored for archaeological resources.

With the implementation of services related to the development (pipelines for water and sewerage and internals roads) already having commenced the Specialist Team focused on investigating the areas impacted by road grading and the various trenches dug for the pipelines. Other areas not yet impacted, such as the old existing farm roads, were also investigated. A number of new sites and finds were made as a result and will assist in interpreting the Stone Age archaeology of the study area.

**It is recommended that monitoring continue as the development continues, but it needs to be stated here that although the services related to township establishment has been undertaken and is nearing completion, there is no clarity on when the actual township development (construction of houses etc.) will commence. According to a representative of Barzani Civils there is currently no funding from the Municipality available for this and it might take a long time before this happens. It is recommended that once this has been determined that the archaeological monitoring work should be scheduled and completed. The heritage specialists should be informed in time so that this can be undertaken successfully.**

The first "site" (A) is located on an old dirt road between the drainage line corridor (Site 6) and Site 5 (outside of the development area). The site contains between 5 and 10 Stone Age artifacts located between the red Kalahari sands and the calcrete layer underlying the sands. The material has been exposed by the road cutting through the sands.

**GPS Location**: S27 40 33.60 E23 01 29.50.

**Figure 48: A view of the old road site.**

**Figure 49: View of red Kalahari sand covering part of the old road between Site 5 and Site 6 (drainage line).**

Another “site” (B) was recorded on a section of the old dirt road described above. This site is represented by an Earlier Stone Age (Acheulian?) quartzite handaxe. This handaxe was sampled as part of mitigation process. A 2nd handaxe (site C) was also found near one of the trenches that were investigated. It is also on quartzite and possible acheulian.

**GPS Location**: S27 40 33.40 E23 01 30.20 (B); S27 40 44.40 E23 01 49.10 (C).

**Figure 50: Acheul handaxe found on the dirt road.**

**Figure 51: The handaxe found close to Trench 4.**

Four trench sections cutting through various portions of the development area was also investigated for the presence of in situ archaeological deposits as well as exposed/disturbed material, as well as to try and determine the archaeological and natural stratigraphic horizons in the area.

**Trench 1** is situated between Extensions 8 in the central part of the development area. A 200m section of this trench was walked and investigated in detail. Sampling of Stone Age material was also done in this section between **GPS Coordinates** S27 40 36.30 E23 01 37.70 & S27 40 32.80 E23 01 31.60.

**Trench 2** is situated in Extension 6 in the southern part of the development. The trench is very deep and could not be accessed and walked in and photographs of the trench were taken to document the stratigraphy of the area here. A 355m section of trench was documented in this fashion. In general the stratigraphy visible in the trench consists of approximately 30cm of red Kalahari sands overlying the calcrete bedrock. In sections sand intrusions are visible in the calcrete bedrock. Between the unstratified calcrete bedrock there is a layer of between 30 and 40cm of calcrete nodules. The trench has been dug to a depth of between 4 and 5m.

**GPS Coordinates**: S27 40 59.40 E23 01 49.70; S27 41 01.40 E23 01 52.80; S27 41 05.20 E23 02 00.90

**Trench 3** is located in Extension 6 as well, but in the south-eastern section of the development area. Detailed photographs of the trench stratigraphy and of any possible in situ archaeological material were taken. A 210m section of trench was covered. The statigraphy in the trench consist basically of overlying red sands (between 30 and 40cm thick) where still visible followed by a calcrete bedrock layer.

**GPS Coordinates**: S27 40 42.30 E23 02 04.10; S27 40 44.50 E23 02 07.10; S27 40 46.10 E23 02 10.50.

**Trench 4** is situated between Extensions 7 and roughly in the central section of the development area. The trench was documented photographically again, with samples of Stone Age material collected as well as part of the process. A 520m section of trench was covered. The stratigraphic layering in the trench, although very disturbed, is again consisting of an overlying red Kalahari sand followed by a calcrete layer. The archaeological horizon is situated between the red sand and this layer, with a few Stone Age artifacts found "in situ".

**GPS Coordinates**: S27 40 47.20 E23 01 52.90; S27 40 36.50 E23 01 38.20.

Sampling of Stone Age material was undertaken in Trenche 1, with no material collected from the other three trenches. Sampling in Trench 1 was done on the edge of the trench as well as in the bottom/base of it (material exposed by the digging actions). "In situ" artifacts were also photographed first before removal.

