

**PHASE 1 HERITAGE
IMPACT ASSESSMENT REPORT**

**APPLICATION FOR ENVIRONMENTAL
AUTHORISATION**

***PROPOSED NICHUME LOGISTICS (PTY) LTD,
HIGHVELD EXCHANGE YARD RAIL SIDING IN
EMALAHLENI, MPUMALANGA PROVINCE.***



SEPTEMBER 2020

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DECLARATION OF INDEPENDENCE: -

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EXECUTIVE SUMMARY: -

BACKGROUND: -

Tsimba Archaeological Footprints (Pty) Ltd was appointed by Nichume Logistics (Pty) Ltd on behalf of the applicant EVRAZ Highveld Steel and Vanadium Corporation (EHSV) to conduct a Phase 1 heritage impact assessment (HIA) for the proposed Nichume Logistics (Pty) Ltd, Highveld exchange yard rail siding in Emalahleni, Mpumalanga province, South Africa.

The aim of the survey was to identify and document archaeological sites, cultural resources, sites associated with oral histories (intangible heritage), graves, cultural landscapes, and any structures of historical significance (tangible heritage) that may be affected within the footprint of the proposed development.

The appointment of Tsimba Archaeological Footprints (Pty) Ltd is in terms of the National Heritage Resources Act (NHRA), No. 25 of 1999 read together with the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The HIA is completed in accordance to requirements of Section 38 (1) (a, b, c) of the NHRA, No. 25 of 1999. This is due to the nature of the proposed development, linear development which involves:

- a) *The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;*
- b) *The construction of a bridge or similar structure exceeding 50 m in length;*
- c) *Any development or other activity which will change the character of a site exceeding 5 000 m² in extent.*

The development may also impact on Cultural Heritage Resources such as graves, structures, archaeological and paleontological resources that are protected in terms of sections 34, 35, and 36 of the NHRA. The field assessment followed a systematic survey of the proposed development area as well as its neighboring features. The aim of the survey was to locate, identify, evaluate and document sites, objects and structures of cultural significance found within the proposed project area. The Phase I Archaeological and Cultural Heritage Impact Assessment field survey for the proposed project noted the existence of a few structures that are potentially old buildings (over 60 years old). There also exists an old train wagon that was formerly used as an office

for the train station.

CONCLUSIONS: -

As is the case elsewhere in the world, railway development in South Africa was an essential part of European colonization in the early days. Factors such as the discovery of more minerals, rapid industrialization after 1910, followed by agricultural development after 1945, the influx of new settlers, urbanization, the creation of Africa's largest energy-generating infrastructure (coal-based), tourism development and others, led to the expansion of the railway system. Unlike any other country, the apartheid policy of dividing and separating the population also facilitated railway development, intended to transport masses of people over great distances between their places of residence and their places of work.

This project: directly contributes to South Africa efforts for expanding its coal exports, thereby generating much needed export earnings and reducing the country's negative trade balance and current account deficit. Coal exports have over the years faced serious barriers and obstacles, including inadequate rail capacity to the coast. This project will bring in the much needed planning and investment coordination between privately owned mines, state-owned rail infrastructure to ensure smooth transportation of coal.

Site Significance: The site is interesting because of its historical connection of mining and the expansion of the railway line. The expansion of the railway line was as result of the need to transport mine proceeds and laborers. Noting the economic benefit this project brings to the local community and the nation at large, it is highly recommended that the Provincial Heritage Resources Authority exercises its discretion and offer a conditional approval for the project. From a heritage perspective it is the author's belief that the recommendations given below will be adequate.

RECOMMENDATIONS:-

According to historical maps and documents the development of the Marshalling yard started from 1965-1967. The yard was developed for the purpose of bringing raw material in and taking product out from Highveld. The Marshalling yard was made

possible as a result of the existing railways developed for coal mining activities. Judging from this historical background, the identified structures at the yard cannot be older than 60 years old. It is also important to note that these buildings do not carry any architectural significance and are also in a dilapidated state. The train wagon that was formerly used as a ticket fits well in retelling the chronological development of trains in South Africa. It is however important to note there are also no significant features that makes the wagon unique so as to carry any intrinsic significance.

- *It is recommended that should the applicant wish to remove these structures in order to pave way for new developments, they should be allowed to do so based on the above mentioned assessment.*

Although no archaeological findings were made during the field survey, sub-surface remains of heritage sites (human burial and archaeological artifacts) could still be encountered during the construction activities associated with the project. Such sites would offer no surface indication of their presence due to heavy plant and coal cover in other areas as well as in the railway corridor.

- *It is recommended that an archaeological induction be carried out before construction begins to enable construction workers to be able to identify archaeological artifacts during the construction phase*

In the event of discovery of other heritage resources during site preparation and construction phase, the Provincial Heritage Resources Authority or SAHRA will be informed immediately and a Phase 2(two) Heritage Impact assessment should be initiated.

The potential impact of the development on fossil heritage is **VERY HIGH**; a desktop survey has been carried out as part of this HIA though it may be possible to request a Phase 1 PIA (field survey). Further mitigation or conservation measures are may be required to locate fossiliferous outcrops in the two quaternary areas.

The following indicators of unmarked sub-surface sites could be encountered;

- i. Bone concentrations, either animal or human;*
- ii. Ceramic fragments such as pottery shards either historic or pre-contact;*
- iii. Stone concentrations of any formal nature.*

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LIST OF ABBREVIATIONS: -

Abbreviation	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
BAR	Basic Assessment Report
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EMPR	Environmental Management Programme
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
LIA	Late Iron Age
LSA	Late Stone Age
MIA	Middle Iron Age
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
PHRA	Provincial Heritage Resources Act
PWP	Prospecting Work Programme
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System

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1. INTRODUCTION: -

1.1 PROJECT BACKGROUND: -

Myezo Environmental Management Services (Pty) Ltd, the independent Environmental Assessment Practitioner (EAP), was requested by Nichume Logistics (Pty) Ltd to apply for Environmental Authorization and to undertake the related Environmental Impact Assessment (EIA) process for the proposed development in Emalahleni, Mpumalanga Province on behalf on the applicant EVRAZ Highveld Steel and Vanadium Corporation (EHSV).

The project involves the provision of a loading terminal and material handling services associated with the receipt of coal loaded in 32 tonne payload road vehicles, offloading onto a stockpile or into a silo and subsequent loading into modified rail containers or open-top wagons. The coal will be loaded on 60 wagon trains and 100 open-top wagons.

The Heritage Impact Assessment was conducted as part of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requirements and it also follows the requirements of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA). The terminology used and the methodology followed with regards to the compilation of the Heritage Impact Assessment (HIA) are explained and the legal framework stated (see **APPENDIX A**). International conventions regarding the protection of cultural resources have also been followed. The ICOMOS Burra Charter (1979) was also consulted for international heritage principles and policies applicable to this project.

1.2 SCOPE OF WORK: -

The scope of the prospecting activities will include activities as follows:

A. Receiving of road coal trucks in the siding

- We expect to receive 4000 tons per day loaded in 125 super link road side tipper trucks.
- The road trucks will then be weighed in the weighbridge facility for road trucks/ coal trucks, capable of weighing the maximum payload allowed by law for road vehicles, to account for coal received by road trucks.
- Delivery slips will be issued to the trucks drivers as proof of delivery and records of received trucks will be stored and filed.
- A staging area will be provided to manage and regulate the flow of trucks inside the rail siding facility.
- Once offloaded, the trucks will then be directed to the stockpile area by the spotters to offload the coal.
- Once offloaded, the trucks will then be weighed to ensure that coal is emptied from the trucks and the truck is not leaving with coal.

