



Archaetnos Culture & Cultural  
Resource Consultants  
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**A REPORT ON A HERITAGE IMPACT ASSESSMENT (HIA) FOR  
A PROPOSED NEW RAIL CROSSING OVER THE GAMAGARA RIVER  
FOR THE GLORIA MINE OPERATIONS, ASSMANG BLACK ROCK,  
ON GLORIA 266, NORTH OF HOTAZEL, NORTHERN CAPE**

For:

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**REPORT: AE11??**

by:

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## SUMMARY

Archaetnos cc was appointed by EScience & Associates, on behalf of ASSMANG, to conduct a Heritage Impact Assessment (HIA) for a proposed new rail crossing over the Gamagara River on the farm Gloria 266, for their Gloria Mine operations, north of Hotazel, in the Northern Cape Province.

A number of archaeological sites and objects of some significance were identified during the assessment. All the sites and finds date to the Stone Age. The report gives a discussion of the finds and observations made during the fieldwork and also gives an indication of the methodology followed. It also indicates how to deal with any archaeological material that may be unearthed or disturbed during the development activities.

**Mitigation measures to minimize the impact of the development on the sites that were located during the assessment are put forward at the end of this report. Once these have been implemented the development, from an Archaeological perspective, can continue.**

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## **1. INTRODUCTION**

Archaetnos cc was appointed by EScience & Associates, on behalf of ASSMANG, to conduct a Heritage Impact Assessment (HIA) for a proposed new rail crossing over the Gamagara River on the farm Gloria 266, for their Gloria Mine operations, north of Hotazel, in the Northern Cape Province.

The client indicated the extent of the proposed development and the boundaries of the area to be surveyed. The work was confined to this area.

## **2. TERMS OF REFERENCE**

The Terms of Reference for the survey were to:

1. Identify all objects, sites, occurrences and structures of an archaeological or historical nature (cultural heritage sites) located in the area of the proposed development (**see Appendix A**).
2. Assess the significance of the cultural resources in terms of their archaeological, historical, scientific, social, religious, aesthetic and tourism value (**see Appendix B**).
3. Describe the possible impact of the proposed development on these cultural remains, according to a standard set of conventions.
4. Propose suitable mitigation measures to minimize possible negative impacts on the cultural resources, should this be applicable.
5. Review applicable legislative requirements.

## **3. CONDITIONS & ASSUMPTIONS**

The following conditions and assumptions have a direct bearing on the survey and the resulting report:

1. Cultural Resources are all non-physical and physical man-made occurrences, as well as natural occurrences associated with human activity. These include all sites, structure and artifacts of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development. Graves and cemeteries are included in this.
2. The significance of the sites, structures and artifacts is determined by means of their historical, social, aesthetic, technological and scientific value in relation to their uniqueness, condition of preservation and research potential. The various aspects are not mutually exclusive, and the evaluation of any site is done with reference to any number of these aspects.
3. Cultural significance is site-specific and relates to the content and context of the site. Sites regarded as having low cultural significance have already been recorded in full and require no further mitigation. Sites with medium cultural significance may or may not require mitigation depending on other factors such as the significance of

impact on the site. Sites with a high cultural significance require further mitigation (see **Appendix B**).

4. The latitude and longitude of any archaeological or historical site or feature, is to be treated as sensitive information by the developer and should not be disclosed to members of the public.
5. All recommendations are made with full cognizance of the relevant legislation.
6. It has to be mentioned that it is almost impossible to locate all the cultural resources in a given area, as it will be very time consuming. Developers should however note that the report should make it clear how to handle any other finds that might be found.

#### **4. 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).

##### **4.1 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 (see **Appendix D**) 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 000m<sup>2</sup> or involve three or more existing erven or subdivisions thereof
- d. Re-zoning of a site exceeding 10 000 m<sup>2</sup>
- 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 or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves;
- b. destroy, damage, alter, exhume 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) 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)**.

Unidentified/unknown graves are also handled as older than 60 until proven otherwise.