It is evident from the trenches that the archaeological material/horizon is situated just below the overlying red Kalahari sand layer (which varies in thickness across the area from a few centimeters to more than 1 meter) and right on top of the underlying bedrock/calcrete formations. The "in situ" artifacts (in the trenches) have more than likely "moved" or fallen from their original positions underneath the red sand layer as a result of the digging actions related to the trenches. Furthermore, the Stone Age artifacts identified and sampled from the trenches are all seemingly dating to the late Pleistocene/early Holocene (later Stone Age). The artifacts are mainly small and slim blades (some partially broken), small scrapers, broken points and waste flakes and micro debitage. Currently the only evidence for in situ earlier Stone Age (possible Acheul etc.) presence is the single handaxe found on the outer edge of Trench 4 (C) the hand axe (B) found on the old road between Sites 5 & the drainage line corridor. On the exterior of both these handaxes there are small traces of calcrete deposits indicating that they originated from the top of the underlying calcrete formation.


**Figure 52: Aerial view of area showing location of Trenches 1-4 (Google Earth 2019).**

**Figure 53: A view of a section of Trench 1.**

**Figure 54: A section of Trench 1 with pipe showing red sand layer overlying calcrete formation below.**

**Figure 55: In situ artifact in Trench 1.**

**Figure 56: Another "in situ" artifact in Trench 1.**

**Figure 57: Some of the artifacts sampled from Trench 1.**

**Figure 58: Closer view of some of the flakes/flake tools, scrapers, blades, broken points & micro-debitage from Trench 1.**

**Figure 59: Hammer stone and more stone tools and waste flakes from Trench 1.**

**Figure 60: A view of a section of Trench 2.**

**Figure 61: Another section of the trench with ongoing work visible.**

**Figure 62: A view of the (disturbed) Trench 2 stratigraphy.**

**Figure 63: Intrusions of sand into the calcrete layering.**

**Figure 64: A view of a section of Trench 3.**

**Figure 65: Another view of Trench 3.**

**Figure 66: A view of a section of Trench 4. The trench is being filled again and compacted after the pipes have been laid.**

**Figure 67: Another section of Trench 4.**

**Figure 68: "In situ" artifact in an red sand intrusion in the calcrete.**

**Figure 69: Some of the artifacts found on the edge of and inside Trench 4.**

**Figure 70: Another section of Trench 4. Note the red sands overlying the calcretes.**

## 7. CONCLUSIONS AND RECOMMENDATIONS

APelser Archaeological Consulting (APAC) was appointed by Maxim Planning Solutions in 2018 to undertake a Cultural Heritage Resources Impact Assessment in respect of proposed township establishment (Kathu Extension) on Portions 1 & 2 of the farm Kalahari Gholf & Jag Landgoed 775 in the Gamagara Local Municipality (Kathu) of the Northern Cape Province.

A number of archaeological and recent historical sites and finds were identified in the study area during the January 2018 assessment (See Report APAC018/04), and recommendations on their mitigation were provided in this report. In their Final Comments Letter (dated to the 20th of March 2019) on the Phase 1 HIA Report for the proposed Kathu Extensions 6-10 Township Establishment (Case ID# 13135), SAHRA concurred with the findings of the Heritage Specialist regarding the Phase 2 Archaeological Mitigation Measures required. A permit for the work was issued to APAC cc (Permit ID#3024 & Case ID#13944) at the end of September 2019. Dr. David Morris of the McGregor Museum in Kimberley will serve as Principal Investigator for the project, while the McGregor Museum will be the Curating Institute for the cultural material (Stone Age artifacts) recovered and sampled from the area during the field work.

The fieldwork was conducted at the end of October/early November 2019.