B. Handling and stockpile management

- Front end loaders will be used in the creation of stockpiles
- Coal will be stacked in a form of a triangular or prism shape, lessening the formation of dust as depicted in the picture below.
- Stockpiles will be divided into 3 to allow for free movement in between the stockpiles.
- Ensure that there is no contamination of coal in the stockyard.
- Ensure that the coal quality is preserved and stockpiled in a manner that will minimise coal from getting wet and allow adequate drainage.
- Record and maintain opening and closing stock volumes data (daily and monthly).
- Physical surveying of the stockpile.
- **Loading of trains**
- Train consists of 100 wagons will be received on site, each wagon having a load carrying capacity of 58 or 84 tons.
- One train is expected per day and will load 5800 tons.
- Trains wagons will be loaded using front end loaders.
- Trains will then be weighed as they depart the rail siding using the rail weigh bridge to account for coal loaded into trains and left the rail siding.
- Trains will be operated by Transnet Freight Rail and the rail siding will only be responsible for the loading of the train and accounting of the coal loaded.

2. DESCRIPTION OF THE RECEIVING ENVIRONMENT: -

2.1 LOCATION: -

The proposed project area is located to the south of the N4 between Bronkhorstspuit and Emalaheni. The site lies between 25° 51' 43" and 25° 54' 16" south and 29° 03' 26" and 29° 08' 10" east near Clewer in the Mpumalanga Province (see Figure 1 below)

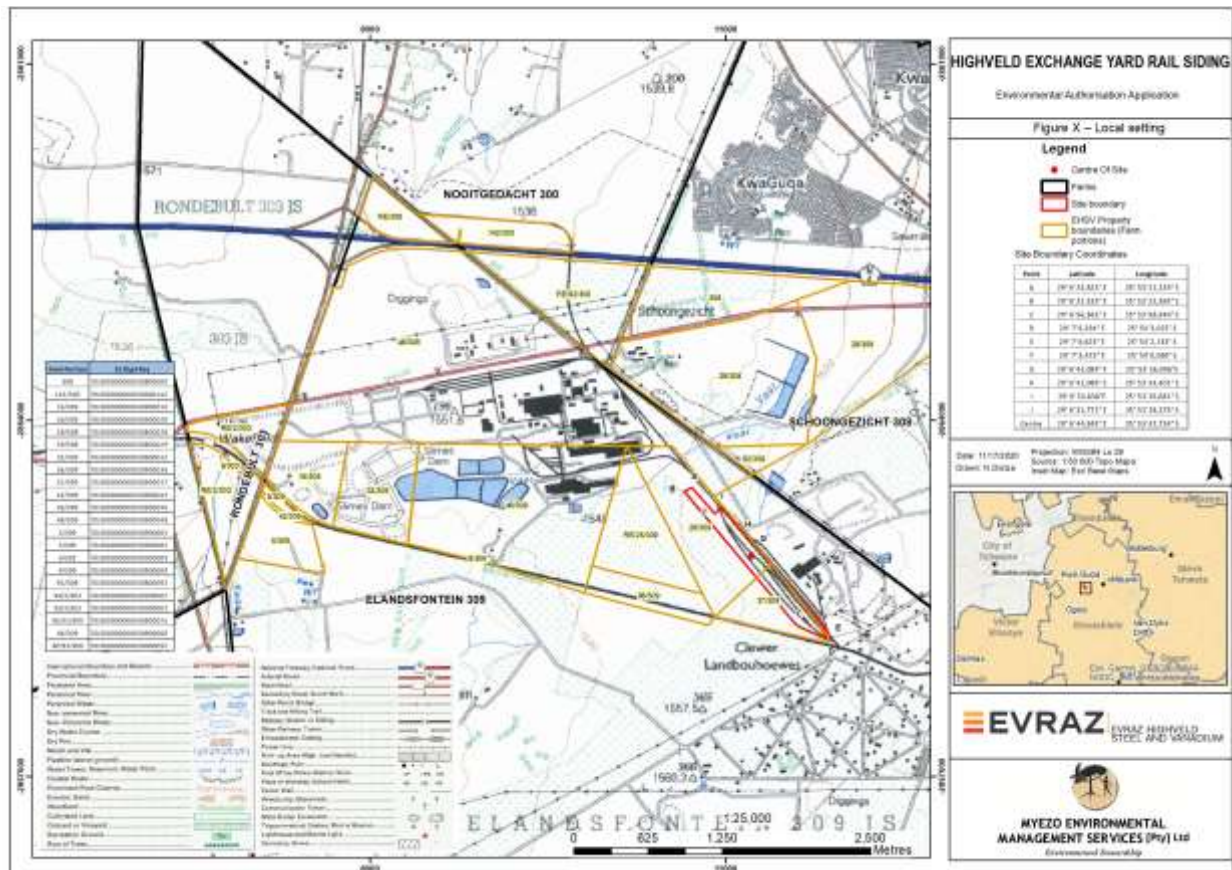


Figure 1: Locality Map

2.2 PHYSICAL ENVIRONMENT: -

A prior soil investigation carried out by Terra Soil Science noted that the geology of the bulk of the site consists predominantly of fine- to coarse-grained sandstone, shale and coal seams of the Vryheid formation. The report further notes that the water flow direction indicates that the site is situated on a catchment divide with water flowing in five main directions away from the crest. The Topographic Wetness Index (TWI) used by Terra Soil Science provides a very accurate indication of water flow paths and areas of water accumulation that are often correlated with wetlands. This is a function of the topography of the site and ties in with the dominant water flow regime in the soils and the landscape.

3. METHODOLOGY: -

3.1 LITERATURE REVIEW: -

The background information search of the proposed development area was conducted following the site maps from the client. Sources used in this study included:

- Published academic papers and HIA studies conducted in and around the region where the proposed infrastructure development will take place;
- Available archaeological literature covering the Emalahleni region and the entire Mpumalanga province area was also consulted;
- The SAHRIS website and the National Data Base was consulted to obtain background information on previous heritage surveys and assessments in the area; and
- Map Archives - Historical maps of the proposed area of development and its surrounds were assessed to aid information gathering of the proposed area of development and its surrounds.

3.2 FIELD SURVEY: -

The field survey lasted for a day on the 3rd of September 2020. It was conducted by an archaeologist from Tsimba Archaeological Footprint through driving and walking. A ground survey, following standard and accepted archaeological procedures, was conducted.

The survey also paid special attention to disturbed and exposed layers of soils such as eroded surfaces. These areas are likely to be exposed or yield archaeological and other heritage resources that may be buried underneath the soil and be brought to the surface by animal and human activities including animal burrow pits and human excavated grounds (King, 1978). The surface was also inspected for possible Stone Age scatters as well as exposed Iron Age implements and other archaeological resources.

The survey followed investigated the cultural resources onsite using the best possible technologies for archaeological field surveys. The project area was surveyed, and findings were documented through photographs using a Nikon Camera (with a built-in GPS). A Samsung GPS Logger (2018) was used to record the archaeological finds on site.

3.3 ORAL HISTORIES: -

The local community is critical in giving an oral account as well as detailed intangible values of a site. Article 12 of the Burra Charter states the conservation, interpretation and management of a heritage resource should provide for the participation of people for whom the place has significant associations and meanings, or who have social, spiritual or other cultural responsibilities for the place. The induction process carried out by EVRAZ Highveld Steel and Vanadium Corporation (EHSV) through Thia Oberholzer shed some light into the historical context of the Highveld area.

3.4 DATA CONSOLIDATION AND REPORT WRITING: -

Data captured on the development area (during the field survey) by means of a desktop study and physical survey is used as a basis for this HIA. This data is also used to establish assessment for any possible current and future impacts within the development footprint. This includes the following:

- Assessment of the significance of the cultural resources in terms of their archaeological, built environment and landscape, historical, scientific, social, religious, aesthetic and tourism value (see **Appendix B**);
- A description of possible impacts of the proposed development, especially during the construction phase, in accordance with the standards and conventions for the management of cultural environments;
- Proposal of suitable mitigation measures to minimize possible negative impacts on the cultural environment and resources that may result during construction;
- Review of applicable legislative requirements that is the NEMA (together with the 2014 EIA Regulations), the NHRA of 1999.
- The consolidation of the data collected using the various sources as described above;
- Acknowledgement of impacts on heritage resources (such as unearthed graves) predicted to occur during construction;
- Geological Information Systems mapping of known archaeological sites and maps in the region, and
- A discussion of the results of this study with conclusions and recommendations based on the available data and study findings.

