PHASE 1:

HERITAGE IMPACT ASSESMENT

RELATING TO COAL CORE SAMPLE DRILLING AND RELATED MINING INFRUSTRUCTURE ON FARMS DARU 889MS, TANGA 648MS, LUKIN 643 MS, SALAITA 188MT

MAKHADO COLLIERY MINE, VHEMBE DISTRICT MUNICIPALITY, LIMPOPO PROVINCE.

***Compiled** by:* Millennium Heritage Group-MHG (PTY) LTD

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09 September 2022

i. Technical and Executive Summaries

Property details	
Province	Limpopo
Magisterial District	Vhembe District
Topo-cadastral map	2229 DD and 2230 CC
Coordinates	S22. 49. 27. 02 and E 29.55.03.06
Closest town	Makhado and Musina CBDs
Farm name	Daru 889MS, Tanga 648 MS, Lukin 643 MS and Salaita 188 MT

Development criteria in terms of Section 38 (1) of the NHR Act 25 of 1999	**Yes**	**No**
Construction of road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length		No
Construction of bridge or similar structure exceeding 50m in length	Yes	
Development exceeding 5000 sqm	Yes	
Development involving three or more existing erven or subdivisions	Yes	
Development involving three or more erven or divisions that have been consolidated within past five years		
Rezoning of site exceeding 10 000 sqm		
Any other development category, public open space, squares, parks, recreation grounds		

Development	
Description of development	Mining establishment, core sample drilling and associated mining infrastructure
Project name	Makhado Colliery
Developer	MC Mining
Heritage consultant	Millennium Heritage Group-MHG (Pty) Ltd
Purpose of the study	Heritage Impact Assessment to categorize and evaluate sites significance to be impacted by the proposed mining establishment, drilling and associated mining infrastructure

Land use	
Previous land use	Agriculture
Current land use	Proposed Coal mining on farmland

ii. Executive Summary

MCM Mining seeks to mine the rich coal deposits on the farms Daru 889MS, Tanga 648MS, Lukin 643MS and Salaita 188MT, about 30 kilometers north of Makhado formally known as Louis Trichardt in Limpopo Province. The study area is positioned along the flats of the Soutpansberg, the proposed project is known as the Makhado Colliery. As part of applications for authorizations, and good corporate citizenship, a heritage impact assessment (Roodt 2011 and 2012) was performed as part of the broader EIA to assess the impact of the development on the receiving environment including heritage resources. The EIA (Jacana 2012) was approved subject to the condition that any subsequent project implementation phases must be preceded by an assessment of their impact on heritage resources (DEA 2012).

In line with these statutory requirements, this report provides an assessment for the confirmatory drilling activities and establishment of ancillary mining infrastructure as approved by the statutory bodies. The proposed development follows the guidance provided in relation to the identified heritage sites and the statutory provision that outlaws mining within 100m of waterbodies. Nationally, the study was conditioned by the provisions of the National Heritage Resources Act of 2011 and supporting regulations such as the South African Heritage Resources Agency Minimum Standards for Impact Assessment. To produce an up best practice product, the assessment was also informed by the international standards such as the ICOMOS Guidelines on Impact Assessment near World Heritage places, and ICOMOS Australia's Burra Charter. Furthermore, the Technical workshop hosted by UNESCO and Mining Companies held in Cairns in 2000 published standards which mining companies must adhere to ensure that they safeguard heritage and the environment. When combined, these standards of best practice motivate for robust impact assessment processes and a cautious approach to the management of sites. They set out firmly that the cultural significance of heritage places must guide all decisions, developmental and otherwise.

Other than these regulatory instruments, the community of nations forming the United Nations has established the **United Nations Sustainable Development Goals** that target among other things to end poverty, protect the planet and ensure prosperity for all by the year 2030. In addition, the Africa Union developed **Agenda 2063** "*The Africa We Want*", which is the continent's 50-year development blueprint which aims to utilize the

continent's natural and cultural heritage resources to improve the standard of living for the continent's inhabitants. Taken together, the SDGs and Agenda 2063 have established sustainable development as an international agenda and a common vision for African countries.

The study marshalled numerous techniques to collect data on which impact assessment was based on. To begin with, the coordinates of sites identified by Roodt (2012) were entered in the GIS database using Garmin software. This led to the confirmation and re-assessment of heritage sites significance. As a precautionary measure, a random field surveys were performed to ensure that there was an 85 % coverage of the area proposed for core drilling and mining development. Based on this mixed approach which also included interviews with key MCM personnel and stakeholder engagement the assessment reached the following conclusions:

- ✓ The assessment confirmed the existence of archaeological sites reported during the first study by Roodt (2011 and 2012).
- ✓ A reassessment of significance found that some sites on the proposed development footprint had potential to add more information to the history of farming communities in northern South Africa.
- ✓ Stone tools were observed on eroded waterways and appear mostly out of context.
- ✓ The study also confirmed the presence of burial grounds on the proposed site, while others noted exist outside the proposed development foot print, these are the Kuvule family grave yard. Furthermore, burial sites such as the (Mulaudzi, Grobler and a possible grave) exist within the proposed west and east pits development foot prints and therefore it is not possible to avoid these burial grounds during the establishment of mining activities and related infrastructure.

Based on these conclusions, the following recommendations were reached:

- ❖ The identified sites found in the proposed development footprint must be subjected to a Phase 1b, followed by a Phase 2 studies
- ❖ Following consultation, the graves must be relocated, those that fall within the proposed development footprint to a safer local cemetery.

- A Heritage Management Plan must be developed to protect sites outside development footprint including sacred heritage places such as springs and fountains.

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1. Introduction

Limpopo Province is rich in mineral resources such as coal which are essential in addressing energy challenges and other developmental needs of South Africa. The proposed project is an open cast mine that will be spread, over time on the farms Daru 889 MS, Tanga 648 MS, Fripp 645 MS, Lukin 643 MS and Salaita188 MT which are all located north of the Soutpansberg (figure 1&2). The proposed study area is positioned roughly 30 kilometers north of Makhado, formally Louis Trichardt Town, situated along the foothills and the lower lying area of the Soutpansberg and the Mutamba River (see figure 3&4). Before exploration by MC mining Company, these farms were used for agriculture and cattle keeping before being converted into game farming. The proposed confirmatory core drilling and related activities are solely restricted to the farms Daru 889 MS, Tanga 648 MS, Lukin 643 MS and Salaita188 MT. As part of the environmental authorization process, a heritage study was performed in 2011 and 2012 (Roodt, 2011; 2012) and acknowledged the existence of numerous archaeological/heritage sites which ranges from Stone Age, Iron Age, historical and recent past sites on these four farms. The proposed activities and associated infrastructure will include the proposed open pit mining site (6 km [east to west] by 1 [north to south] km, worker's residential quarters, and office space. The proposed development will use preexisting road infrastructure approved during the EIA process.

Figure 1: Farm Daru 889MS and Tanga 648MS

Figure 2: Farms Lukin 643MS and Salaita 188MT

A study of accessible literature exposes a long sequence of human occupation from the Earlier Stone Age through the Middle Stone Age to the later Stone Age. These were culturally succeeded by the Early, Middle and Later Iron Ages and recent Venda histories in the study area (Loubser 1991; Roodt 2012; Antonites 2014). Indeed, Roodt (2012) identified a multitude of Iron Age sites of varying significance. Given this sensitivity, adequate care is necessary to ensure that the coal core sample drilling and related mining infrastructure developments avoid direct or indirect impact on the known sites, without mitigation. The objective of the current study is to re-confirm the presence of archaeological and historical sites including burial grounds identified in the previous study (Roodt 2012) and to identify any new ones, to inform and provide guidance on the proposed core sample drilling and mining related activities. One of the limitations put forward by Roodt (2012) was that there existed dangerous game such as lions, which prohibited access to other farms such as farm Salaita. This was no longer the case as there has been a change of land use. In the end, the study makes recommendations for Phase 2 mitigation work to enable the preservation of sites and resources by record or in situ, as provided for by the provisions of the National Heritage Resources Act (Act 25 of 1999).