### **4.2 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.

## **5. METHODOLOGY**

### **5.1 Survey of literature**

A survey of literature was undertaken in order to obtain background information regarding the archaeology of the area. Sources consulted in this regard are indicated in the bibliography.

### **5.2 Field survey**

The survey was conducted according to generally accepted HIA/AIA practices and was aimed at locating all possible objects, sites and features of cultural (archaeological and historical) significance in the area of proposed development. If required, the location/position of any site is determined by means of a Global Positioning System (GPS), while photographs are also taken where needed.

The survey was undertaken mainly on foot, although certain sections were traversed by vehicle.

### **5.3 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. **In this case no oral histories were recorded.**

### **5.4 Documentation**

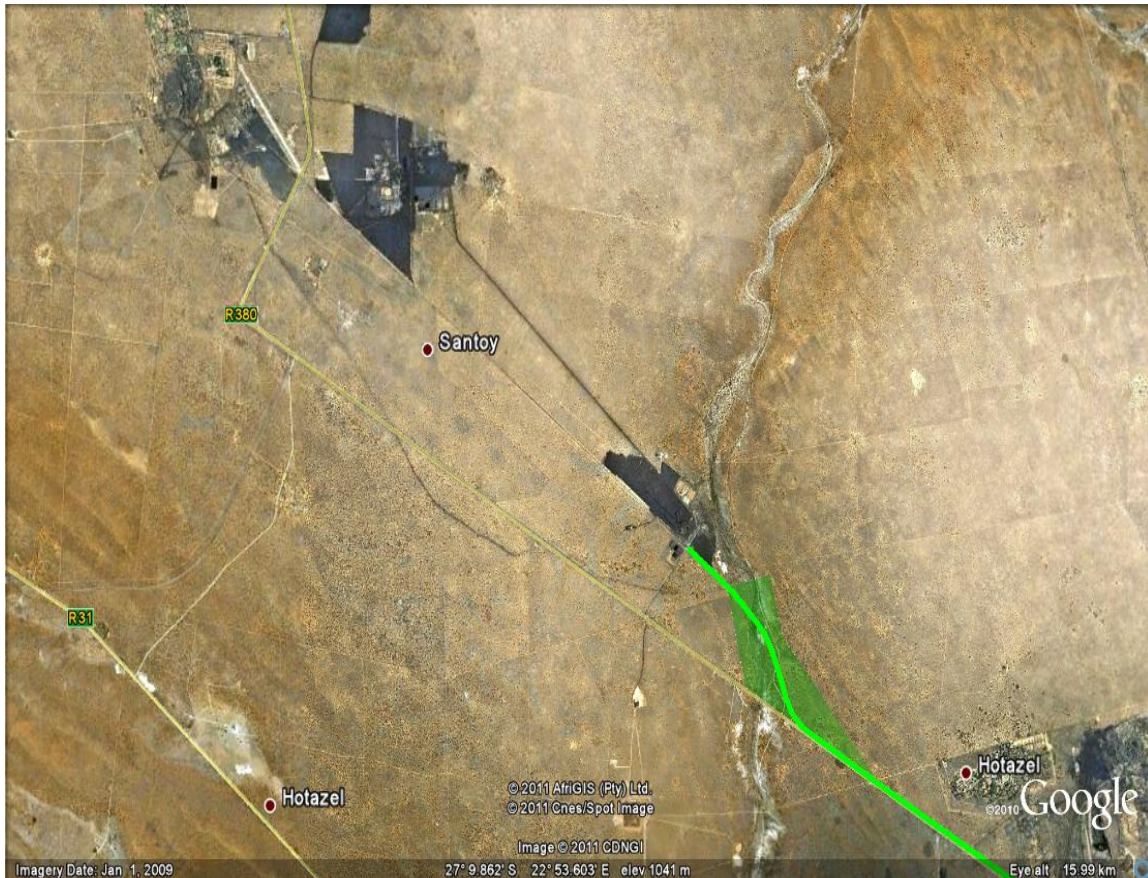
All sites, objects, features and structures identified are documented according to the general minimum standards accepted by the archaeological profession. Co-ordinates of individual localities are determined by means of the Global Positioning System (GPS). The information is added to the description in order to facilitate the identification of each locality.