4. LEGISLATIVE FRAMEWORK

EVRAZ Highveld Steel and Vanadium Corporation (EHSV) is required to obtain an Environmental Authorization (EA) in terms of the National Environmental Management Act, 1998 (NEMA, 1st No. 107 of 1998) which involves the submission of Environmental Impact Assessment. Myezo Environmental Management Services (Pty) Ltd have been appointed by Nichume Logistics (Pty) Ltd as the Environmental Assessment Practitioner (EAP) to assist in complying with these requirements. As part of the process Nichume Logistics (Pty) Ltd also requested Tsimba Archaeological Footprints to conduct an HIA (with Desktop Paleontological Impact Assessment) as part of the Environmental Authorisation process. This HIA study is informed and conducted to fulfil the requirements of the National Heritage Resources Act (No 25 of 1999). The development also triggered the regulations applicable under the National Environmental Management Act 107 of 1998 and other environmental management acts of South Africa.

As such, the EIA study includes a Heritage Impact Assessment specialist study, recommendations from the AIA/HIA report require Heritage Authority review and comments to be incorporated into the final EIA Record of Decision. This particular Development triggered the following Sections of the Heritage Legislation;

Section 38 (1) of the National Heritage Resources Act requires that where relevant, an Impact Assessment is undertaken in case where a listed activity is triggered. Such activities include:

- (a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- (b) the construction of a bridge or similar structure exceeding 50 m in length; and
- (c) any development or other activity which will change the character of an area of land, or water -
 - (i) exceeding 5 000 m² in extent;
 - (ii) involving three or more existing erven or subdivisions thereof; or
 - (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a Provincial Heritage Resources Authority;
- (d) the re-zoning of a site exceeding 10 000 m² in extent; or
- (e) any other category of development provided for in regulations by SAHRA or a Provincial Heritage Resources Authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

Section 3 of the National Heritage Resources Act (25 of 1999) lists a wide range of national resources protected under the act as they are deemed to be national estate. When conducting a Heritage Impact Assessment (HIA) the following heritage resources have to be identified:

- (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 natural features of cultural significance
- (e) Geological sites of scientific or cultural importance’;
- (f) Archaeological and paleontological sites;
- (g) Graves and burial grounds including-
 - (i) Ancestral graves;
 - (ii) Royal graves and graves of traditional leaders;
 - (iii) Graves of victims of conflict;
 - (iv) Graves of individuals designated by the Minister by notice in the Gazette
 - (v) Historical graves and cemeteries;
 - (vi) Other human remains which are not covered by in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);
- (h) Sites of significance relating to the history of slavery in South Africa;
 - (i) Moveable objects, including - objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects and material, meteorites and rare geological specimens;
 - (ii) Objects to which oral traditions are attached or which are associated with living heritage
 - (iii) Ethnographic art and objects;
 - (iv) Military objects;
 - (v) Objects of decorative or fine art; and
 - (vi) Objects of scientific or technological interest; and(vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in Section 1 of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996)

5. ARCHEOLOGICAL AND HISTORICAL BACKGROUND: -

5.1 THE STONE AGE

a) The Early Stone Age (2 million to 250 000 years BP): -

The Stone Age dates back more than 2 million years representing a more explicit beginning of the cultural sequence divided into three epochs, the Early, Middle and Late Stone Ages. These early people made stone and bone implements. In South Africa more than 3 million years ago appeared proto-human hominids. The hominid site nearest to the study area is Taung near Vryburg. Taung was proclaimed a UNESCO World Heritage Site proclaimed at the same time with the Sterkfontein Caves (Krugersdorp) and Makapans Valley (Mokopane) in a sequential nomination.

Archaeological research carried out over a period of approximately 70 years has shed light on various aspects of this extensive past, from the Earlier Stone Age to the Late Iron Age. These studies have focused on a range of topics from early subsistence strategies to farming, settlement, and mining. Over this time, the archaeological evidence shows, as our early ancestors advanced physically, mentally and socially they invented stone and bone tools and learned to control fire and exploit natural resources effectively. The earliest tools clearly manufactured by our ancestors and their relatives (early hominids) date to 2,5 million years ago.

Oldowan and Acheulean tools are widely distributed across South Africa, where they are most commonly found in association with water sources such as lakes and rivers. Unfortunately, because of this there are very few sites where the tools are found in a primary context, that is, exactly where the user left them. Most of the tools have either been washed into caves or eroded out of riverbanks and washed down rivers. An example of this is the site of Maleoskop on the farm Rietkloof1, one of only a few places in Mpumalanga where ESA artefacts have been found to date. This area is drained by the Olifant River, which is fed by numerous tributaries, of which the Rietspruit is one. Erosion gullies along the Rietspruit revealed concentrations of ESA stone tools. These stone tools consisted of choppers (Olduwan), hand axes, and cleavers (Acheulean).

b) The Middle Stone Age (MSA) [250 000 years – 30 000 years BP]: -

The Middle Stone Age is marked by the introduction of a new tool kit which included prepared cores, parallel-sided blades and triangular points hafted to make spears. By then humans had become skilful hunters, especially of large grazers such as wildebeest, hartebeest and eland.

Although the MSA has not been extensively studied in Mpumalanga, evidence for this period has been excavated from Bushman Rock Shelter (BRS), a well-known site situated on the farm Klipfonteinhoek in the Ohrigstad District. This cave, which formed in the Malmani dolomites, was excavated twice during the 1960s, first by Louw and later by Eloff. The MSA layers indicated that the cave was repeatedly visited over a long period, the lower layers dated to more than 40 000 years ago, with those above dating to 27 000BP. It is possible that humans occupied the cave when climate conditions were particularly wet and cold. At about 12 000BP, for example, a high number of fractured pieces of dolomite from the cave roof were found in the archaeological deposit. This occurs naturally when conditions are particularly wet and cold, and the rock is forced to expand and contract as the water freezes and thaws. The archaeological deposit that contained the fractured pieces of roof also preserved the remains of stone tools, animals and ash, which suggested that the sporadic roof fall stopped people from using the shelter.

c) The Later Stone Age (LSA)[40 000 years to ca2000 years BP]:-

In the LSA period humans are classified as Homo sapiens which refer to the modern physical form and thinking capabilities. Several behavioural traits are exhibited, such as rock art and purposeful burials with ornaments, became a regular practice¹.

The Later Stone Age (LSA), which occurred from about 20 000 years ago, is signalled by a series of technological innovations and social transformations within these early hunter-gatherer societies.

As at other LSA sites in southern Africa evidence of adornment in the form of ostrich eggshell beads was present in most levels at these two Mpumalanga sites. An examination of the beads, and remaining pieces of shell, provided insight into the methods used to make strings of beads. In most cases shell pieces were drilled from the inside surface of the shell, probably because the outside surface was slippery; once pierced they were ground to create smooth edges.

There appears to be a gap in the Mpumalanga LSA record between 9 000 BP and 5 000 BP. This may have to do with the general dearth of Stone Age research in the province, but it also encompasses a period of rapid warming and major climate fluctuation, which may have forced people to seek out more protected and viable environments in this area.

We pick up the Mpumalanga Stone Age record again in the mid-Holocene at the farm Honingklip (HKLP) near Badplaas in the Carolina District. Here two LSA sites were found on opposite sides of a bend in the Nhlazatshe River, about 1km west of its confluence with the Teespruit. The HKLP sites are in the foothills of the Drakensberg, where the climate is warmer than the highveld but cooler than the lowveld.

The first site, dated to between ~4870BP and ~700BP, was situated on a terrace on the northern side of a low rock shelter in which there are four panels of rock art. It was not possible to say whether the rock art was painted during the mid- or later Holocene, as colouring material was present in all the excavated layers. Stonewalling present at both sites was associated with the

last 250 years of hunter-gatherer occupation, and may have served as protection against intruders and predators. The faunal assemblage suggested that during the late Holocene small game hunting was no longer significant, and that snaring and fishing formed the main subsistence activity. A high percentage of the tools at one of the sites were used to prepare skins and in woodworking activities.