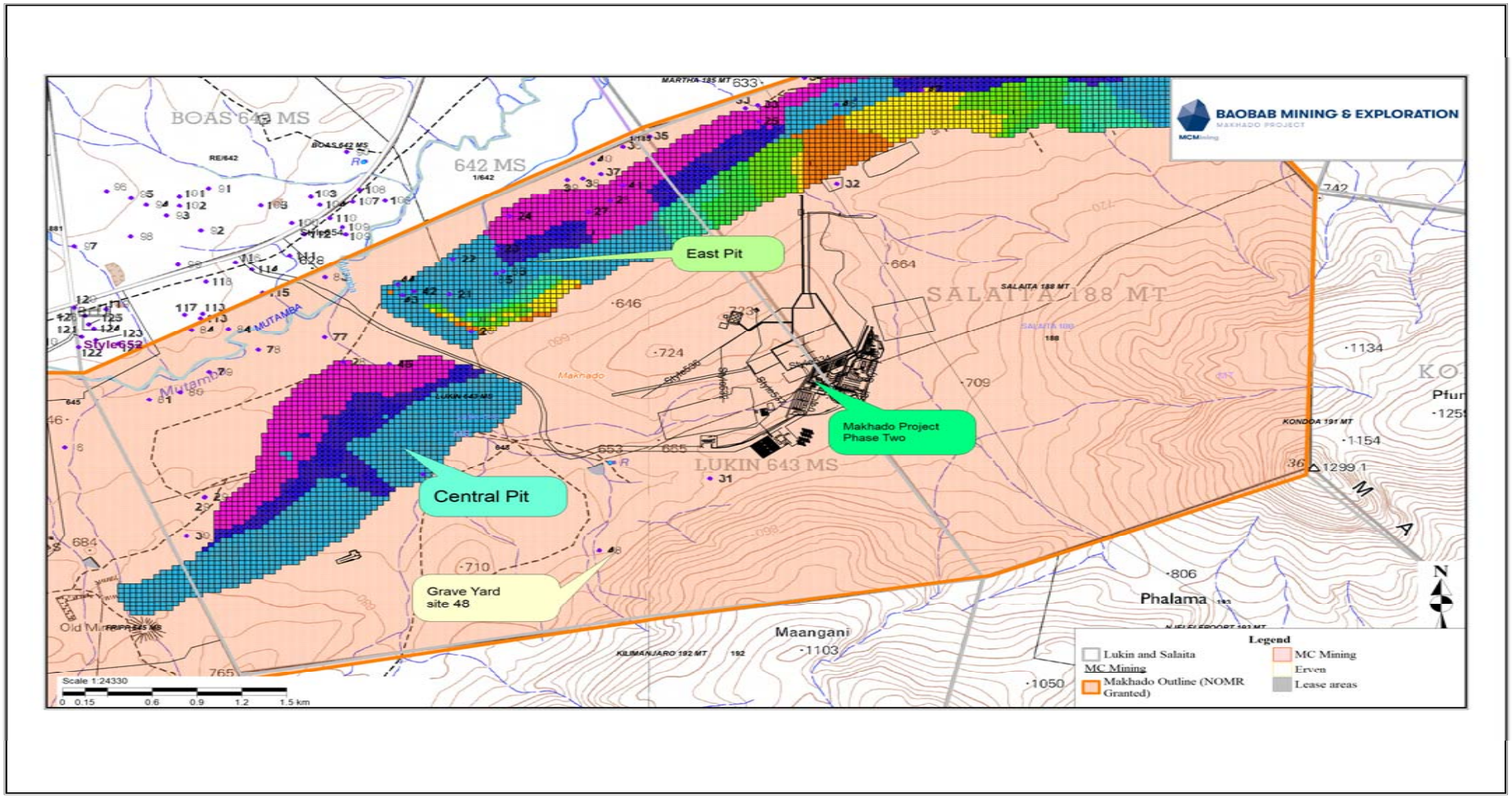

Figure 3: Topographical map of the sites affected by the east and central pit on farm Lukin 643MS and Salaita 188MT