## **6. DESCRIPTION OF THE AREA**

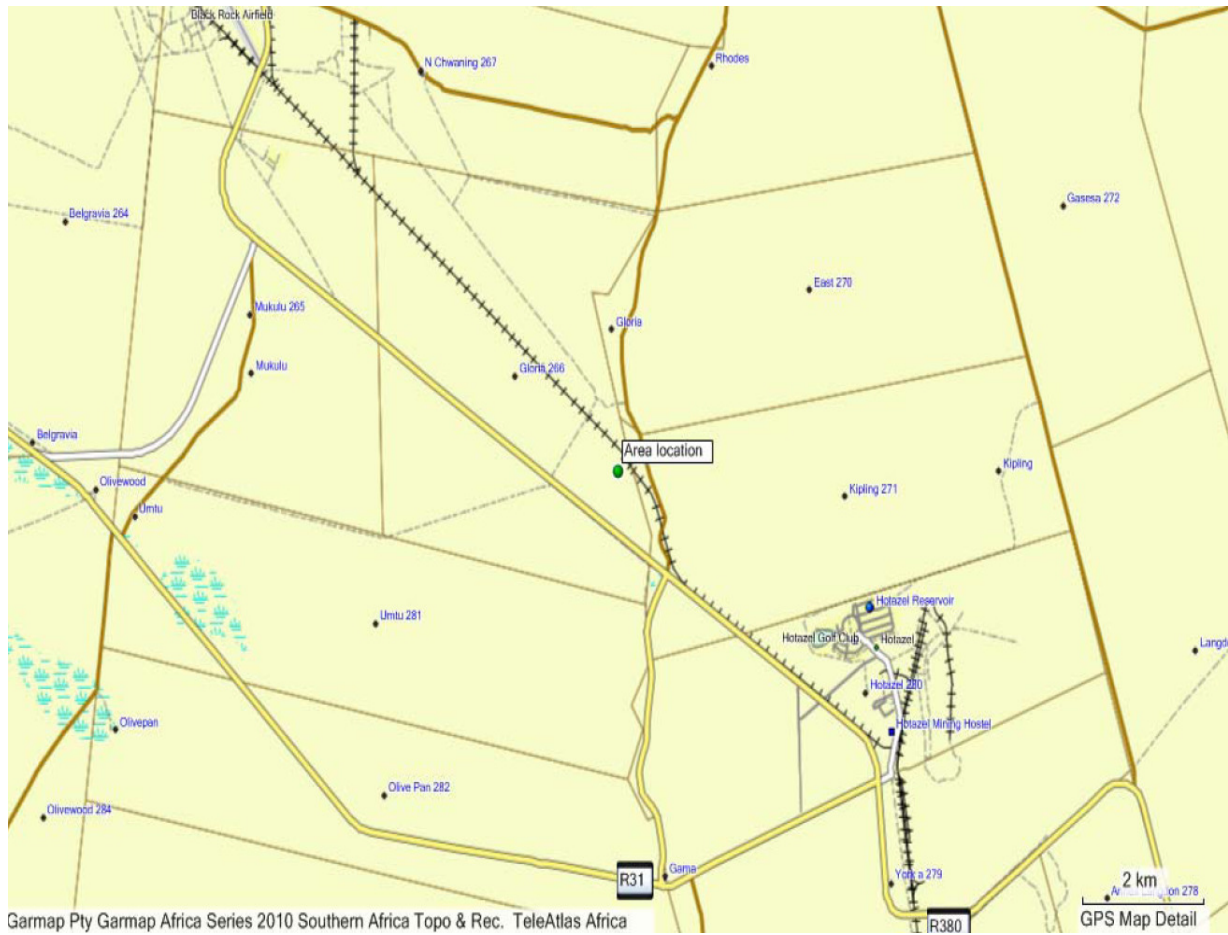
The project area is located on the farm Gloria 266, in the Kgalagadi District Municipality of the Northern Cape Province. It is situated a few kilometers south of ASSMANG's Black Rock Mine and north of the mining town of Hotazel. A new railway bridge/rail crossing over the Gamagara River for ASSMANG's Gloria Mine is being proposed. Earlier work done by Kusel for Black Rock (September 2007) is relevant to this study. Although we had to focus mainly on the area where the new rail bridge will cross the river (directly adjacent to the