5.2 IRON AGE PERIOD: -

The Mpumalanga region attracted people in the Iron Age through its diverse and abundant plants and animals, people would later go on to extract the area's rich variety of minerals, such as ochre, copper and iron; a practice that can be traced back thousands of years. Pieces of clay ceramic and an iron bead indicated early social contact with the first farmers who moved into the area sometime around AD 500, which marked the beginning of the Iron Age in South Africa (Berrington 1978).

The expansion of early farmers, who, among other things, cultivated crops, raised livestock, mined ore and smelted metals, occurred in this area between AD 400 and AD 1100. Dates from Early Iron Age sites¹⁰ indicated that by the beginning of the 5th century AD Bantu-speaking farmers had migrated down the eastern lowlands and settled in the Mpumalanga lowveld. Subsequently, farmers continued to move into and between the lowveld and highveld of Mpumalanga until the 12th century. These Early Iron Age sites tend to be found in similar locations. Sites were found within 100m of water, either on a riverbank or at the confluence of streams. The close proximity to streams meant that the sites were often located on alluvial fans (Whitelaw, 1996 pp 75-83).

Huffman (1997) notes that large cattle byres with pits were also significant features of EIA highveld sites dating from AD 600. At Langdraai,¹⁵ an AD750 site, situated on an alluvial fan about 400m east of the Alexander Spruit, the dung deposit in one of the cattle kraals was at least 25cm thick and two bag shaped pits were located at either end of the kraal. The size of the cattle kraal and the presence of cattle bones at the site show that herding undoubtedly played an important role in the subsistence economy of the Early Iron Age. Evidence from this and the previous site also suggested that small domestic livestock, like sheep and goat, were eaten (Schapera, 1993 p.53).

The archaeology also shows that people and their ancestors regularly moved between these vastly different environments to and from the coast to obtain and trade a variety of resources. From AD 900 these included objects brought across the ocean from foreign

countries (Marker 1976). Coal was used in South Africa as far back as the Iron Age (300 – 1880 AD). During this time charcoal was used to melt copper and iron. Large-scale usage of coal only started happening around the middle of the 19th century.

Coal mining has undergone major development over the years. In the early days of coal mining men used to physically create tunnels to get to the coal deposits by digging. They then extracted the coal and transported the coal on mine carts. These days coal mines are technologically advanced and use sophisticated equipment including; trucks, jacks, conveyors, draglines and shearers to extract the coal.

5.3 HISTORICAL BACKGROUND OF COAL MINING IN SOUTH AFRICA: -

- **Early industrial developments**

In 1852, the first mine was constructed in what is now South Africa. This was the beginning of a copper project that would go on to form the cornerstone of the town of Springbokfontein, today Springbok, in the Northern Cape province. Commercial coal mining began 12 years later, with the construction of a mine in Eastern Cape that would also see a settlement constructed around it, the town of Molteno. This town was established by George Vice, the local-born son of an Englishman, and named after an Anglo-Italian immigrant who had been born in London, and established a process of white Europeans moving to South Africa to set up mining operations, which would be staffed by predominantly black workers, a trend which would characterize later generations of South African mining.

Coal mining played a supportive role as provider of energy to the growing gold mining industry and indeed, many collieries were historically and are today owned by gold mining companies. To these coal mine owners it was more important to keep the costs of their own energy inputs low, than to profit from coal mining itself. The coal price remained very low until the mid-1970s, when export opportunities opened up through a deep terminal in Richards Bay, and Japanese long term contracts. The low coal price was accompanied by harsh working conditions and low wages for African workers, a tendency to mine only the best coal (“picking out the eyes” in mining jargon) instead of mining the whole seam, and a disregard for environmental impacts.

Coal mining continued to expand until the turn of the 20th century, with deposits at Vereeniging and Witbank exploited from 1879 and 1895 respectively fuelling the region’s growing industries. Historically the Vaal coalfields were the first to be intensively exploited, hosting a number of coal fired power stations as well as steel and heavy industry. The largest coalfields are found in a continuous expanse from Mpumalanga into Kwazulu Natal , where seams are between 15 and 100 metres deep, and around seven metres thick, but very variable . More recently, coalfields to the North (Waterberg and Soutpansberg) have been opened up.

- ***The History of cheap labour and Coal Mining***

The dominance of coal interests has imposed logic on the political economy which is played out in the form of weak regulation and the dependence of local and provincial government on coal interests. Under apartheid, coal mining provided an avenue for advancing Afrikaner capital, and is now the focus of a programme for building a black middle class through participation in coal mining. Coal mining also has a history of cheap labor, and confrontation with organized labor. Mine owners in general, like other business and industry, made a limited presentation to the Truth and Reconciliation Commission, but did not come near to accepting responsibility for, amongst others, miners' deaths and ongoing illnesses.

- ***Historical context of coal mining in the Mpumalanga Highveld***

Coal has been mined in the Mpumalanga Highveld area as far back as hundred years ago. South Africa's most important coalfield, has imposed a complicated "coal dynamic" on the area, resulting in extensive environmental and social externalities. Terra Soil science notes that by 1960 a railway line had been in operation on the northern side of the proposed development site. The marshalling yard was developed during 1965-1967 for the purpose of bringing raw material in and taking product out from Highveld. The marshalling yard was made possible as a result of the existing railways developed for coal mining activities. This line runs from the north, turns south-east continuing through the site, and then joins an existing line forming the southern boundary of the site. This was still the status quo on the 1974 map but this changed by 1996 where the line's alignment was changed to run east and then turn due south and then south-east through the site. At this period some of the mining itself, the generation of electricity in coal fired power stations, some of which are serviced by captive collieries, heavy industry using coal to produce steel and alloyed products, coal hauling by truck, and a culture of indoor coal burning for heating and cooking in seasonally cold areas, now recognized as a major health hazard.