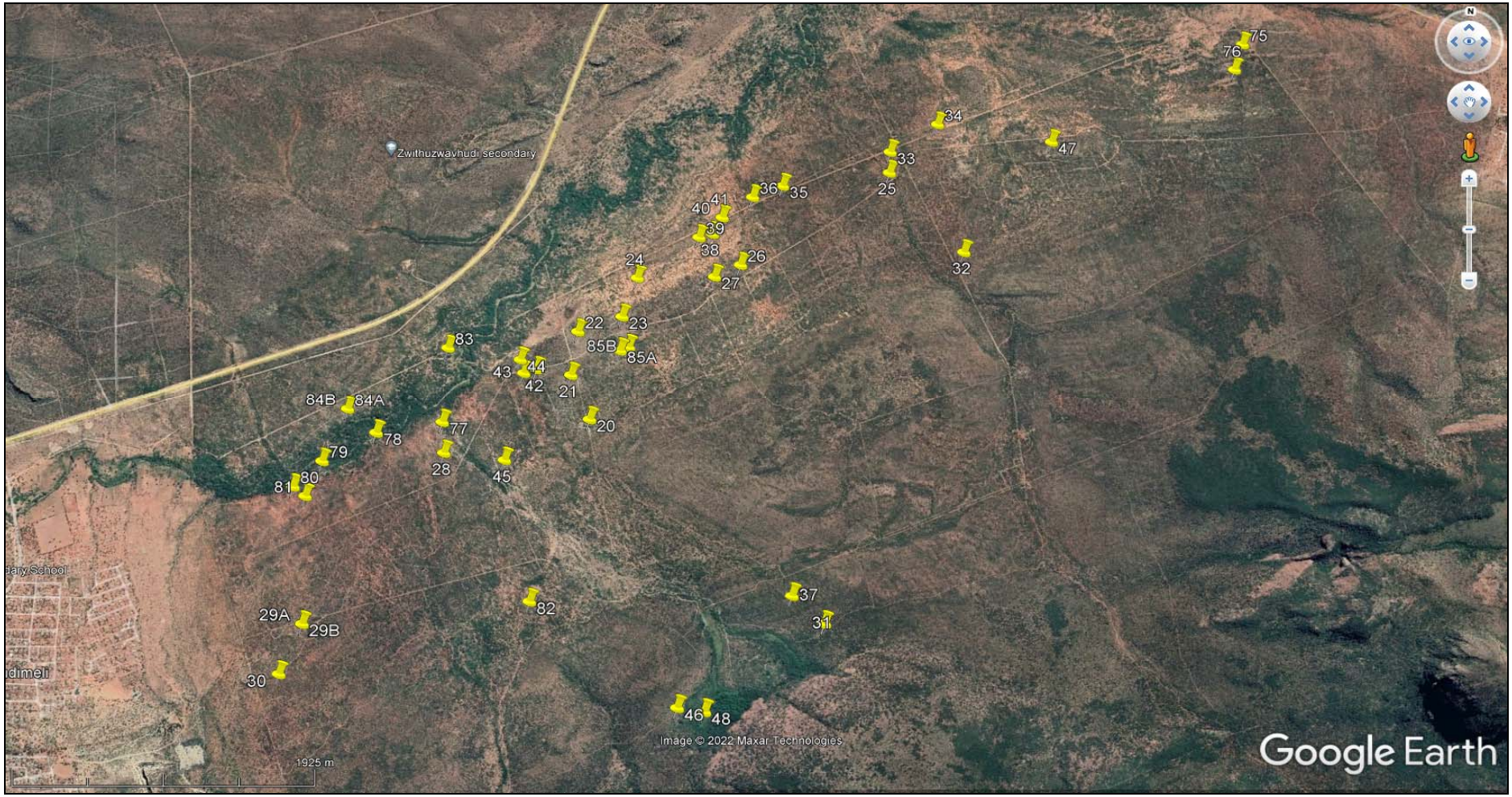

Figure 4: Plotted sites adapted from Google Earth program

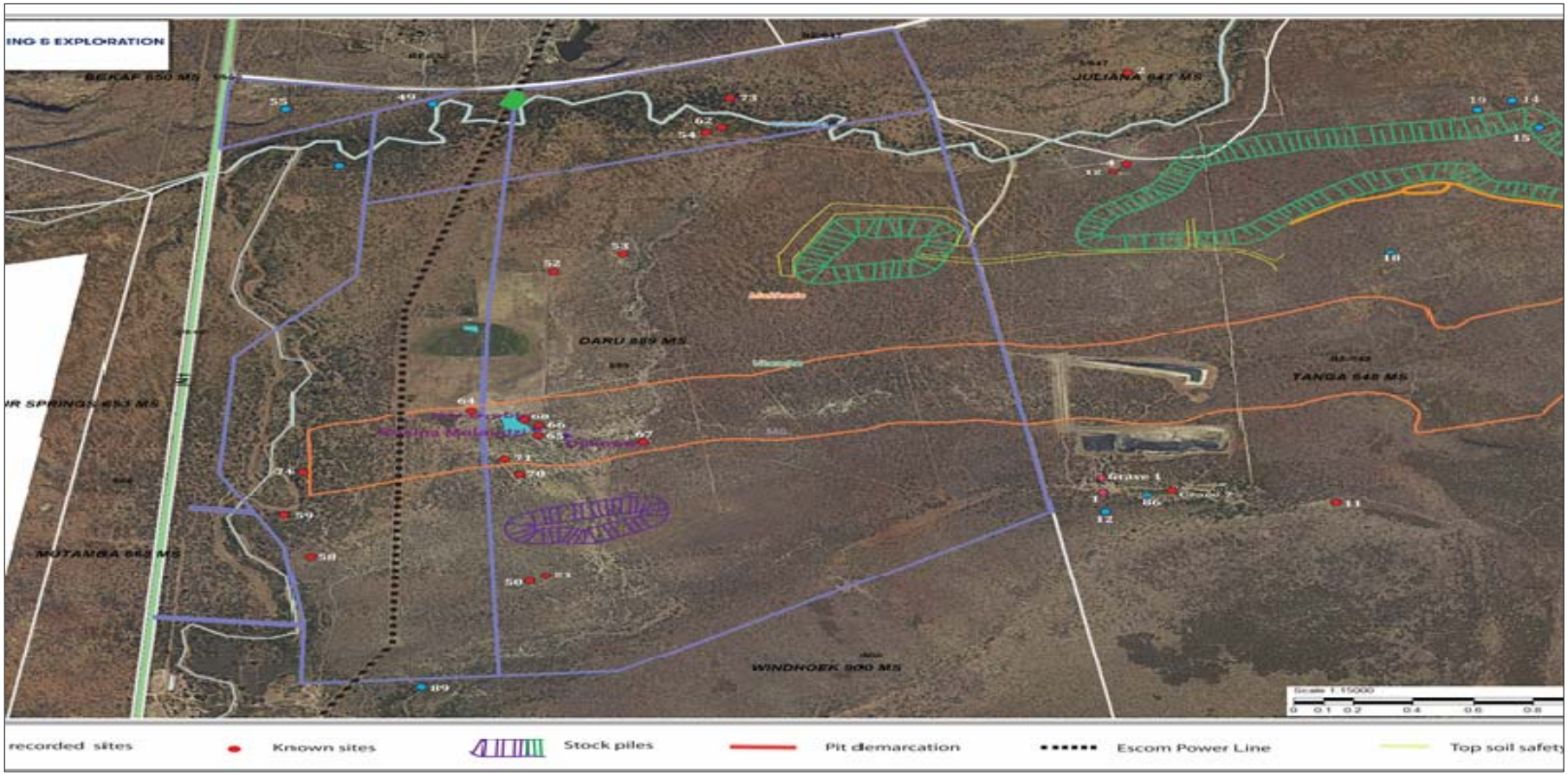

Figure 5: View of the affected farms, identified heritage resources and layout of proposed developments associated with the West Pit.

The National Heritage Resources Act (Act 25,1999) make it explicit that as preservation by record, mitigation is an essential component for conserving the national estate. In fact, mitigation is conservation by record. However, Kristian (2009) has argued that compliance only oriented mitigation is narrow and less useful because the need to create and disseminate new knowledge carries equal weight with the need to preserve the past. Therefore, mitigation outcomes must be interpreted and published according to current research standards, and thus contribute to the production of new archaeological knowledge. In this way mitigation automatically becomes integrated into the archaeological research environment. It therefore follows that proper excavation and documentation approaches and framework which are only an instrument, but not the goal of mitigation, as they follow from the research priorities made. Having said this, the objects from excavation must be optimally curated to create a usable database record for the future investigations and further analysis. This study takes inspiration from this international imperative to create a comprehensive written, drawn and photographic archives that fulfills research needs as well as preserving the past by record. The study seeks to verify and provide database list of all heritage resources within the receiving environment that could be impacted by the proposed core drilling, mining and infrastructure development. To comply with National Heritage Resources Act (Act 25 of 1999), the applicant requires information on the significance of heritage resources that occur within or near the proposed site and their heritage significance. The objective of the study is to document the presence of archaeological and historical sites of significance to inform and provide guidance on the proposed development and related activities. Apart from contributing towards the preservation of the heritage resources, the studies provide information and awareness of the types of archaeological and heritage sites that occur within the proposed study area. The HIA document enables the developer to align their functions and responsibilities to advance development activities and at the same time minimizing potential impact on archaeological and heritage sites. The study is conducted in line with the National Heritage Resources Act of 1999 (Act No. 25 of 1999) which protects heritage resources through formal and general protection. The Act provide that certain developmental activities require consents from relevant heritage resources namely South African Heritage Resources Agency (SAHRA). In addition to heritage legislations, the South African Heritage Resources Agency (SAHRA) has developed minimum standards used in impact assessment, while these local standards, are operational they are strengthened by the

International Council of Monuments and Sites (ICOMOS) published guideline for assessing impacts. The Burra Charter of 1999, requires a cautious approach to the management of sites; it sets out firmly that the cultural significance of heritage places must guide all decisions. A separate permit application was made to mitigate the burial ground owning to the requirements in the NHRA law allowing for 60 days' public consultation period. A permit for three burials affected by the western pit has been issued by SAHRA Permit ID: 3157 Case ID: 14655. In the process, the approach by MC Mining fulfills the requirements of both national and international standards of best practice.

2. Background to the Paleontology and archaeology of the research area

2.1. Fossil record

South Africa is richly endowed with paleontological heritage which has illuminated in varying ways biological evolution in the entire world (Durand, 2018). Durand (2018) the rocks of the Karoo Supergroup are relatively fossil rich. Fossils have been discovered in the Tuli Basin as well as the northern part of the Tshipise Basin (Van Eeden & Keyser, 1972; Van den Berg, 1980; Brandl & McCourt, 1980; Durand, 1996; 2001, 2005). Tshidzi Formation (Brandl, 1981) Van den Berg (1980) reports imprints of wood fragments and scarce *Glossopteris* leaf imprints from this formation and the presence of fossilized worm burrows in mudstones under the coaliferous layers.

The Madzaringwe and Mkambeni Formations (Brandl, 1981) are a single unit (Sone 2) by Van der Berg (1980). Van den Berg reports Vertebraria as being the most common plant fossil in this geological unit, while scarce *Glossopteris* and *Phyllotheca* imprints, fossilized tree trunks and wood fragments have also been found. Worm burrows are also common in the bioturbated sandstones and siltstones between the coaliferous layers (Van der Berg, 1980). In general, the Lowveld areas of South Africa with a Karoo Geology are known to host fossils of plants and animals. While the coal hosting Madzaringwe and Mikambeni Formations, are known to host fossils, a detailed field walking by Dr. Francois Durand failed to find any fossils on the proposed development footprint.

2.1. The Stone Age Period

Most of the research on the Stone Age in northern south Africa took place in the Mapungubwe National Park about 130km to the west of the proposed area. Nevertheless, a general account of the nature of the Stone Age can be provided. Conventionally speaking,

the Stone Age period has been divided into the Early Stone Age (ESA) (3.5 million and 250 000 BP), the Middle Stone Age (MSA) (250 000 – 25000 BP) and the Later Stone Age (25000 – 2000 BP) (Phillipson 2005). Early Stone Age stone tool assemblages are made up of the earlier Oldwan and later Acheulian types. The Oldwan tools were very crude and were used for chopping and butchering. These were replaced by Acheulian ESA tools dominated by hand axes and cleavers which are remarkably standardized (Wadley, 2007; Sharon, 2009). Evidence presented from Sterkfontein, Swartkrans and Makapansgat caves shows that the first tool making hominids belong to either an early species of the Homo or an immediate ancestor which is yet to be discovered here in South Africa (Phillipson 2005; Esterhuysen, 2007). Both the Oldwan and Acheulian industries are well represented in the archaeology of northern South Africa as shown by studies in the Mapungubwe National Park (Kuman et al. 2005; Sumner and Kuman 2014).

The Middle Stone Age dates to between 250 000 ago and 25 000 years ago. In general, Middle Stone Age tools are characterized by a size reduction in tools such as hand axes, cleavers, and flake and blade industries. The period is marked by the emergence of modern humans and was accompanied by change in technology, behavior, physical appearance, art, and symbolism (Phillipson 2005). A variety of MSA tools includes blades, flakes, scraper and pointed tools that may have been hafted onto shafts or handles and used as pear heads. Surface scatters of these flake and blade industries occur widespread across southern Africa (Klein 2000; Thompson & Marean, 2008). Residue analyses on some of the stone tools indicate that these tools were certainly used as spear heads (Wadley, 2007). From about 25 000 BP, stone tool assemblages generally attributed to the Later Stone Age emerged. This period is marked by a reduction in stone tool sizes. Typical stone tools include microliths and bladelets. Later Stone Age stone tools were recovered in the Mapungubwe National Park area (Forsman 2011). This period is also associated with the development of rock art whose distribution is known across southern Africa (Deacon and Deacon 1999; Phillipson 2005).

2.2. Farming communities and recent histories

Beginning in the early first millennium AD, farming communities who made a distinctive type of pottery, settled permanently settled in villages, and cultivated crops and raised animals appeared in southern Africa (Maggs, 1980; Loubser, 1988; Huffman 2007). Typical Early Iron Age sites are known along river banks and waterways. Sites dating to

the Early Iron Age are known to occur to the west of the Nzhelele valley at Klein Africa and Happy Rest these sites were first identified by De Vaal (1941) and were later excavated by Helgaard Prinsloo (1974). Around AD900, the Middle Iron Age developed and is well known from sites in the Middle Limpopo such as K2 and Mapungubwe. Middle Iron Age sites are known in and around Musina and near the Soutpansberg Range of Mountains. Some known sites include the sites of Mutamba, found along the Mutamba river. The Middle Iron Age was succeeded by the Late Iron Age after 1300. Khami type sites are known the study area and beyond. These are defined by the presence of characteristic band and panel pottery and drystone built terraces where houses were built. The Khami period is associated with the formation and development of a Venda identity (Loubser 1991). Khami type sites continued into the late 19th century and are associated with various Venda communities. Some of the most well-known Khami sites include Dzata located in the Nzhelele Valley. The late 19th century saw the introduction of European colonialism. Over the course of the 20th century, local communities were resettled to give way to European farms as well as for state activities. Often, these forced removals were not accompanied by exhumations of burials and other sensitive cultural remains. This is important because the military corridor was created after families were forcibly removed.