existing bridge), we were also instructed to survey an area much wider in order to determine if any sites would be impacted upon should there be any rail alignments required.

The Gamagara river crosses through the development area, resulting in a number of erosion gullies. The topography of the area is relatively flat, although there are a number of rocky outcrops as well. The most characteristic feature is red sand dunes covered by grass and shrubs, and in some places the red dunes are underlain by calcrete (where the sand has been blown away). In certain areas there are open patches of sand or calcrete where the vegetation is sparser.



**Figure 1: Aerial location of development (© Google 2009, image courtesy EScience).**



**Figure 2: Topographic Location of development (© Map Source 2010).**



**Figure 3: Typical view of area.**



**Figure 4: One of the erosion dongas in the area.**



**Figure 5: View of one of the red dunes, underlain by calcrete formations.**

## **7. DISCUSSION**

During the assessment a number of sites, features and objects of archaeological nature were located in the area. In order to enable the reader to understand archaeological objects, features and sites that could possibly be unearthed and disturbed during development, it is necessary to give a background regarding the different phases of human history.

### **7.1 Stone Age**

The Stone Age is the period in human history when lithic (stone) material was mainly used to produce tools (Coertze & Coertze 1996: 293). In South Africa the Stone Age can be divided

in three periods. **It is however important to note that dates are relative and only provide a broad framework for interpretation.** The division for the Stone Age according to Korsman & Meyer (1999: 93-94) is as follows:

Early Stone Age (ESA) 2 million – 150 000 years ago  
Middle Stone Age (MSA) 150 000 – 30 000 years ago  
Late Stone Age (LSA) 40 000 years ago – 1850 - A.D.

According to David Morris of the McGregor Museum in Kimberley the archaeology of the Northern Cape is rich and varied, covering long spans of human history. The Karoo is particularly bountiful. Some areas are richer than others, and not all sites are equally significant. The significance of sites encountered in the study area may be assessed against previous research in the region and subcontinent. The region's remoteness from research institutions accounts for a relative lack of archaeological research in the area. The area has probably been relatively marginal to human settlement for most of its history, yet it is in fact exceptionally rich in terms of Stone Age sites and rock art, as a relatively few but important studies have shown (Morris 2006).

An earlier study conducted in the area by Kusel (2009) also revealed a significant Stone Age site, very close to the study area surveyed by Archaetnos. The results of Kusel's survey, commented on by SAHRA, also necessitated a Phase I HIA for the rail bridge over the Gamagara River for Gloria Mine.

All the sites, features or objects identified during the assessment date to the Stone Age. The finds will be discussed in more detail further on in the report.

## **7.2 Iron Age**

The Iron Age is the name given to the period of human history when metal was mainly used to produce artifacts (Coertze & Coertze 1996: 346). In South Africa it can be divided in two separate phases according to Van der Ryst & Meyer (1999: 96-98), namely:

Early Iron Age (EIA) 200 – 1000 A.D.  
Late Iron Age (LIA) 1000 – 1850 A.D.

Huffman (2007: xiii) however indicates that a Middle Iron Age should be included. His dates, which now seem to be widely accepted in archaeological circles, are:

Early Iron Age (EIA) 250 – 900 A.D.  
Middle Iron Age (MIA) 900 – 1300 A.D.  
Late Iron Age (LIA) 1300 – 1840 A.D.