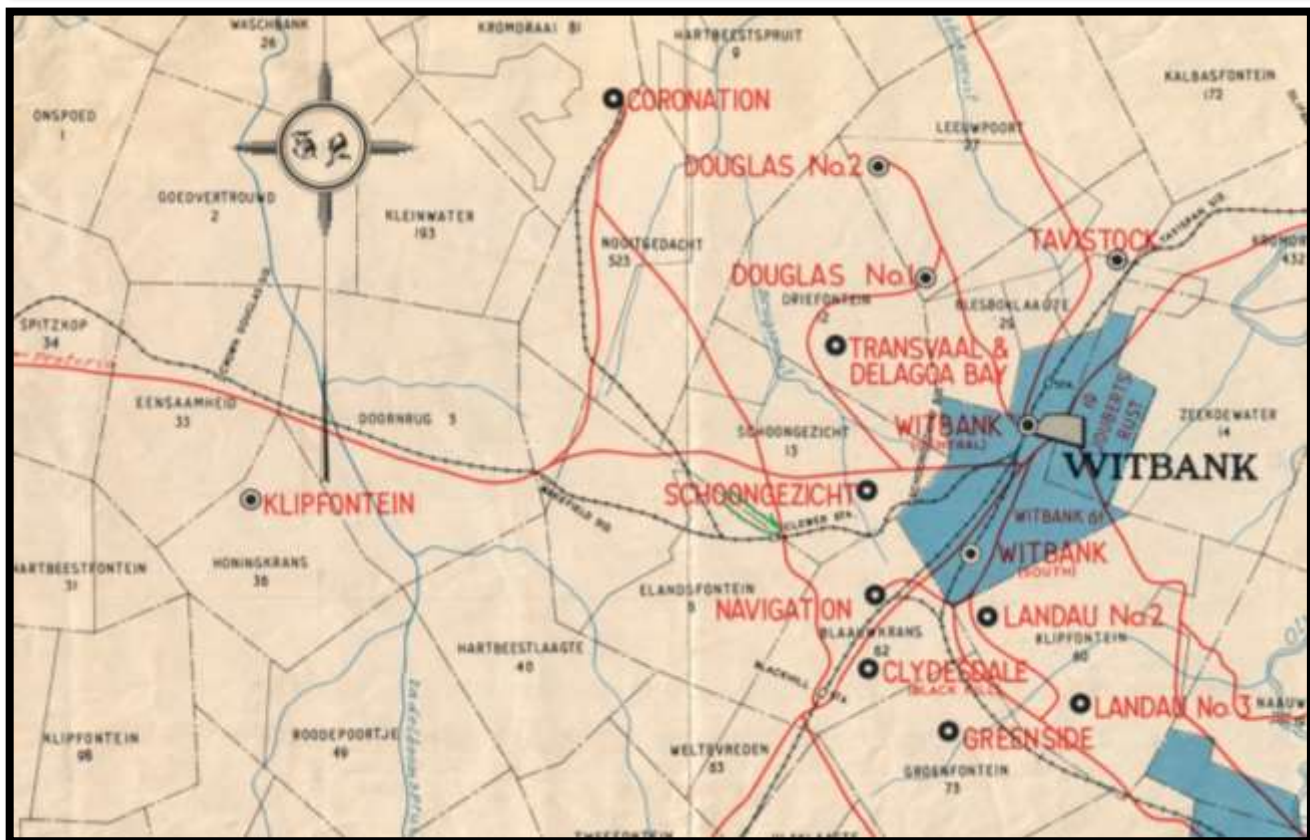
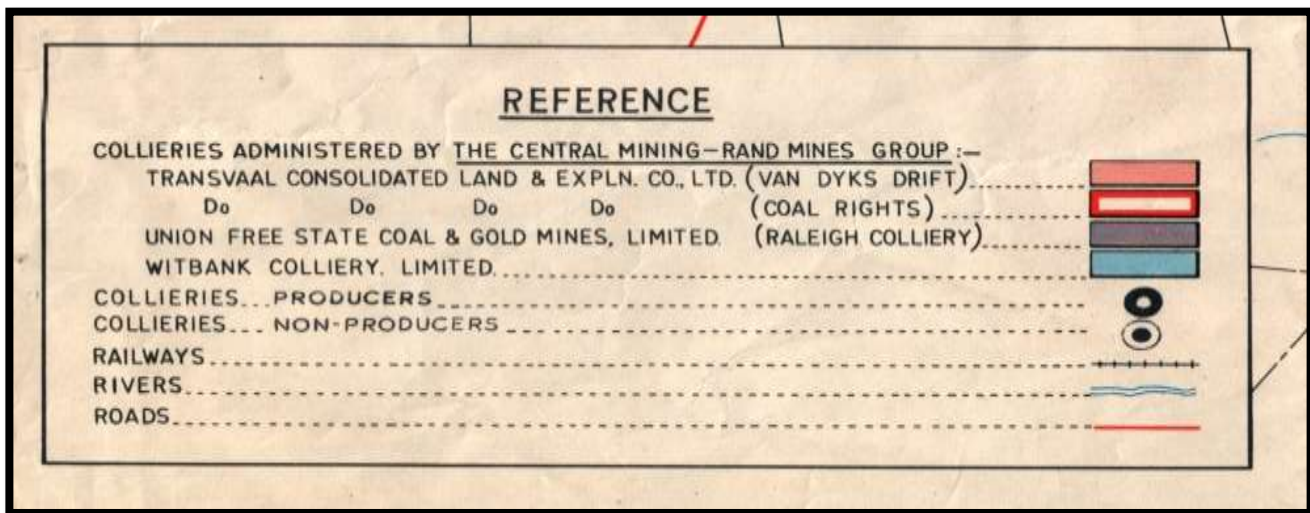


Figure 2: A historical map of Witbank coalfields showing collieries administered by the central Mining -Rand Mines Group with names of places, collieries producers, colliers producers, collieries non producers, railways and roads. The study area marked in green in 1950.

Major rivers rise from the Mpumalanga Highveld. The Vaal River which is the source of Rand Water's raw water for more than 10 million people and the core economy in Gauteng and neighbouring areas, runs through South Africa's industrial heartland. The Olifants river supplies water to the national electricity supplier, Eskom, and to the Kruger National Park and surrounding private game reserves, the heart of South Africa's conservation and ecotourist industry. The Olifants and the Inkomati rivers are shared with neighbouring Mozambique and Swaziland, where major downstream investments have been made in irrigation. These are sensitive to rising salinity levels in the water.

Coal mining implies the externalities of transport, by train for export and by truck to 8 – soon to be 11 – coalfired power stations. Coal mining and the uses of coal, both domestic at ground level and via coal fired power stations of which the majority are situated in this area, cause air pollution. Associated activities in steel, chrome and vanadium add to pollution levels. Coal mining, which was based on cheap and dangerous work until mechanization started in the 1970s and sped up with the advent of open cast mining (1980s), now almost equally divided between underground and opencast, attracted thousands of job seekers into the area, who stayed on even as job numbers were drastically reduced. Discard coal dumps prone to spontaneous combustion and creating conditions for poor communities to reclaim coal in dangerous conditions, the use of duff (fine low quality coal) in power stations has imposed air pollution on the whole area – and on more distant areas.

- ***Historical context of legislations and regulations for coal mines***

As far back as 1903, South Africa has had laws that placed the responsibility for mining impacts on the mine owner. When a closure certificate was obtained, this responsibility ceased. However, under a traditionally weak regulation system, many mines became defunct and ownerless. The then apartheid government, attempted to deal with this situation through the 1975 Fanie Botha Accord, between the Minister of Water Affairs and the Chamber of Mines. They agreed that the state would take 100% responsibility for all mines closed before 1976. Mines closed from 1976 to 1986 would be 50% state responsibility and 50% owner responsibility. After 1986 all mines and its closure would be the responsibility of the owner. As a result, the South African Department of Water Affairs has spent more than R120 million the last 10 years to deal with historic pollution – though this amount is said to only be a fraction of what is ultimately needed.

Historical problems include the estimated 6000 abandoned mines (not all of them coal mines). The abandoned Transvaal and Delagoa Bay Colliery outside Witbank has been identified as representing the greatest possible risk of any mine in the D&O Mines database. This is a large colliery which has partially collapsed, leaving large sinkholes in an area adjacent to an informal settlement. The remaining coal in the underground workings is burning, compounding the physical hazard posed by the mine as well as polluting the air. The workings are flooded and have started to decant, producing highly saline acid drainage with unacceptable levels of heavy metals. This water drains into the Brugspruit, a tributary of the Olifants River. Poor water quality resulting from this and other abandoned and operational coal mines has been linked to the death of fish and crocodiles in the Loskop Dam Nature reserve downstream.

6. DESCRIPTION AND DOCUMENTS OF THE CULTURAL HERITAGE RESOURCES: -

In terms of the national estate as defined by the NHRA, no sites of significance were found during the survey as described below.

The surveyed area is an undulating piece of land which is characterised by spread-out grass veldt in some sections, the railway line and coal along the railway line. The site is flanked by farming fields and heavy industrial sites. There are a few dotted gum trees within the site and few stationary goods train wagons. There are also homesteads in the surrounding areas.

The current state of the Marshalling yard station represents an overall picture of most train stations in South Africa today. The closure or realignment of railway lines made old lines obsolete or uneconomical, leading to the closure of stations, retrenchment or relocation of staff and the end of train movement. A major impetus to the decline of railway transport has been the emergence of road transport. Except in a few urban areas, there is limited passenger movement by train. The only goods that are still transported widely by rail are bulk goods. The closure of lines is not peculiar to the past two decades but also happened in earlier years, when more modern and better construction methods led to the replacement of old routes that incorporated many curves and other obstacles with straight shortcuts. In most cases farmers and other local people found a use for the redundant buildings. Bureaucracy and lack of clear policy today prevent the rapid transfer of redundant infrastructure from the railway

owners to other parties. Where operating lines are concerned, lack of funds has prevented the regular maintenance and security of buildings and structures. Where stations have been decommissioned along operating lines, demolition by neglect is the case.

Crime, and especially violent crime, is rampant in South Africa. Lack of respect for individual and private property is widespread. Coupled to rising unemployment, much of the country's obsolete and redundant railway infrastructure has been systematically vandalised. In real terms this means the disappearance of woodwork, roof covers, floor tiles, fireplaces and anything else that can be stripped from structures. Nor have locomotives and rolling stock escaped vandalism, including professional vandalism by collectors of brass plates and other fittings.