3. Terms of reference

Undertake a Phase 1b Heritage Impact Assessment for the proposed Confirmatory core sample drilling activities including mining and infrastructure development on the farms in the Soutpansberg area, Limpopo Province and submit a specialist report, which addresses the following:

- Executive summary;
- Scope of work undertaken, assumptions and limitations;
- Methodology used to obtain supporting information;
- Overview of relevant legislation and international best practice;
- Results of all investigations;
- Interpretation of information;
- Assessment of impacts (including cumulative impacts) associated with all the stages of the project (construction, operation, closure and post closure);
- Recommendations on other management measures;
- References.

4. Legislation: National and International standards of best practice

Nationally, two sets of legislation are relevant for this study regarding the protection of tangible and intangible heritage resources including graves. These are as follows:

4.A. The National Heritage Resources Act (25 of 1999) (NHRA)

This act makes provision for the identification, protection and conservation of heritage in South Africa through various sections. As far as development is concerned, the NHRA mandates that predevelopment heritage resources impact assessments must be performed for various categories of development as enshrined in Section 38. Section 7 of the act further provides for the grading of heritage resources based on values and significance. Grade 1 sites are National Heritage sites (national significance), while Grade II sites are provincial sites (provincial significance) with Grade III being mostly local (local significance). In terms of cumulative impact assessment, a higher concentration of Grade III resources may have huge significance when compared to individual sites.

In terms of the National Heritage Resources Act (1999) the following categories of the national estate are of relevance:

Historical remains

Section 34(1): No person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the heritage resources authority (national or provincial).

Archaeological remains

Section 35(3): Any discoveries of archaeological or paleontological objects or material or a meteorite in the course of development or agricultural activity must be immediately reported to responsible heritage resources authorities.

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

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological 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 which assist with the detection or recovery of metals or archaeological material or objects or use such equipment for the recovery of meteorites.

Subsection 35(5): When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedures in terms of section 38 has been followed, it may-

(a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;
(b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;
(c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and
(d) recover the costs of such investigation form the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

Burial grounds and graves

Subsection 36(3)

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

(c) destroy, damage, alter, exhume, 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

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

Subsection 36(6) Subject to the provision of any law, any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to the responsible heritage resources authority which must, in co-operation with the South African Police Service and in accordance with regulations of the responsible heritage resources authority-

(a) carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of this Act or is of significance to any community; and

(b) if such grave is protected or is of significance, assist any person who or community which is a direct descendant to plan for the exhumation and re-interment of the content of such grave or, in the absence of such person or community, make any such arrangement as it deems fit.

Culture Resource Management

Subsection 38(1) Subject to the provisions of subsection (7), (8) and (9), any person who intends to undertake a development must at the very earliest stages of initiating such development notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development. Development refers to any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in a change to

the nature, appearance or physical nature of a place, or influence its stability and future well-being, including

(a) construction, alteration, demolition, removal or change of use of a place or a structure at a place.

The Human Tissues Act (65 of 1983)

This Act protects graves younger than 60 years. This fall under the jurisdiction of the National Department of Health and the Provincial Health Departments. Approval for the exhumation and reburial must be obtained from the relevant Provincial MEC as well as the relevant Local Authorities. Public consultation is essential in all this.

4.B. The ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties (2011) and ICOMOS Australia Burra Charter

The International Council of Monuments and Sites (ICOMOS) has established guidelines for carrying out impact assessments near World Heritage sites. The principles that underwrite the guidelines however apply to all categories of heritage. In conjunction with these guidelines, ICOMOS Australia published the Burra Charter which argues that the cultural significance of places must guide decisions made on heritage places. Taken together, the ICOMOS Guidelines and the Burra Charter makes a strong case for cumulative impact assessment which focuses on the direct and indirect impact caused by any proposed development on heritage places. These guidelines define impacts as follows:

- Direct impacts are those which result in the destruction or altering of attributes of a heritage place.
- Indirect impacts are those whose impact is not clearly visible and quantifiable.
- Cumulative impacts refer to the sum of direct and indirect impacts in the short and medium to long term (ICOMOS 2011).

In addition, community engagement is essential in making decisions relating to heritage places. MCM has embarked on a robust community engagement program which has built rapport with local communities including chiefs and farmers. In so doing, the company implements the provisions of the 2000 Technical Meeting between UNESCO and the world's mining companies. The recommendations of the committee make it explicit that

communities must benefit from projects while their heritage and environment must be safeguarded. In a way, this also has deep synergies with the SDGs and the African Union's Agenda 2063. In summary, international best practice mandates that cultural significance of heritage places must determine all decisions and that heritage conservation interests must be balanced with development as the two are not mutually exclusive. This report combines this logic with the provisions of the National Heritage Resources Act of 1999 to ensure that the proposed development balances the interests of conservation (in situ or by record) as well as development to promote poverty alleviation within a framework provided by compliance requirements and good corporate citizenship.

5. Assumption and Limitations

The archaeological record is made up of remains that lie either on or beneath the ground. While those above ground may be visible, that underneath may not be easily visible unless the ground is exposed. The major limitation encountered in this study was that assessment was only limited to what was observable above the ground. It is possible that sub-surface material may exist and which may be uncovered during development. However, should this happen, the chance discovery must immediately be reported to the nearest heritage authority and the heritage specialist.

6. Data sources and methodology

The study relied on published and unpublished sources of information including online databases such as Google Earth and Google Scholar. Previous impact assessment reports were also consulted together with academic literature such as Loubser (1991), Huffman (2007) and among others Antonites (2012). Subsequent to the desktop study, fieldwalking was performed on the farms Daru 889 MS, Tanga 648 MS, Lukin 643 MS and Salaita188 MT. To begin with, the coordinates of sites recorded in Roodt (2012) were loaded onto a Garmin GPS, with a tracking mode. The sites were then identified individually resulting in checking features that were observable against written descriptions. Furthermore, a targeted field survey was performed on areas proposed for development such as the location of the East, Central and West box pits, the staff quarters and office blocks and other related activities. This process resulted in the confirmation of heritage sites and an understanding of their significance based on the density of material culture, period, and the secure nature of the context of the materials. Interviews were also performed with key MCM members of staff such as geologists, engineers, surveyors and stakeholder engagement and community

liaison experts. The fieldwork team was comprised of Dr. Eric Mathoho, (PhD) Mr. Lovemore Tshivhula and Mr. Modjadji Muremi (MCM- Social facilitators). Photography formed an important part of the documentation together with the mapping of the distribution of heritage sites in relation to proposed development activities. In summary, the study adopted a mixed approach that combined desktop studies with field observations and interviews and community engagement.

7. Assessment criteria

This section describes the evaluation criteria used for determining the significance of archaeological and heritage sites. The significance of archaeological and heritage sites was determined based on the following criteria:

- The unique nature of a site.
- The amount/depth of the archaeological deposit and the range of features (stone walls, activity areas etc.).
- The wider historic, archaeological and geographic context of the site.
- The preservation condition and integrity of the site.
- The potential to generate new knowledge
-

7.1. Site Significance

The site significance classification standards as prescribed in the guidelines and endorsed by the South African Heritage Resources Agency (2006) and approved by the Association for Southern African Professional Archaeologists (ASAPA) for the Southern African Development Community (SADC) region, were used in determining the site significance for this report.

The classification index is represented in the Table below that show grading and rating systems of heritage resources in South Africa alongside that by ICOMOS.

ICOMOS Field Ranking	South African Legislation Field Ranking (National Heritage Resources Act Ranking)
Very high (World Heritage Sites)	National Heritage Sites (Grade 1)
High (Nationally significant sites	National Heritage Sites (Grade 1), Grade 2 (Provincial Heritage Sites), burials
Medium (regionally significant sites)	Grade 3a (Conservation, mitigation, based on situation)
Low (locally significant sites)	Grade 3b (Conservation, mitigation, based on local situation)
Negligible	Grade 3c (mitigation)
Unknown	Grade 3a (mitigation

7.2. Impact Rating

POSITIVE AND NEGATIVE VERY HIGH

These impacts would be considered by society as constituting a major and usually permanent change to the (natural and/or cultural) environment, and usually result in severe or very severe effects, or beneficial or very beneficial effects.

Example: The loss of a highly significant site would be viewed by the community as being of negative VERY HIGH impact.

Example: The establishment of a mine in a rural area, which previously had very few employment opportunities would be regarded by the affected parties as resulting in benefits with positive VERY HIGH significance.