The expansion of early farmers, who, among other things, cultivated crops, raised livestock, made ceramic containers (pots), mined ore and smelted metals, occurred in this area between AD 400 and AD 1100 and brought the Early Iron Age (EIA) to South Africa. They settled in semi-permanent villages.

While there is some evidence that the EIA continued into the 15th century in the South African Lowveld, on the escarpment it had ended by AD1100. The Highveld became active

again from the 15th century onwards due to a gradually warmer and wetter climate. From here communities spread to other parts of the interior. This later phase, termed the Late Iron Age (LIA), was accompanied by extensive stonewalled settlements, such as the Thlaping capital Dithakong, 40 km north of Kuruman.

Sotho-Tswana and Nguni societies, the descendants of the LIA mixed farming communities, found the region already sparsely inhabited by the Late Stone Age (LSA) Khoisan groups, the so-called 'first people'. Most of them were eventually assimilated by LIA communities and only a few managed to survive, such as the Korana and Griqua. This period of contact is sometimes known as the Ceramic Late Stone Age and is represented by the Blinkklipkop specularite mine near Postmasburg and finds at the Kathu Pan.

No known Iron Age archaeological sites are located in the area.

### **7.3 Historical Age**

Factors such as population expansion, increasing pressure on natural resources, the emergence of power blocs, attempts to control trade and penetration by Griquas, Korana and white communities from the south-west resulted in a period of instability in Southern Africa that began in the late 18<sup>th</sup> century and effectively ended with the settlement of white farmers in the interior. This period, known as the *difaqane* or *Mfecane*, also affected the Northern Cape Province, although at a relatively late stage compared to the rest of Southern Africa. Here, the period of instability, beginning in the mid-1820s, was triggered by the incursion of displaced refugees associated with the Tlokwa, Fokeng, Hlakwana and Phuting tribal groups.

The *difaqane* coincided with the penetration of the interior of South Africa by white traders, hunters, explorers and missionaries. The first was PJ Truter's and William Somerville's journey of 1801, which reached Dithakong at Kuruman. They were followed by Cowan, Donovan, Burchell and Campbell and resulted in the establishment of a London Mission Society station near Kuruman in 1817 by James Read.

The Great Trek of the Boers from the Cape in 1836 brought large numbers of Voortrekkers up to the borders of large regions known as Bechuanaland and Griqualand West, thereby coming into conflict with many Tswana groups and also the missionaries of the London Mission Society. The conflict between Boer and Tswana communities escalated in the 1860s and 1870s when the Korana and Griqua communities became involved and later also the British government. The conflict mainly centered on land claims by various communities. For decades the western border of the Transvaal Boer republic was not fixed. Only through arbitration (the Keate Arbitration), triggered by the discovery of gold at Tati (1866) and diamonds at Hopetown (1867) was part of the western border finally determined in 1871. Ten years later, the Pretoria Convention fixed the entire western border, thereby finally excluding Bechuanaland and Griqualand West from Boer domination.

The first Geologist to have surveyed the Northern Cape was Dr. A. W. Rogers of the Geological Commission of the Cape Colony in 1906. One of the features he noted was a small hill called Black Rock and reported on the presence of manganese ore at the base of the hill. In 1940 Associated Manganese Mines of South Africa acquired the manganese outcrop known as Black Rock and shortly afterwards started mining the deposit. The ore is extracted by both underground and open cast operations. Mines in the area include Wessels,

N'Chwaning I, N'Chwaning II, Black Rock, Hotazel, Langdon, Devon, Perth, Smart, Adams, Mamatwan (largest opencast mine in the area), Middleplaats and Gloria. Gloria Mine was opened in 1978 (Kusel et.al. 2009: 3).