Figure 3: Exposed surfaces that were inspected for archaeological artifacts



Figure 4: Open trench areas that were also inspected for archaeological artifacts below the sub surface



Figure 5: View of the southern end of the proposed project area



Figure 6: View of the goods train wagons stationary within the proposed development area



Figure 7: A view of Trans Alloys a coal dependent industry close to the Marshalling Yard



Figure 8: View of the Trans Alloys from the south -western side of the study area



Figure 9: An exposed supply pipeline running along the railway line



Figure 10: Part of the railway line on site

6.1 BUILT ENVIRONMENT: -

Section 34(1) of National Heritage Resources Act of 1999 protects these structures against any altering.

- ❖ Structures possibly over 60 years old



Figure 11: The Marshall Yard electricity substation

- **GPS Co-ordinates S 25° 53' 47" E 29° 06' 47"**

The substation is still functional and is still structurally sound. The substation cannot be 60 years old judging from the dates the Marshalling ward started operating. The substation also has got an extension at the back that looks recent (pointed with green arrow).



Figure 12: Abandoned red-cross offices



Figure 13: View of the dilapidated inside of the abandoned red-cross building

- **GPS Co-ordinates S 25° 53' 48" E 29° 06' 42"**

The abandoned red-cross building looks dilapidated from the inside though the outside structure looks structurally sound. This building can not be 60 years old and does not have the historical nor architectural significance to warrant preservation as a historic building.



Figure 14: Another abandoned brick house

- **GPS Co-ordinates S 25° 53' 48" E 29° 06' 48"**

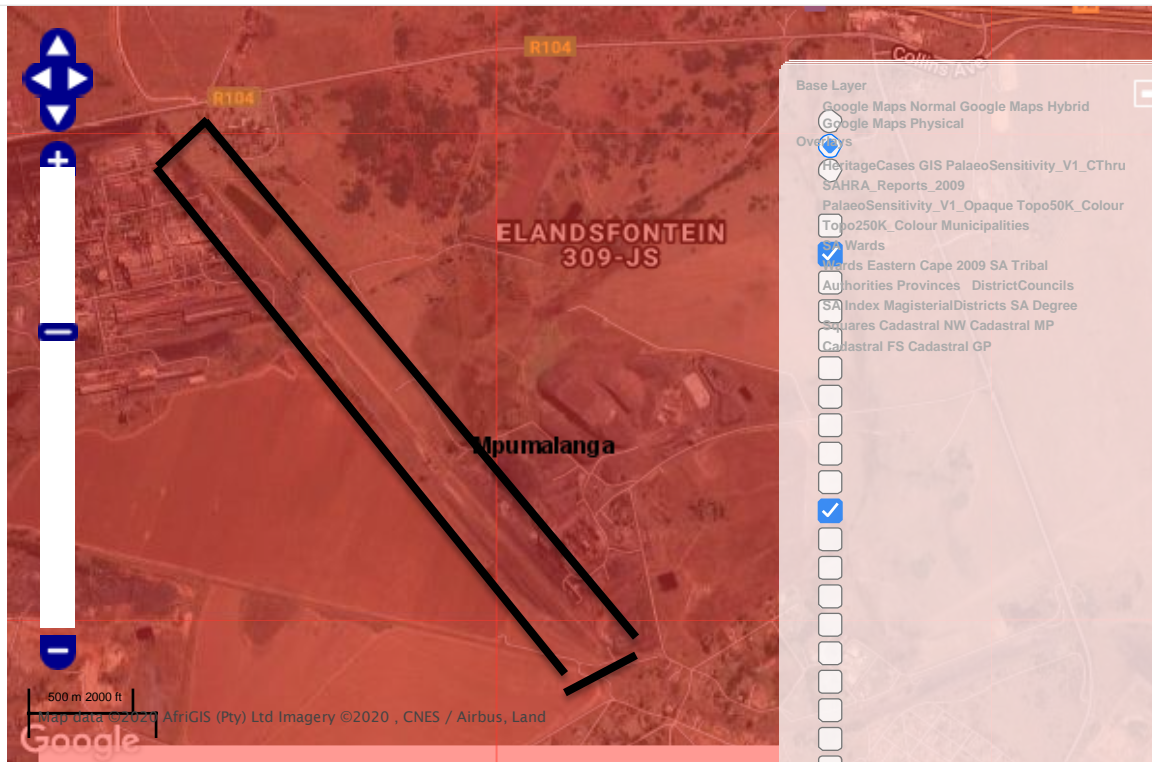
The abandoned brick house was being used as a kitchen and offices with ablution facilities inside. Though the building looks structurally sound it does not carry significant heritage or architectural value. The building was also graded as a new structure.

6.2 ARCHAEOLOGICAL AND PALEONTOLOGICAL RESOURCES: -

Section 35 (4) No person may, without a permit issued by the responsible heritage resources authority

- During the survey, no archaeological sites were recorded.
- According to the Paleo Sensitive map generated from the SAHRIS (maps) website, the proposed development area is regarded as a **VERY HIGH** pale ontologically; the area is marked in **RED** (see **APPENDIX F**). Given below is the Paleo sensitive map with the general development area shown in black.

Figure 15: 1 in 250 00 Geological formation layers are courtesy of the Council for GeoScience (Paleontological /fossil Sensitivity Map)



Colour	Sensitivity	Required Action
RED	VERY HIGH	field assessment and protocol for finds is required
ORANGE/YELLOW	HIGH	desktop study is required and based on the outcome of the desktop study, a field assessment is likely
GREEN	MODERATE	desktop study is required
BLUE	LOW	no palaeontological studies are required however a protocol for finds is required
GREY	INSIGNIFICANT/ZERO	no palaeontological studies are required
WHITE/CLEAR	UNKNOWN	these areas will require a minimum of a desktop study. As more information comes to light, SAHRA will continue to populate the map.

6.3 CULTURAL LANDSCAPES, INTANGIBLE AND LIVING HERITAGE: -

Section 3 (3) of the National Heritage Resources Act, No. 25 of 1999 makes provisions of such places of spiritual significance to individuals.

- Long term impact on the cultural landscape is considered to be negligible as the surrounding area consists of a residential area. Visual impacts to scenic routes and sense of place are also considered to be high due to the

nonexistence of any notable scenic routes structures within the study area.

6.4 BURIAL GROUNDS AND GRAVES: -

36(3) No person may, without a permit issued by SAHRA or a provincial heritage resources authority.

- No graves or burial grounds were recorded within the study area.

6.5 PUBLIC MONUMENTS AND MEMORIALS:-

37. Public monuments and memorials must, without the need to publish a notice to this effect be protected in the same manner as places which are entered in a heritage register referred to in section 30.



Figure 16: An old passenger's train wagon that was formerly used as offices



Figure 17: View of the inside of the train wagon

- **GPS Co-ordinates S 25° 53' 48" E 29° 06' 48"**

The train wagon fits well into the history of the railway line in South Africa. It is however important to note that though the wagon carries no significant intrinsic or historic value to warrant preservation.

7. RISK ASSESSMENT OF THE PROPOSED PROJECT AREA: -

Table 1: Risk Assessment / Evaluation

EVALUATION CRITERIA	RISK ASSESSMENT
1. Description of Potential Impact	Negative impacts range from partial to total destruction of surface and under-surface movable/immovable relics
2. Nature of Impact	Negative impacts can both be direct or indirect.
3. Legal Requirements	Sections 34, 35, 36, 38 of National Heritage Resources Act (No. 25 1999).
4. Stage/Phase	Construction phase Operational phase
5. Nature of Impact	Negative, both direct & indirect impacts.
6. Extent of Impact	Excavations and ground clearing has potential to damage archaeological resources above and below the surface not seen during the survey.
7. Duration of Impact	Any accidental destruction of surface or subsurface relics is not reversible but can be mitigated.

8. ASSESSMENT OF SIGNIFICANCE: -

8.1 SITE SIGNIFICANCE CLASSIFICATION

Article 26(2) of the Burra Charter emphasizes that written statements of cultural significance for heritage resources should be prepared, justified and accompanied by supporting evidence. Site significance classification standards prescribed by SAHRA (2006), and acknowledged by ASAPA for the SADC Region, were used for the purposes of this report.