POSITIVE AND NEGATIVE HIGH

These impacts will usually result in long term effects on the social and /or natural environment. Impacts rated as HIGH will need to be considered by society as constituting an important and usually long-term change to the (natural and/or social) environment. Society would view these impacts in a serious light.

Example: The loss of a heritage site, which is sacred, would have a significance rating of NEGATIVE HIGH.

Example: If development contributes to the conservation of a site then the impact will be POSITIVE HIGH.

MODERATE

These impacts will usually result in medium- to long-term effects (both negative and positive) on the social and/or natural environment. Impacts rated as MODERATE will need to be considered by the public or the specialist as constituting an unimportant and usually short-term change to the (natural and/or social) environment. These impacts are real, but not substantial.

Example: The loss of a site with thin scatters of material may be regarded as MODERATELY significant.

Example: The provision of a clinic in a rural area would result in a benefit of MODERATE significance.

LOW

These impacts will usually result in medium to short term effects on the social and/or natural environment. Impacts rated as LOW will need to be considered by society as constituting an important and usually medium-term change to the (natural and/or social) environment. These impacts are not substantial and are likely to have little real effect.

Example: The alteration of a site of low significance will represent a minor loss.

Example: The increased earning potential of people employed because of a development would only result in benefits of LOW significance to people living some distance away.

NO SIGNIFICANCE

There are no primary or secondary effects at all that are important to scientists or the public.

Example: A change to the geology of a certain formation may be regarded as severe from a geological perspective but is of NO SIGNIFICANCE in the overall context.

DIRECT, INDIRECT & CUMULATIVE IMPACT

Positive and negative impacts on heritage resources take many forms: they may be direct or indirect; cumulative, short term or long term, reversible or irreversible, visual, and physical. For these impacts to be relevant to the HIA study, they must be triggered by the proposed development (ICOMOS 2011).

Direct impacts are those that arise as a primary consequence of the proposed development or change of use. They can result in the physical loss of part or all of an attribute, and/or changes to its setting - the surroundings in which a place is experienced, its local context,

embracing present and past relationships to the adjacent landscape (ICOMOS 2011). In the process of identifying direct impacts, effort must be invested in considering cumulative impact, because a little impact on a few sites may cause extensive damage on a large scale. By their nature, direct impacts are associated with the development footprint and result in physical loss such that they constitute a major threat to OUV. Direct impacts resulting in physical loss are usually permanent and irreversible.

Indirect impacts occur as a secondary consequence of construction or operation of the development, and can result in physical loss or changes to the setting of an asset beyond the development footprint.

The scale or severity of impacts or changes can be judged taking into account their direct and indirect effects and whether they are short or long term, reversible or irreversible. The cumulative effect of separate impacts should also be considered.

International best practice indicates that every reasonable effort should be made to avoid, eliminate or minimise adverse impacts on heritage resources and other significant places. Ultimately, however, it may be necessary to balance the public benefit of the proposed change against the harm to the place (ICOMOS 2011; UNESCO et al. 2010). In the case of developing countries such as South Africa, maintaining such a cable is important.

7.2.1. Certainty

DEFINITE: More than 90% probability of an impact happening .

PROBABLE: Over 70% probability of an impact occurring.

POSSIBLE: Only over 40% probability of an impact occurring.

UNSURE: Less than 40% probability of an impact occurring.

7.2.2. Duration

SHORT TERM: 0 – 5 years

MEDIUM: 6 – 20 years

LONG TERM: more than 20 years

DEMOLISHED: heritage resource will be demolished or has already been demolished

7.2.3. Mitigation

Management actions and interventions which will result in a reduction in the impact on the sites. The recommendation for mitigation will be as follows:

- ✓ **A** – No further action necessary
- ✓ **B** – Mapping of the site and controlled sampling required
- ✓ **C** – Preserve site, or extensive data collection and mapping required; and
- ✓ **D** – Preserve site

8. Project Location and Description-Makhado Colliery

Farms Daru 889 MS, Tanga 648MS, Lukin 643MS, and Salaita188MT are located roughly 30 kilometers north of the Makhado Central Business District (CBD), within the Soutpansberg area. An open cast coal mine has been proposed on the terrain of these farms. The landscape formation is diverse and comprised the north facing Soutpansberg foothills, sand stone ridges, calcrete outcrops and the Mutamba River floodplain. The scenery north of the Soutpansberg is dominated by the Soutpansberg Mountain Bushveld Complex, mixed with riverine vegetation alongside the Mutamba River. Sharply complementary classes of vegetation occur mostly within limited areas that encompasses wide-ranging bushveld complex dominated by subtropical moist thickets with miscellaneous mopane bushveld complex which occur on the lower-lying area of the study area. The geology of the study area is dominated by sand stone and quartzite, conglomerates, basalt, tuff, shale and siltstones of the Soutpansberg Group (including the Wylies Poort, Fundudzi and Nzhelele formations) Mokolian Erathem (Mucina & Rutherford, 2006:475).

The mining operations has been selected due to the structural nature of the fossiliferous coal deposit and for that reason the Karoo-aged sedimentary rocks combined covers roughly 7634.32 hectares with an estimated coal mining reserve of 169 MT in situ in the Soutpansberg coal field. The deposit extends from a sub- outcrop at a depth of less than 30m to over 300m on some of the farms. Six potential mining horizons(seams) have been identified and plotted by CoAl namely; Upper Seam, Middle Upper Seam, Middle Lower Seam, Bottom Upper Seam, Bottom Middle Seam and Bottom Lower Seam. The Makhado Coal Mine will be an opencast mining operation, with an estimated 8.5-14 MT of ROM coal to be produced per year (Jacana, 2012). Due to the structural nature of the deposit and to reduce the visual and noise impact from the mining operation compared to the use of a dragline shovel. Three mining methods were considered and the modified Terraces option was selected due to the improvement in safety of the operation, the space created for early

in pit overburden disposal and the relatively concentrated mining activities. Initial mining operation will commence in the higher yielding East Pit (on farm Salaita 188 MT) and then proceed to the Central Pit (on farm Lukin 643MS) and lastly the West Pit (on Daru 889 MS and Tanga 648MS Farms). See detailed mining planimetric maps of the proposed study area (Figure 5 & 6).

The extent of the proposed mining as follows:

- East Pit-500ha, maximum depth 200m
- Central Pit-250ha, maximum depth 160m
- West Pit-280ha, maximum depth 120m

The lifespan of the proposed Coal mine is projected to be 16 years. Five primary procedures will be implemented during the mining process these includes:

- Removal and stockpiling of topsoil;
- Stripping and stockpiling of overburden;
- Excavation of coal and backfilling of pit with overburden material;
- Replacement and leveling/shaping of topsoil; and
- Re-vegetation and maintenance of levelled areas

In addition to the open pit, the colliery will consist of the following surface workings:
• Topsoil stockpiles;
• Overburden stockpiles (for start-up period until a wedge has been opened in the pits so that the overburden can be used as fill);
• ROM coal storage area;
• Intermediate crusher/screening plant);
• Associated conveyors from intermediate crusher/screening plants to the processing plant;
• ROM coal processing plant (primary, secondary and tertiary crusher);
• Associated conveyors from the processing plant to the product storage areas;
• Product stockpile areas and overland conveyor to RLT on farm Tanga;
• Carbonaceous (discard) stockpile area;

• Haul roads and service roads, including a bridge over the Mutamba River;
• Earthmoving vehicle workshops;
• Clean and dirty water management infrastructure;
• Water storage structures and settling ponds;
• Water reticulation systems;
• Change houses and offices;
• Wastewater (sewage) treatment plant;
• Main entrance gate security and freight area;
• Bulk electricity supply infrastructure;
• Bulk water supply infrastructure (still to confirm);
• Bulk fuel storage facilities;
• Explosives magazine;
• Recruitment and training center;
• Product transport infrastructure (railway line);
• Security structures and fences.

9. Heritage-specific Consultation

The area where the proposed development falls is historically associated with Vhavenda communities. However, from the late 19th and early 20th centuries, European farms were established in the area thereby introducing people of western ancestry into this region. Burials and living heritage associated with these historical layers exist. A detailed heritage consultation programme was developed to identify living heritage sites and link burials to descendants as part of the permit application for burials. The consultation involved chiefs, farm owners and farm laboures. During the consultation, stakeholders were asked if they had any sacred sites or those associated with living heritage in the areas proposed for development. The process fed into the broad environment impact assessment process. Both Kuvule and Mulaudzi families were identified as descendants of the identified graves. Twelve burial grounds on farm Lukin 643MS belong to the Kuvule family while of the grave belongs to theMulaudzi family located on the farm Daru, both these families were consulted and the proposed mine development was related to them. However, the Kuvule family burial ground on the farm Lukin 643MS will not be affected by the proposed mining

activities since the site fall outside the proposed development footprint. Most of the heritage resources belong to what archaeologists refer to as the Middle and Later Iron Ages which do not have any reported direct links with the groups that were consulted. However, Letaba sites have been linked to the Venda and other groups thereby establishing historical connection between local people as broadly defined and the heritage resources in this part of South Africa.