The Terms of Reference for the Kathu Extensions 6-10 Phase 2 Archaeological Mitigation work were the following:

1. Sites 1 and 2 must be appropriately mitigated and a representative sample collected.

***The tar road section next to where Sites 1 & 2 are situated were investigated in total, with 5 Sample Blocks (A-E) measured out next to the road (Block E was close to Sites 1 & 2). These blocks were 10m x 5m in size, and all Stone Age material located in each block was sampled for detailed analysis at a later stage. A total of 254 artifacts were sampled in the 5 Blocks, which taking into account that 250 square meters were sampled is not very dense. However it needs to be stated that only material visible to the naked eye was collected (on the surface of each block) and that no digging was undertaken. There might therefore be many more artifacts in these areas that were covered by debris from the recent trenching and the old road construction activities. Most of the artifacts are on quartzite/banded iron stone material.***

***The Kathu Extension 6 – 10 development area is located a few kilometers to the north-west of Kathu Townlands. The Stone Age material found next to the tar road section in the study area is similar to that found at Kathu Townlands. The artifacts are mainly on banded iron stone material. Detailed analysis of the material from Kathu Extensions 6 – 10 still needs to be undertaken, but it is highly likely that these will be of similar age and range as the assemblage from Kathu Townlands.***

***What is important to note however in regards to the material found and sampled in the tar road section is that these only occur next to the road and into the road reserve section. Similar material (stone tools) is not found in high numbers away from the road and across the study area, with mainly middle to later Stone Age material identified. The initial hypotheses after the Phase 1 HIA was that the material at the tar road came from a another sources and that it might have been used in the construction of the Kathu-Sishen tar road (of which the section in the study area forms part) seems to hold true, taking into consideration the reference in the Walker article that the outcropping of ironstone (and the tremendous amount of artefacts) was used as a source of road gravel. Mr Viljoen notified Mr Beaumont (who was excavating at KP1 at the time) that he had observed workmen using gravel that was composed primarily of artefacts to repair roads". It is therefore very possible that the material found here could have originated from Kathu Townlands or a similar source. It can then also be concluded that the Stone Age material along the tar road in the Kathu Extension 6 -10 Development Area is not in a primary context.***

2. Construction work around Site 5 must be monitored. Any exposed archaeological deposits must be mapped and sampled.

***The site was found to be located outside of the boundary of the township development and no further mitigation work is required.***

3. Detailed mapping and recording of all the identified Stone Age archaeological sites must be undertaken as per SAHRA's original recommendations.

***This included Sites 3, 4, 8 & 9 identified in 2018 but excludes Site 6 which represents the drainage line corridor (Condition 5 in the SAHRA Permit) that has to be monitored.***

***Sites 3, 4, 8 & 9 were all surface sites containing single or denser scatter of MSA/LSA tools (blades, scrapers, cores, flakes and waste) on them. One of these sites (Site 9) falls outside the footprint of study area and is located in an old dry pan area. Sites 3 & 4 were re-visited in November 2019 and it was clear that both sites are represented by low density scatters of***

***fairly weathered MSA/LSA artifacts including cores, flakes and flake tools. The general areas around these sites have been impacted to some degree already by the clearing of the area for new internal roads related to the development. No further sites were identified in proximity to these sites.***

***The specialist team could not locate Site 8 during the November 2019 mitigation work. The digging of trenches and grading of new internal roads made accessing certain areas difficult. The site is also located fairly close to the outer boundary of the development and it is possible that it might be located outside of the area. Site 9 was not assessed again, as it falls outside of the development area and will not be impacted by the current Kathu Extensions 6 – 10 Development.***

4. Due to the close proximity of the development to Kathu Pan Grade 1 site, the excavations related to the construction activities must be continually monitored for archaeological resources.

***With the implementation of services related to the development (pipelines for water and sewerage and internals roads) already having commenced the Specialist Team focused on investigating the areas impacted by road grading and the various trenches dug for the pipelines. Other areas not yet impacted, such as the old existing farm roads, were also investigated. A number of new sites and finds were made as a result and will assist in interpreting the Stone Age archaeology of the study area.***

***It is recommended that monitoring continue as the development continues, but it needs to be stated here that although the services related to township establishment has been undertaken and is nearing completion, there is no clarity on when the actual township development (construction of houses etc.) will commence. According to a representative of Barzani Civils there is currently no funding from the Municipality available for this and it might take a long time before this happens. It is recommended that once this has been determined that the archaeological monitoring work should be scheduled and completed. The heritage specialists should be informed in time so that this can be undertaken successfully.***