Table 2: Site Significance Classification

SAHRA'S SITE SIGNIFICANCE MINIMUM STANDARDS			
Filed Rating	Grade	Classification	Recommendation
1. National Significance (NS)	Grade 1		Conservation; National Site nomination
2. Provincial Significance (PS)	Grade 2		Conservation; Provincial Site nomination
3. Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
4. Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
5. Generally Protected A (GP.A)		High/ Medium Significance	Mitigation before destruction
6. Generally Protected B (GP.B)		Medium Significance	Recording before destruction
7. Generally Protected C (GP.A)		Low Significance	Destruction

8.2 SITE SIGNIFICANCE CALCULATION FORMULA: -

Site significance is calculated by combining the following concepts in the given formula:

$$S = (E+D+M) P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

8.3 SIGNIFICANCE WEIGHTINGS FOR EACH POTENTIAL IMPACT: -

The significance weightings for each potential impact are as presented in and Table 3.

Table 3: Significance weightings for each potential impact

ASPECT	DESCRIPTION	WEIGHT
Probability	Improbable	1
	Probable	2
	Highly Probable	4
	Definite	5
Duration	Short term	1
	Medium term	3
	Long term	4
	Permanent	5
Scale	Local	1
	Site	2
	Regional	3
Magnitude/Severity	Low	2
	Medium	6
	High	8

8.4 IMPACT SIGNIFICANCE: -

Table 4: Impact Significance

Significance		
<p>It provides an indication of the importance of the impact in terms of both tangible and intangible characteristics. (S) is formulated by adding the sum of numbers assigned to Extent (E), Duration (D), and Intensity (I) and multiplying the sum by the Probability. $S = (E+D+M) P$</p>		
<30	Low	Mitigation of impacts is easily achieved where this impact would not have a direct influence on the decision to develop in the area.
30-60	Medium	Mitigation of impact is both feasible and fairly easy. The impact could influence the decision to develop in the area unless it is effectively mitigated.
>60	High	Significant impacts where there is difficult. The impact must have an influence on the decision process to develop in the area.

8.5 IMPACT ASSESSMENT: -

Table 5: Impact Assessment

<p>Nature: During the construction phase activities resulting in disturbance of surfaces and/or sub-surfaces may destroy, damage, alter, or remove from its original position archaeological material or objects.</p>		
	Without Mitigation	With Mitigation
Extent	Local (1)	Local (1)
Duration	Permanent (5)	Permanent (5)
Magnitude	Low (2)	Low(2)
Probability	Not Probable (2)	Not probable (2)
Significance	Low (16)	Low(16)
Status	Negative	Negative
Reversibility	Not irreversible	Not irreversible
Irreversible loss of resources	No resources were recorded	No resources were recorded
Can impacts be mitigated?	Yes, a chance find procedure should be implemented.	Yes
<p>Mitigation: Due to the lack of apparent significant heritage resources no further mitigation is required prior to construction. A Chance Find Procedure should be implemented for the project should any sites be identified during the construction process.</p>		

9. CONCLUSIONS

As is the case elsewhere in the world, railway development in South Africa was an essential part of European colonization in the early days. Factors such as the discovery of more minerals, rapid industrialization after 1910, followed by agricultural development after 1945, the influx of new settlers, urbanization, the creation of Africa's largest energy-generating infrastructure (coal-based), tourism development and others, led to the expansion of the railway system. Unlike any other country, the apartheid policy of dividing and separating the population also facilitated railway development, intended to transport masses of people over great distances between their places of residence and their places of work.

This project: directly contributes to South Africa efforts for expanding its coal exports, thereby generating much needed export earnings and reducing the country's negative trade balance and current account deficit. Coal exports have over the years faced serious barriers and obstacles, including inadequate rail capacity to the coast. This project will bring in the much needed planning and investment coordination between privately owned mines, state-owned rail infrastructure to ensure smooth transportation of coal.

Site Significance: the site is interesting because of its historical connection of mining and the expansion of the railway line. The expansion of the railway line was as result of the need to transport mine proceeds and laborers. Noting the economic benefit this project brings to the Highveld community, it is highly recommended that the Provincial Heritage Resources Authority exercises its discretion and offer a conditional approval for the project. From a heritage perspective we it is the author's belief that the recommendations given below will be adequate.

10. RECOMMENDATIONS: -

According to historical maps and documents the development of the Marshalling yard started from 1965-1967. The yard was developed for the purpose of bringing raw material in and taking product out from Highveld. The marshalling yard was made possible as a result of the existing railways developed for coal mining activities. Judging from this historical background, the identified structures at the yard cannot be older than 60 years old. It is also important to note that these buildings do not carry any architectural significance and are also in a dilapidated state. The train wagon that was formerly used as a ticket fits well in retelling the chronological development of trains in South Africa. It is however important to note there are also no significant features that makes the wagon unique so as to carry any intrinsic significance.

- *It is recommended that should the applicant wish to remove these structures in order to pave way for new developments, they should be allowed to do so based on the above mentioned assessment.*

Although no archaeological findings were made during the field survey, sub-surface remains of heritage sites (human burial and archaeological artifacts) could still be encountered during the construction activities associated with the project. Such sites would offer no surface indication of their presence due to heavy plant and coal cover in other areas as well as in the railway corridor.

- *It is recommended that an archaeological induction be carried out before construction begins to enable construction workers to be able to identify archaeological artifacts during the construction phase.*

In the event of discovery of other heritage resources during site preparation and construction phase, the Provincial Heritage Resources Authority or SAHRA will be informed immediately and a Phase 2(two) Heritage Impact assessment should be initiated.

The potential impact of the development on fossil heritage is **VERY HIGH**; a desktop survey has been carried out as part of this HIA though it may be possible to request a Phase 1 PIA (field survey). Further mitigation or conservation measures are may be required to locate fossiliferous outcrops in the two quaternary areas.

The following indicators of unmarked sub-surface sites could be encountered;

- iv. Bone concentrations, either animal or human;*
- v. Ceramic fragments such as pottery shards either historic or pre-contact;*
- vi. Stone concentrations of any formal nature*

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LIST OF LEGISLATURES USED: -

1. ICOMOS, 1996.International Charter for the Conservation and Restoration of Monuments and sites (the Venice charter).
2. ICOMOS, 1999.The Australia ICOMOS charter for places of cultural significance (the Burra Charter).
3. ICOMOS Charter, Principles for the analysis, conservation and structural restoration of architectural heritage (2003)
4. National Heritage and Resources Act of South Africa No.25 of 1999

APPENDIX A: DEFINITION OF TERMS ADOPTED IN THIS HIA

DEFINITION OF TERMS ADOPTED IN THIS HIA: -

The terminology adopted in this document is mainly influenced by the NHRA of South Africa (1999) and the Burra Charter (1979).

Adaptation: Changes made to a place so that it can have different but reconcilable uses.

Artefact: Cultural object (made by humans).

Buffer Zone: Means an area surrounding a cultural heritage which has restrictions placed on its use or where collaborative projects and programs are undertaken to afford additional protection to the site.

Co-management: Managing in such a way as to take into account the needs and desires of stakeholders, neighbours and partners, and incorporating these into decision making through, amongst others, the promulgation of a local board.

Conservation: In relation to heritage resources, includes protection, maintenance, preservation and sustainable use of places or objects so as to safeguard their cultural significance as defined. These processes include, but are not necessarily restricted to preservation, restoration, reconstruction and adaptation.

Contextual Paradigm: A scientific approach which places importance on the total context as catalyst for cultural change and which specifically studies the symbolic role of the individual and immediate historical context.

Cultural Resource: Any place or object of cultural significance

Cultural Significance: Means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance of a place or object for past, present and future generations.

Feature: A coincidental find of movable cultural objects (also see Knudson 1978: 20).

Grading: The South African heritage resource management system is based on a grading system, which provides for assigning the appropriate level of management responsibility to a heritage resource.

Heritage Resources Management: The utilization of management techniques to protect and develop cultural resources so that these become long term cultural heritage which are of value to the general public.

Heritage Resources Management Paradigm: A scientific approach based on the Contextual paradigm, but placing the emphasis on the cultural importance of archaeological (and historical) sites for the community.