10. Results of the Survey

The following sites were identified informed by desktop study and subsequently confirmed through ground truthing conducted on the farms Daru 889 MS, Tanga 648MS, Lukin 643MS, and Salaita188MT. The survey for archaeological sites during the impact assessment process identified sites that fall within and outside the proposed development footprint on the East and Central Pit (located on farm Lukin 643MS and Salaita 188MT) and lastly the West Pit (located on Daru 889 MS and Tanga 648MS Farms). The significance assessment revealed that most of the sites are of low Grade 3 significance. The map below (Figure 5 and 6) shows the sites with respect to the development footprint.

Rating/ Action in below table indicates:

- **Phase 1B assessment**- Sampling of heritage site/s is required through limited test pits or shovel pit excavation or auger sampling
- **Phase 2 assessment**- In depth cultural resources management studies which could include major archaeological excavations, detailed sites mapping to comprehend distribution of activities and settlement pattern.

Farm Lukin 643 MS GPS Coordinates and Number	**Description**	**Rating/Action**
20. S22. 47. 13. 06 and E 29.59.18.07	Non-Diagnostic ceramics on calcrete outcrop	Phase 1B assessment
21. S22. 47. 03. 00 and E 29.59.13.06	Large open area on Calcrete outcrop, non-diagnostic ceramics and early stone age materials	Phase 1B assessment
22. S22. 46. 53. 00 and E 29.59.14.04	Large open area on calcrete outcrop with cattle enclosure deposit, scattered ceramics with well-preserved deposit (dominant are non-diagnostic)	Phase 2 assessment
23. S22. 46. 49. 09 and E 29.59.24.04	Ceramics near sandstone outcrop, possibly Thavhatshena	Phase 1B assessment

24. S22. 46. 40. 07 and E 29.59.27.05	Mutamba pottery in open mopane patch, present is a spindle whorl	Phase 1B assessment
26. S22. 46. 36. 02 and E 29.59.51.00	Pottery on sandstone ridge (non-diagnostic)	Phase 1B assessment
27. S22. 46. 39. 05 and E 29.59.45.09	Pottery on a sandstone ridge (non-diagnostic)	Phase 1B assessment
28. S22. 47. 22. 04 and E 29.58.49.00	Pottery in open patch in mopane veldt (non- diagnostic)	Phase 1B assessment
29A S22. 48. 01. 04 and E 29.58.16.08 29B. S22. 48. 01. 02 and E 29.58.16.09	Pottery in neck of two sandstone hillocks (non -diagnostic) stone feature and grinding stone	Phase 2 assessment
30. S22. 48. 12. 03 and E 29.58.12.07	Pottery on sandstone ridge (non -diagnostic)	Phase 1B assessment
31. S22. 47. 56. 00 and E 30.00.14.01	Pottery in open area near mountain (non-diagnostic)	Phase 1B assessment
37. S22. 46. 28. 05 and E 30.59.49.08	Middle stone age stone tools dominated by flakes	Phase 2 -assessment To be assessed by Stone Age Specialist
38. S22. 46. 29. 08 and E 29.59.44.06	Non-diagnostic pottery fragments	Phase 1B assessment
39. S22. 46. 30. 02 and E 29.59.41.00	Pottery scattered and a piece of Tuyere fragment	Phase 1B assessment
40. S22. 46. 25. 05 and E 29.59.46.09	An unidentified low cairn of packed stones was recorded. It does not resemble a grave but requires further investigation, it is to be affected by the development although it falls just outside the pit.	To be protected
41. S22. 46. 25. 05 and E 29.59.46.09	Cattle enclosure and pottery fragments tentatively identified as Thavhatshena	Phase 2 -assessment
42. S22. 47. 02. 02 and E 29.59.05.04	Iron Age pottery fragments	Phase 1B assessment
43. S22. 47. 03. 03 and E 29.59.02.07	Iron Age site, gravel road has degraded they are and bisect the site into two sections	Phase 1B assessment
44. S22. 47. 00. 03 and E 29.59.01.07	Cupule on stone moved during the grading of the farm road non-diagnostic ceramic on the rise	No action
45. S22. 47. 23. 00 and E 29.58. 59.07	Single non-diagnostic ceramics pot	No action
48. S22. 48. 16. 05 and E 29.59. 48.04	Kuvule family grave yard- 12 indicated burial sites, parked stone outline as grave dressing. The burial ground is located outside the proposed development foot print.	To be protected and fall outside the proposed development foot print
77. S22. 47. 15. 03 and E 29.58. 44.07	Middle stone age material	No action- not affected
78. S22. 47. 18. 09 and E 29.58.29.03	Iron Age remains, scattered ceramic fragments with grinding stone	No action- not affected
79. S22. 47. 25. 03 and E 29.58.17.09	Iron Age ceramics, ash midden deposit with top grinding stone	No action- not affected

80. S22. 47. 31. 01 and E 29.58.11.02	Burnt grain bin rubble (78,79,80)	Phase 1B assessment
81. S22. 47. 33. 03 and E 29.58.14.00	Middle stone age, small flakes	Phase 2 -assessment To be assessed by Stone Age
82. S22. 47. 54. 08 and E 29.59.07.05	Pottery scatter	Phase 1B assessment
83. S22. 46. 58. 02 and E 29.58.44.08	Pottery scatter on flood plain	Phase 1B assessment located in proximity to mining activity area
84A. S22. 47. 13. 02 and E 29.58.22.04 84B. S22. 47. 13. 00 and E 29.58.22.04	Middle Stone Age	No action- not affected
85A. S22. 46. 57. 02 and E 29.59.24.05 85B. S22. 46. 56. 06 and E 29.59.26.01	Non-diagnostic iron age remains which extend eastwards and seem to be a twin site with 85 B	Phase 1B assessment
Farm Salaita 188MT	**Description**	**Rating/Action**
25. S22. 46. 13. 06 and E 30.00.25.04	Pottery fragments near drainage line Non-diagnostic and Early Stone Age material)	Phase 1B assessment
32. S22. 46. 31. 03 and E 30.00.43.05	Single ceramics vessel, non-diagnostic	Phase 1B assessment
33. S22. 46. 08. 09 and E 30.00.25.02	Iron Age site, along drainage like one diagnostic potsherd resemble the Thavhatshena facies and ostrich eggshell beads. Small non-diagnostic ceramic vessel was found nearby	Phase 1B assessment
34. S22. 46. 01. 01 and E 30.00.36.00	Clear stone circle, possibly a cattle enclosure, non-diagnostic pottery	Phase 2- assessment
35. S22. 46. 17. 08 and E 30.00.00.01	Pottery fragments and grain bin stand in open Mopani patch (non-diagnostic)	Phase 2- assessment
36. S22. 46. 20. 07 and E 29.59.53.09	Rain bin stand and ash midden	Phase 2- assessment
46. S22. 46. 08. 08 and E 30.00.43.04	Large cattle ensure deposit with ceramics, glass beads and lower grinding stone, grain bin stands, Letaba ceramic	Phase 2- assessment
47. S22. 46. 04. 07 and E 30.01.03.03	Pottery fragments on sandstone ridge (non-diagnostic)	Phase 1B assessment
75. S22. 45. 39. 00 and E 30.01.48.04	Iron Age remains, grinding stone, stone platforms- possibly floor, Iron spearhead was recorded here.	Phase 2 assessment if affected by the proposed borrow pit
76. S22. 45. 45. 09 and E 30.01.46.03	Middle Stone Age materials	Phase 2 -assessment To be assessed by Stone Age Specialist
Farm Tanga 648 MS	**Description**	**Rating/Action**
1. S22. 49. 26. 02 and E 29.55.13.01	Recent historical site, with ash midden /hunting camp: ruins foundation, mud wall and oval	Not affected

S22. 49. 25. 06 and E 29.55.00.06 S22. 49. 25. 01 and E 29.55.05.00	parked stones as grave dressing (according to an informant the site was abandoned in the early 1970)	
2. S22. 48. 06. 03 and E 29.55.04.02	Iron Age pottery remains between Mutamba River and a low sandstone outcrop, small midden with fragments; pottery fragments including some decorated fragments occur scattered in the area.	Not affected
# S22. 49. 24. 02 and E 29.55.04.03	Possible grave indicated by parked stones as grave dressing. The area seems to be part of the hunting camp	Not affected
3. S22. 49. 24. 02 and E 29.55.04.03	Iron Age remains containing a grinding stone and some pottery fragments.	Not affected
4 S22. 47. 47. 03 and E 29.55.43.09	Iron Age ceramics (Diagnostic and non- diagnostic pottery) between the Mutamba River and low sandstone outcrop	Not affected
11. S22. 49. 29. 05 and E 29.55.29.05	Iron Age remains, on the foothills of the mountain. A small flat area is formed with some pottery fragments and a simple circular stone wall, most likely a cattle enclosure.	Not affected
12. S22. 49. 34. 07 and E 29.55.08.08	Iron Age remains, on foothill. Cutting formed by road with midden deposits and pottery fragments	Phase 2- assessment
# S22. 48. 22. 07 and E 29.55.06.02	Recent past site on undulating calcrete rocky outcrop, disturbed site currently used as dumping site with tree stumps. Undiagnostic ceramics, porcelains fragments, glass and metal pieces and a possible grave indicated by parked stone outline.	Phase 2- assessment Located within the proposed development foot print
86. S22. 49. 29. 02 and E 29.55.20.01	Dried up fountain at the foot of the mountain, which was used in the past by passersby and local communities	Not affected
Farm Daru 889 MS	**Description**	**Rating/Action**
49. S22. 48. 08. 08 and E 29.53.43.02	Two historical graves	Outside the development footprint