***The first "site" (A) is located on an old dirt road between the drainage line corridor (Site 6) and Site 5 (outside of the development area). The site contains between 5 and 10 Stone Age artifacts located between the red Kalahari sands and the calcrete layer underlying the sands. The material has been exposed by the road cutting through the sands. Another "site" (B) was recorded on a section of the old dirt road described above. This site is represented by an Earlier Stone Age (Acheulian?) quartzite handaxe. This handaxe was sampled as part of mitigation process. A 2nd handaxe (site C) was also found near one of the trenches that were investigated. It is also on quartzite and possible acheulian.***

***Four trench sections cutting through various portions of the development area was also investigated for the presence of in situ archaeological deposits as well as exposed/disturbed material, as well as to try and determine the archaeological and natural stratigraphic horizons in the area.***

***Sampling of Stone Age material was undertaken in Trench 1, with no material collected from the other three trenches. Sampling in Trench 1 was done on the edge of the trench as well as in the bottom/base of it (material exposed by the digging actions). "In situ" artifacts were also photographed first before removal.***

***It is evident from the trenches that the archaeological material/horizon is situated just below the overlying red Kalahari sand layer (which varies in thickness across the area from a few centimeters to more than 1 meter) and right on top of the underlying bedrock/calcrete formations. The "in situ" artifacts (in the trenches) have more than likely "moved" or fallen from their original positions underneath the red sand layer as a result of the digging actions related to the trenches. Furthermore, the Stone Age artifacts identified and sampled from the trenches are all seemingly dating to the late Pleistocene/early Holocene (later Stone Age). The artifacts are mainly small and slim blades (some partially broken), small scrapers, broken points and waste flakes and micro debitage. Currently the only evidence for in situ earlier Stone Age (possible Acheul etc.) presence is the single handaxe found on the outer edge of Trench 4 (C) the hand axe (B) found on the old road between Sites 5 & the drainage line corridor. On the exterior of both these handaxes there are small traces of calcrete deposits indicating that they originated from the top of the underlying calcrete formation.***

5. The corridor (Drainage Lines) identified between A - L represented in the Geotechnical Report Map as part of the Environmental Authorization must be monitored by the specialist archaeological team. The extent of the monitoring must be determined in consultation with the specialist archaeological team.

***It was clear that the area around the drainage line and in some instances in it has been impacted by the current development actions related to the implementation of services for the Kathu Extensions 6 – 10 Township Development. This included grading of internals road, trenching for pipe lines and areas that are being prepared for blasting as part of ground works. In the main the drainage line is however left intact as recommended.***

***A number of sites and scatters of Stone Age material were identified in the area during the November 2019 mitigation. Some of these were in the drainage line corridor area, while some material was found exposed in the scraped roads. It is clear that the archaeological material is situated just below the red Kalahari sands that characterize the area here and that they get exposed by wind erosion and in this case when the sands are scraped away for the roads. The material is located between the sand layer and the bedrock/calcrete layer that underlies this sand. The Stone Age artifacts include mostly cores, flakes, flake tools such as scrapers, blades and points, as well as waste from micro-debitage. Preliminary this dates the material to the late Pleistocene/early Holocene. Detailed analysis of sampled material from the drainage line still needs to be completed however, while no dating of the Aeolian sands and calcretes from the area has been undertaken obviously.***

***7 new sites and areas with scatters of material (exposed by development work) were recorded in and around the drainage line corridor in November 2019. Some material was sampled as part of the mitigation work. A total of around 110 artifacts were identified. There is high likelihood that many more sites and scatters of material would be located in the drainage line corridor.***

Finally it should be said that the fieldwork conducted during October/November 2019 at the Kathu Extensions 6-10 Township Establishment study area was conducted successfully. The conditions (see above) as set out in the SAHRA Permit were adhered to as best as possible taking into consideration that some development work has already commenced when the work was undertaken. Furthermore, detailed analysis of the Stone Age material sampled from the area still needs to be undertaken and therefore the deductions regarding the Stone Age archaeology of the area is at this stage at best preliminary. The material will be provided to Dr. David Morris (the Principal Investigator for the project) of the McGregor Museum in Kimberley for his expert analysis, after which a Final Report to SAHRA and the client will be provided. The material will also be curated by the same Museum once properly packed and accessioned.

**Once full-scale development on the housing at Kathu Extensions 6-10 commences, more monitoring of the related excavation works should be undertaken as a matter of course. The specialist team should be informed in time when the work is scheduled to commence so that archaeological work is planned and conducted in detail.**

## 8. REFERENCES


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