Heritage Site Management: The control of the elements that make up the physical and social environment of a site, its physical condition, land use, human visitors, interpretation etc. Management may be aimed at preservation or, if necessary at minimizing damage or destruction or at presentation of the site to the public.

Historic: Means significant in history, belonging to the past; of what is important or famous in the past.

Historical: Means belonging to the past, or relating to the study of history.

Maintenance: Means the continuous protective care of the fabric, contents and setting of a place. It does not involve physical alteration.

Object: Artifact (cultural object)

Paradigm: Theories, laws, models, analogies, metaphors and the epistemological and methodological values used by researchers to solve a scientific problem.

Preservation: Refers to protecting and maintaining the fabric of a place in its existing state and retarding deterioration or change, and may include stabilization where necessary. Preservation is appropriate where the existing state of the fabric itself constitutes evidence of specific cultural significance, or where insufficient evidence is available to allow other conservation processes to be carried out.

Protection: With reference to cultural heritage resources this includes the conservation, maintenance, preservation and sustainable utilization of places or objects in order to maintain the cultural significance thereof.

Place :means a geographically defined area. It may include elements, objects, spaces and views. Place may have tangible and intangible dimensions.

Reconstruction: To bring a place or object as close as possible to a specific known state by using old and new materials.

Rehabilitation: The repairing and/ or changing of a structure without necessarily taking the historical correctness thereof into account (NMC 1983: 1).

Restoration: To bring a place or object back as close as possible to a known state, without using any new materials.

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

Sustainable: Means the use of such resource in a way and at a rate that would not lead to its long-term decline, would not decrease its historical integrity or cultural significance and would ensure its continued use to meet the needs and aspirations of present and future generations of people.

APPENDIX B: DEFINITION OF VALUES

Value	Definition
Historic Value	Important in the community or pattern of history or has an association with the life or work of a person, group or organization of importance in history.
Scientific Value	Potential to yield information that will contribute to an understanding of natural or cultural history or is important in demonstrating a high degree of creative or technical achievement of a particular period
Aesthetic Value	Important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
Social Value	Have a strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
Rarity	Does it possess uncommon, rare or endangered aspects of natural or cultural heritage
Representivity	Important in demonstrating the principal characteristics of a particular class of natural or cultural places or object or a range of landscapes or environments characteristic of its class or of human activities (including way of life, philosophy, custom, process, land-use function, design or technique) in the environment of the nation, province region or locality.

APPENDIX C: ENVIRONMENTAL CONTEXT FOR HERITAGE SPECIALIST STUDIES IN SOUTHERN AFRICA

This is categorized by a temporal layering including a substantial pre-colonial, early contact and early colonial history as distinct from other regions. The following table can be regarded as a useful categorization of these formative layers:

Indigenous:

Palaeontological and geological:

- ◀ Precambian (1.2 bya to late Pleistocene 20 000 ya) Archaeological:
- ◀ Earlier Stone Age (3 mya to 300 00ya) (ESA)
- ◀ Middle Stone Age (c300 000 to 30 000 ya) (MSA)
- ◀ Later Stone Age (c 30 000 to 2000 ya) (LSA)
- ◀ Late Stone Age Herder period (after 2000 ya) (LSA - Herder period)
- ◀ Early contact (c 1500 - 1652)

Colonial:

- ◀ Dutch East India Company (1652 - 1795)
- ◀ Transition British and Dutch occupation (1796-1814)
- ◀ British colony (1814 -1910)
- ◀ Union of South Africa (1911-1961)
- ◀ Republic of South Africa (1962 – 1996)

Democratic:

- ◀ Republic of South Africa (1997 to present)

It is also useful to identify specific themes, which are relevant to the Western Cape context. These include, *inter alia*, the following:

- ◀ Role of women
- ◀ Liberation struggle
- ◀ Victims of conflict
- ◀ Slavery
- ◀ Religion
- ◀ Pandemic health crisis
- ◀ Agriculture
- ◀ Water

Specific spatial regions also reveal distinct characteristics, which are a function of the interplay between biophysical conditions and historical processes. Such broad regions include the following:

- ◀ West Coast
- ◀ Boland
- ◀ Overberg
- ◀ Karoo

A large number and concentration of formally protected Grade 1, 2 and World Heritage Sites, also characterize the Western Cape. Such sites include:

- ◀ Robben Island
- ◀ Table Mountain National Park

APPENDIX D: RESOURCE LIKELY TO OCCUR WITHIN THESE CONTEXTS AND LIKELY SOURCES OF HERITAGE IMPACTS/ISSUES

HERITAGE CONTEXT	HERITAGE RESOURCES	SOURCES OF HERITAGE IMPACTS/ISSUES
A. PALAEOLOGICAL LANDSCAPE CONTEXT	Fossil remains. Such resources are typically found in specific geographical areas, e.g. the Karoo and are embedded in ancient rock and limestone/calcrete formations.	<ul style="list-style-type: none"> ◀ Road cuttings ◀ Quarry excavation
B. ARCHAEOLOGICAL LANDSCAPE CONTEXT NOTE: Archaeology is the study of human material and remains (by definition) and is not restricted in any formal way as being below the ground surface.	Archaeological remains dating to the following periods: <ul style="list-style-type: none"> ▪ ESA ▪ MSA ▪ LSA ▪ LSA - Herder ▪ Historical ▪ Maritime history Types of sites that could occur include: <ul style="list-style-type: none"> ▪ Shell middens ▪ Historical dumps ▪ Structural remains 	<ul style="list-style-type: none"> ▪ Subsurface excavations including ground leveling, landscaping, foundation preparation. ▪ In the case of maritime resources, development including land reclamation, harbor/marina/water front developments, marine mining, engineering and salvaging.
C. HISTORICAL BUILT URBAN LANDSCAPE CONTEXT	<ul style="list-style-type: none"> ◀ Historical townscapes/streetscapes. ◀ Historical structures; i.e. older than 60 years ◀ Formal public spaces. ◀ Formally declared urban conservation areas. ◀ Places associated with social identity/displacement. 	A range of physical and land use changes within this context could result in the following heritage impacts/issues: <ul style="list-style-type: none"> ◀ Loss of historical fabric or layering related to demolition or alteration work. ◀ Loss of urban morphology related to changes in patterns of subdivision and incompatibility of the scale, massing and form of new development. ◀ Loss of social fabric related to processes of gentrification and urban renewal.

APPENDIX E: AUTHOR'S RESUME

ROY MUROYI

ARCHAEOLOGY & HERITAGE SPECIALIST



AREAS OF SPECIALITY

- Iron Age archaeology
- Colonial archaeology
- Industrial Archaeology
- Grave relocations
- Human Skeletal remains analysis

WORK EXPERIENCE (SEVEN YEARS)

- **Tsimba Archaeological Footprints (Pty) Ltd | Current Director**
 - Heritage Impact Assessment compilation
 - Archaeological excavations
 - Human Skeletal analysis
 - Compliance with National Heritage & Environmental law
 - Geological Information systems work
- **G&A Heritage Consultants | 2018 | Field Technician**
- **Cape Archaeological Survey|2017|Field Technician**
- **Vhubvo ArchHeritageConsultantsArchaeologist|2017**
- **NGT Holdings |Archaeologist |2016**
- **Time Line Consulting Botswana |Field Technician**
- **National Museums & Monuments of Botswana Salvage Archaeology| 2013**

CAREER OVERVIEW

I am a flexible, creative, hard-working and professionally minded archaeologist with realistic methods, who always aims to produce only the best results. I have been involved in grave relocation projects, experience in compiling Heritage Impact Assessments, and Conservation Management Plans Eco-Tourism Impact Assessments. I have also gained experience in Community Engagement for major developmental projects.

ACADEMIC ACHIEVEMENTS

MA. Heritage Studies (Candidate) -University of Witwatersrand

MA. CDS (with specialization in African Archaeology)-University of Witwaterand

BA.Hon. Archaeology, Cultural Heritage and Museum Studies- Midlands State University

Certificate in Applied anatomy and biological anthropology training program -University of Cape Town

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APPENDIX F: PALEONTOLOGICAL IMPACT ASSESSMENT (DESKTOP)