50. S22. 49. 44. 08 and E 29.53.59.08	Low concentration pottery on calcrete outcrop (Non-diagnostic)	Phase 1B assessment
51. S22. 49. 02. 03 and E 29.54.15.03	Pottery fragments and packed stone possibly grain bin stands (non- diagnostic)	Phase 1B assessment
52. S22. 49. 02. 03 and E 29.54.15.03	Low concentration pottery scatter on floodplain	Phase 1B assessment
53. S22. 49. 02. 03 and E 29.54.15.03	Cattle enclosure and midden deposit(non-diagnostic)	Phase 1B assessment
54. S22. 48. 17. 09 and E 29.54.22.06	Stone Age material and pottery scatter-possibly Gumanye ceramics	Not affected
55. S22. 48. 14. 09 and E 29.53.26.04	Rock overhang at sandstone outcrop, concentration of pottery fragments and stone Age material	Not affected-No mitigation required
56. S22. 49. 51. 09 and E 29.53.27.02	Pottery fragments on flood plain (non- diagnostic). Extends westwards. Probably Mutamba ceramics	Not affected
57. S22. 50. 34. 02 and E 29.53.21.05	Seven graves; 1 grave stone, Six packed stones as grave dressings.	Not affected.
58. S22. 49. 40. 09 and E 29.53.32.01	Possible grave on raised platform	Not affected.
59. S22. 49. 35. 05 and E 29.53.30.05	Iron Age remains on floodplain, possibly Mutamba- has been impacted on by erosion. Extent further to the northwest where more ceramics fragments.	Not affected.
60. S22. 49. 34. 06 and E 29.53.34.02	Recent historical midden remains such as cast iron pot pieces	Not affected.
61. S22. 49. 10. 09 and E 29.53.44.03	Farm labour area, glass bottles earthenware ceramics	No action
62. S22. 49. 19. 07 and E 29.54.08.02	Single grave and homestead foundation	Consultation for grave relocation
63. S22. 49. 15. 03 and E 29.53.47.00	Earthenware ceramics, possibly related to farm laboures occupation	No action
64. S22. 49. 10. 04 and E 29.53.51.00	Non- diagnostic ceramics on calcrete raised platform, previously ploughed for agricultural purposes.	Phase 1B assessment
65. S22. 49. 15. 04 and E 29.53.59.01	A single grave indicated by granite tombstone as grave dressing: in scripted, Vhengane Rosina Mulaudzi Scattered non-diagnostic ceramics on calcrete raised outcrop. Surface disturbances by agricultural cultivations.	Consultation for grave relocation

66. S22. 49. 14. 01 and E 29.53.59.00	Grave- headstone has fallen over- could possibly have been disturbed- Grobler T.J. Born 1856, date of death unknown.	Consultation for grave relocation
67. S22. 49. 15. 04 and E 29.54.02.04	Grave indicated by parked calcrete stones as grave dressing	Consultation for grave relocation
68. S22. 49. 15. 02 and E 29.54.11.01	Farm workers' settlement, rectangular foundation, bottles dated by collectors to circa 1910-1930	Phase 2 assessment
69. S22. 49. 20. 06 and E 29.53.50.09	Rectangular foundation ruin of recent historical house.	No action
70. S22. 49. 20. 06 and E 29.53.50.09	Non-diagnostic pottery scatter	Phase 1B assessment
71. S22. 49. 21. 04 and E 29.53.55.09	Grain bin stand and scattering of ceramics. A small iron Adze was recorded here	Phase 1B assessment
72. S22. 49. 12. 06 and E 29.53.52.03	Roundavel foundation	No action
73. S22. 48. 08. 07 and E 29.54.22.04	Non-diagnostic pottery scatter on raised platform on floodplain, the site extents southwards.	No action
74. S22. 49. 21. 02 and E 29.53.31.01	Midden deposit and cultural remains next to the river. Contains glass on surface, but could be a contaminated Iron Age deposit	Not affected
87. S22. 50. 38. 00 and E 29.53.20.02	An unknown child grave in between the remains of a recent historical homestead of the Singo family. The site was evacuated in the early 1920s.	Not affected
88. S22. 50. 38. 00 and E 29.53.20.02	A group of three graves of the Mavhetha family- One has a newly erected modern granite gravestone, buried in 1940. The other graves are indicated by packed stones as grave dressings	Not affected
89. S22. 50. 14. 09 and E 29.53.49.05	A fountain called Mpfuluka	Not affected

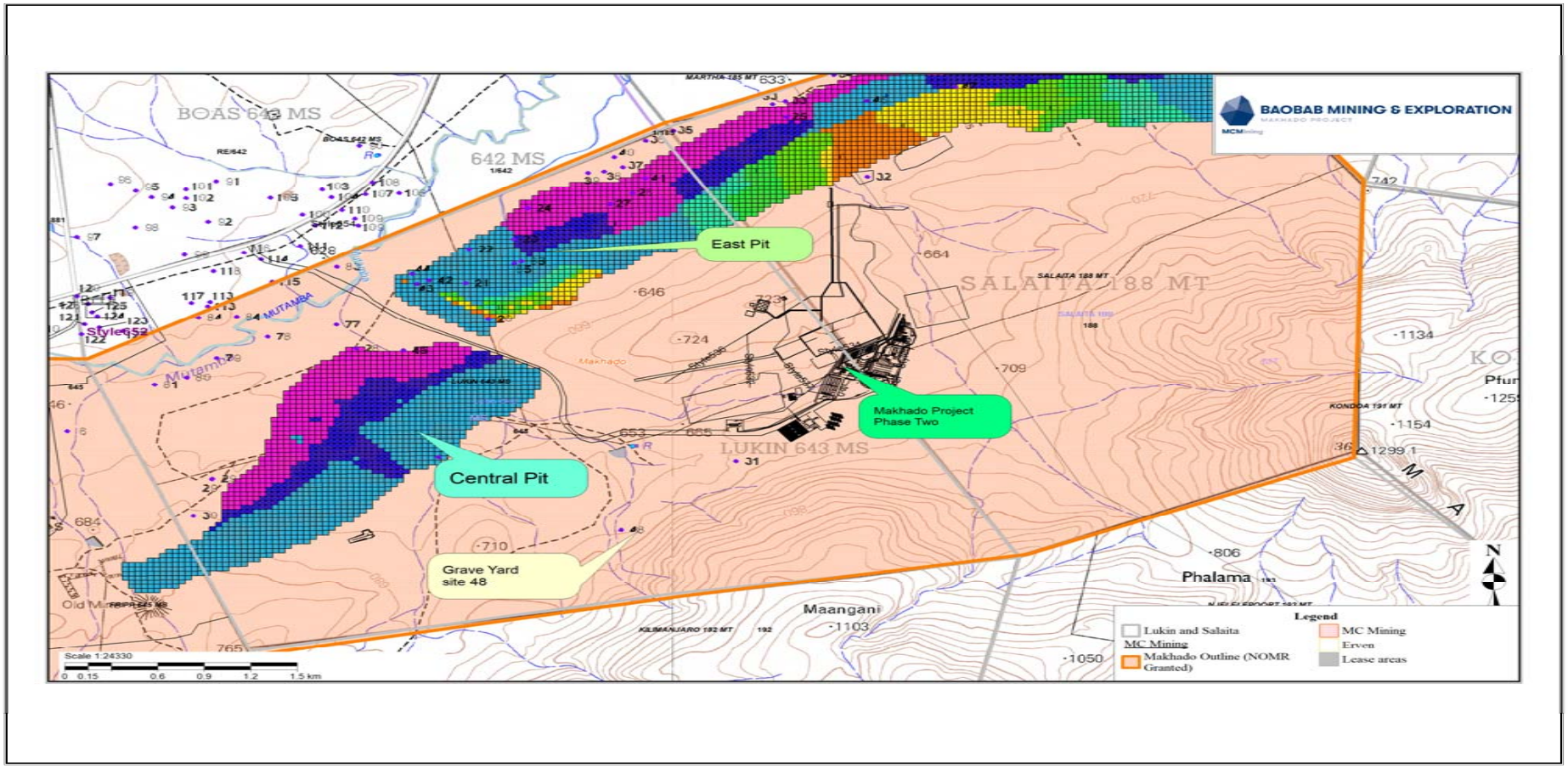

Figure 6: Topographical map of the sites affected by the east and central pit on farm Lukin 643MS and Salaita 188MT