The strata bound ore deposits of the Kalahari Manganese field represent the largest land bound sedimentary manganese deposits in the world and originated from a single episode of manganese deposition about 2200 million years ago. A widespread hypothermal event occurred in the north western portion of the Kalahari Manganese field 1300 million years ago with temperatures reaching a maximum of 450 degrees centigrade in the Wessels, N'Chwaning and Black Rock areas. This event resulted in the upgrading of the Manganese-content of the ore and produced a wide range of rare minerals as well as mineral assemblages. Of the approximately 150 minerals, 10 have to date only been found in the Kalahari manganese field and a further 26 are found at four or fewer mineral localities worldwide (Kusel et.al. 2009: 3).

### **Discussion of sites, features or objects found during the assessment**

A total of 14 sites with a Stone Age origin were recorded during the survey. It is however envisaged that many more sites could still be uncovered in the area, with fairly dense grass cover in certain areas, as well as red Aeolian sand dunes, rendering them invisible. Two sites (6 and 7) fall outside the area we had to survey.

The existing old railway bridge, adjacent to the area where the new rail crossing is proposed, can be considered the 15<sup>th</sup> site.

#### *Site 1*

This is the existing rail bridge. It is probably less than 60 years of age, and the documentation done during the survey is seen as ample mitigation. It is not sure if the bridge will be destroyed for the purposes of constructing the new rail crossing.

With the high number of Stone Age sites found in the area, and especially close to the river bed and banks, care should however be taken when the new rail bridge is constructed that no Stone Age sites or occurrences are destroyed. Mitigation measures in this regard will be given in the Recommendation section of this report.

**GPS Location: S27.18295 E22.91906.**

**Significance of site: Medium. Bridge younger than 60 years of age. Might not be impacted on by development.**



**Figure 6: Existing rail bridge over the Gamagara River.**



**Figure 7: Closer view of existing bridge.**

#### *Sites 2 – 15: Stone Age*

The Stone Age sites, as well as the stone tools recorded in the area are similar to the one identified by Kusel in 2009. The sites are characterized by scatters of flakes, cores and more formal tools (ESA to MSA/LSA), situated in erosion dongas and quarries, as well as in calcrete formations overlain by red (Aeolian) sand dunes. In certain areas the red sand dunes are being eroded (wind erosion), exposing the calcretes and Stone Age artefacts.

The sites vary from low density scatters with only a few artefacts, to areas with literary thousands of cores, flakes and more formal tools. The significance of the sites is seen as medium to high, and although many might not be impacted on by the development, it is



envisaged that any development activity will uncover Stone Age sites and occurrences in the area. This is also true for the new rail crossing, which will be in the Gamagara riverbed. Stone Age artefacts are located in and on the river banks, and the likelihood of uncovering archaeological material is very high. It is therefore recommended that Phase II mitigation is undertaken on some of the sites identified in the area to minimize the impact of the development. This will entail mapping of the sites, as well as controlled surface sampling of material.

Kusels' 2009 survey determined that stone artefacts occurred within pebble and gravel levels overlying the calcrete formations within the ancient river bed of the Gamagara River. Due to the density of good quality raw material in the form of pebbles significant knapping activities took place over time. The collection represents a mix of mainly ESA and MSA cores, flakes, blades and waste from stone tool knapping and other lithic reduction processes. Flakes, blades and bladelets are the main products of any stone reduction process. The collection includes one example that seems similar to an ESA chopper, but is more likely to be a pebble core with flake removals as the Oldowan is known from only a few sites. A number of formal ESA tool types were present among the exposed lithics. Most of the formal tools are typical ESA Acheulean handaxes, or large cutting tools (LCT's). These handaxes/bifaces are classified as formal tools, because they have been shaped or transformed into a specific shape and have been given a cutting edge through secondary retouch (i.e. by removing small flakes). Significant numbers of the MSA flakes and blades retain faceted striking platforms that indicate the use of the core preparation technique.

The stone tools found by Kusel show a high frequency of prepared cores characteristic of MSA technologies. The prepared core technique was used during the MSA to produce triangular flake blanks and blade blanks. Some of the flake and blade blanks from the Assmang locality do exhibit such faceted striking platforms that typify core preparation characteristic of Levallois-type cores.

It is not in all the examples possible to assign firm associations of the stone tools with specific Stone Age periods. The relative high frequency of long flake-blades may, however, be significant. These tool types may either be ascribed to the Fauresmith Industrial Complex, which is transitory between the ESA and MSA, or forms part of a fully developed MSA.

Kusel's collection is dominated by local cryptocrystalline silica rock types, which are fine-grained good knapping materials. Jaspers are particularly abundant and used for the bulk of the lithics. Local rock types were generally used at most Stone Age localities with small numbers of tools occasionally made on rocks imported to the region or manufactured at other localities and then brought back.

In the Northern Cape ESA assemblages, including the Fauresmith, tend to occur as lag deposits on the margins of seasonal rivers, semi-permanent water holes or pans. Such assemblages commonly represent the accumulated remains of numerous reoccupations over possibly many thousands of years. The particular locality from where the hand axes in the collection originate reflects the correlation of Acheulean sites with sources of water and an environment that could provide animal and plant foods. In this region stone tools often occur within calcrete zones underlying the modern surface of unstratified red aeolian sands.

## **GPS Locations of sites**

Site 2: S27.18572 E22.92173  
Site 3: S27.18362 E22.91820  
Site 4: S27.18539 E22.92119  
Site 5: S27.18605 E22.92180  
Site 6: S27.17542 E22.91651  
Site 7: S27.17592 E22.91679  
Site 8: S27.17885 E22.92081  
Site 9: S27.18185 E22.92095  
Site 10: S27.18157 E22.92185  
Site 11: S27.18129 E22.92189  
Site 12: S27.18110 E22.92196  
Site 13: S27.18422 E22.92130  
Site 14: S27.19146 E22.92320  
Site 15: S27.18940 E22.91817

**Significance of sites: Medium to High. Of these sites, Sites 6 and 12 are the most significant (in terms of artifact density).**

**Mitigation Measure: Mapping of sites and controlled sampling of material.**

According to Kusel (2009: p.8) the Stone Age site recorded during his survey is representative of similar sites occurring near water. As such the site as well as possible sites all along the banks of the Gamagara River represents a very long period of human occupation. These sites are at least of regional importance.



**Figure 8: MSA flakes and tools from one of the sites.**



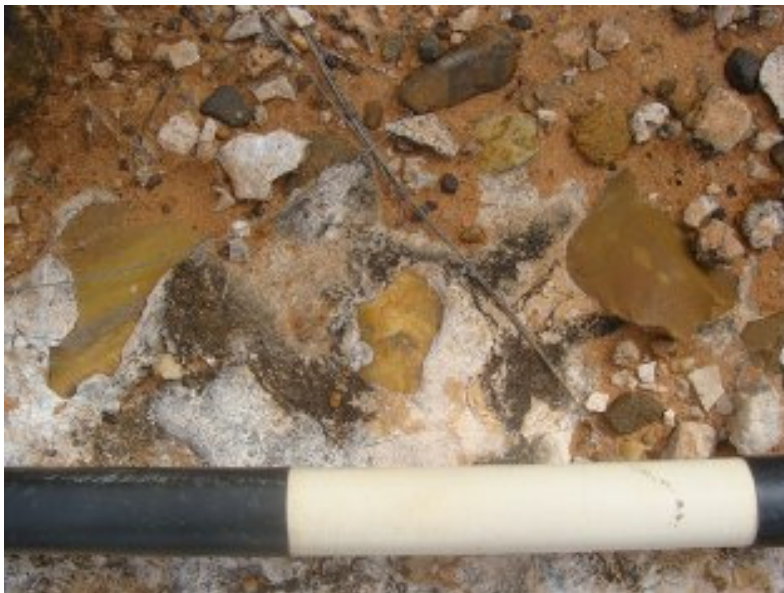
**Figure 9: ESA and MSA tools.**



**Figure 10: Close-up of ESA tool from the area.**



**Figure 11: ESA hand axe from Site 12.**



**Figure 12: MSA flakes and tools embedded in hard calcrete layer.**



**Figure 13: View of one of the sites, with red sand and pebble layer over calcrete formation. Many tools occur in the red pebble layer.**



**Figure 14: Distribution of sites in the area.**

## 8. CONCLUSIONS AND RECOMMENDATIONS

In conclusion it can be stated that the Heritage Impact Assessment (HIA) of the area was conducted successfully. A number of archaeological sites were identified and recorded in the area, **all dating to the Stone Age (mainly MSA/LSA, with some ESA occurrences)**. Most of the sites are situated in erosion dongas or gullies, on the river banks, in calcrete formations under red Aeolian sands and is represented by scatters or concentrations of stone artifacts of varying density.

**With little or no archaeological research done in the area in the past the sites are fairly important and at least of regional significance.** Although most sites will not directly impacted on by the proposed development, and no sites were identified in the river bed close to the new rail crossing, it is envisaged that the development will more than likely uncover stone tools, and possibly in situ sites, in the river banks and sand dunes and calcrete formations around the area where the rail crossing will be constructed. Also, should any railway line diversions be undertaken other sites will be negatively impacted upon. **It is therefore recommended that Phase II mitigation measures be undertaken before the development commences. This will entail the following:**

**(a) Mapping of the most significant sites (highest density of material) in the area. Sites 6 and 12 are recommended. With Site 6 located outside the area earmarked for development activities, Site 12 will therefore be mapped.**

**(b) Controlled sampling of material in order to obtain a representative sample of the Stone Age material in the area. This will be in the form of blocks on the site, which will be mapped and material in these blocks will then be sampled.**

Although no other sites of cultural heritage significance were identified in the area, they could be present, or could have been missed as a result of the grass and vegetation cover in certain areas making visibility difficult. This is especially true for low stone packed or unmarked graves. Kusel did record 2 historical graveyards in the large geographical area during 2009, and a lookout should be kept for similar sites.

**Finally, it should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts are always a distinct possibility. Care should therefore be taken during any development activities that if any of these are accidentally discovered, a qualified archaeologist be called in to investigate.**

## 9. REFERENCES

Aerial view of development location as well as Site Distribution: Courtesy Google Earth

Topographic Location of development: Courtesy Map Source 2010

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## APPENDIX A

### Definition of terms:

Site: A large place with extensive structures and related cultural objects. It can also be a large assemblage of cultural artifacts, found on a single location.

Structure: A permanent building found in isolation or which forms a site in conjunction with other structures.

Feature: A coincidental find of movable cultural objects.

Object: Artifact (cultural object).

(Also see Knudson 1978: 20).



## APPENDIX B

### Cultural significance:

- Low            A cultural object being found out of context, not being part of a site or without any related feature/structure in its surroundings.
  
- Medium        Any site, structure or feature being regarded less important due to a number of factors, such as date and frequency. Also any important object found out of context.
  
- High            Any site, structure or feature regarded as important because of its age or uniqueness. Graves are always categorized as of a high importance. Also any important object found within a specific context.

## APPENDIX C

### **Heritage significance:**

- Grade I     Heritage resources with exceptional qualities to the extent that they are of national significance
- Grade II    Heritage resources with qualities giving it provincial or regional importance although it may form part of the national estate
- Grade III   Other heritage resources of local importance and therefore worthy of conservation

## APPENDIX D

### Protection of heritage resources:

#### - Formal protection

National heritage sites and Provincial heritage sites – grade I and II

Protected areas - an area surrounding a heritage site

Provisional protection – for a maximum period of two years

Heritage registers – listing grades II and III

Heritage areas – areas with more than one heritage site included

Heritage objects – e.g. archaeological, palaeontological, meteorites, geological specimens, visual art, military, numismatic, books, etc.

#### - General protection

Objects protected by the laws of foreign states

Structures – older than 60 years

Archaeology, palaeontology and meteorites

Burial grounds and graves

Public monuments and memorials