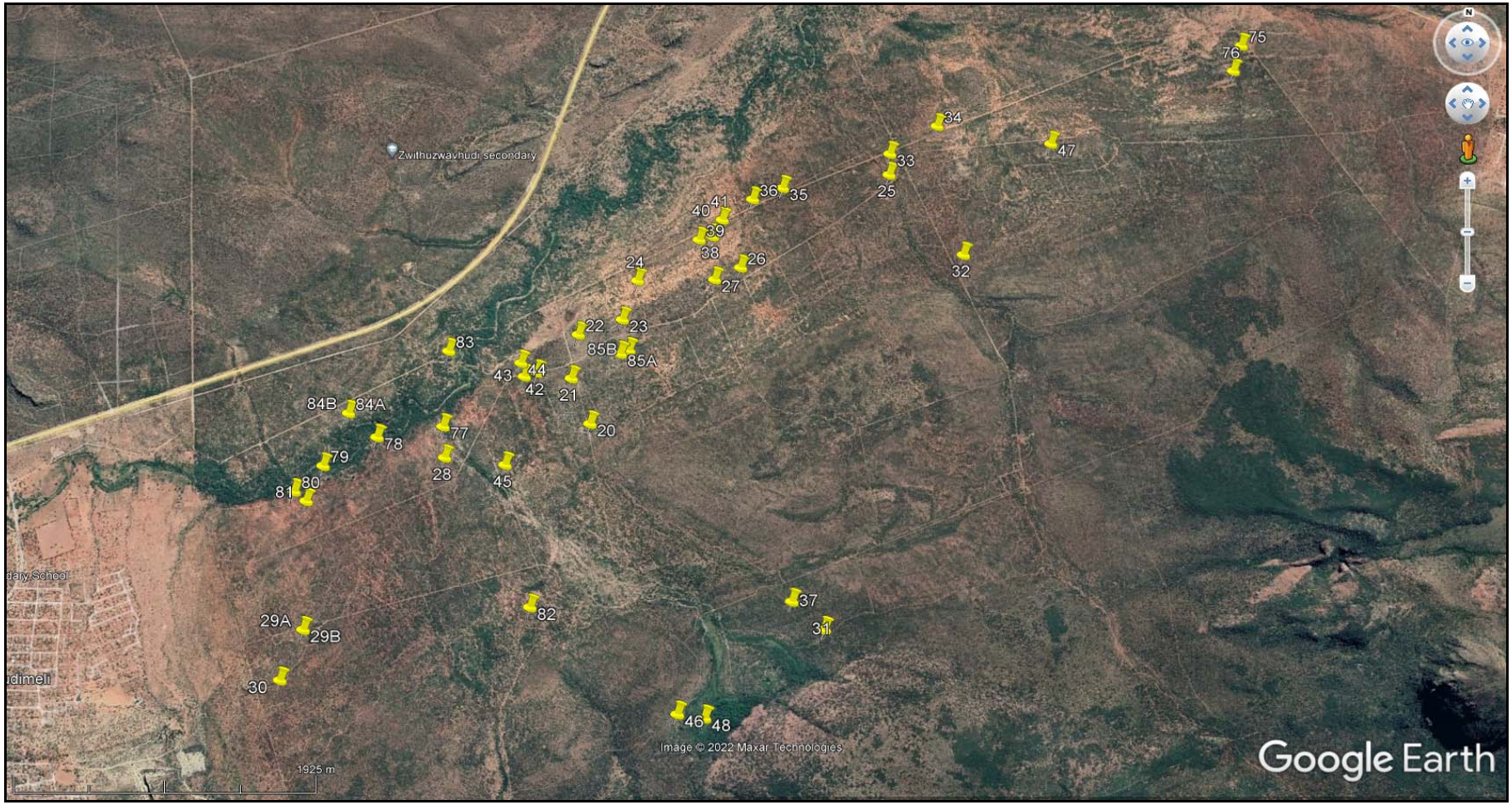

Figure 7: Recorded sites adapted from Google Earth Map

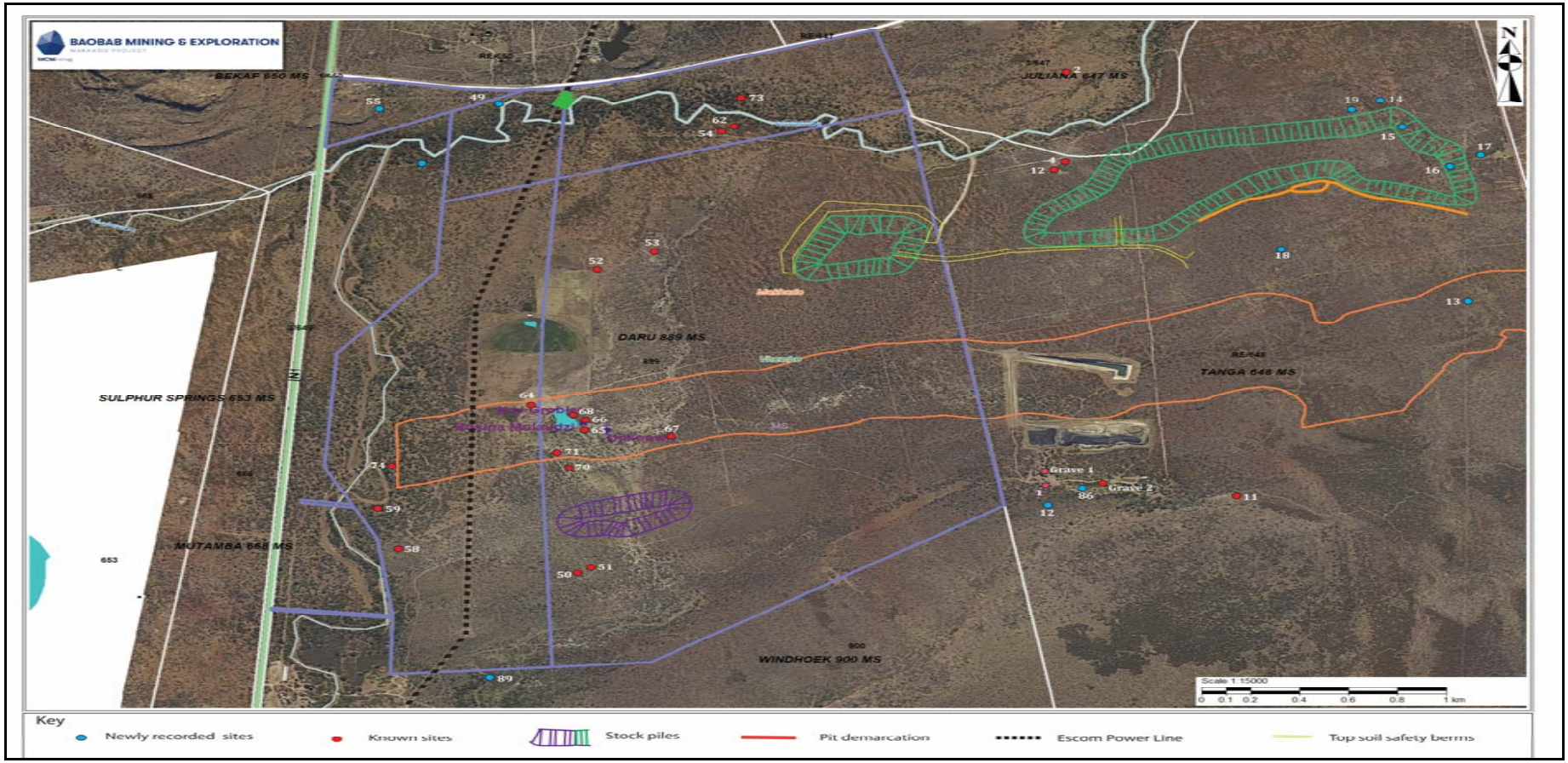

Figure 8: View of the study area with Plotted archaeological sites indicated by numbers adopted from Roodt (2012) report

Below sites were documented on farms Daru 889MS and Tanga 648MS these includes, Iron Age sites, burial grounds, historical and recent past sites.

Figure 9: Grave indicated by granite tombstone.

Figure 10: Grave indicated by parked calcrete stones as grave dressings

Figure 11: Sandstone headrest in scripted. Grobler T.J. Born 1856 date of death unknown.

Figure 12: Farm homestead remains

Figure 13: Recent past remains

Figure 14: Recent past remains of a home stead, according to the informants the area was occupied by Iscor drilling team from 1974-1985.

Figure 15: Ash midden with recent past items such as copper fork, plate and broken glass and bottles.

Figure 16: Recent past remains of roundavel foundation

Figure 17: Ash midden with recent past items, possibly as a results of hunting camp activities

Figure 18:A single grave indicated by oval parked stones as grave dressings

Figure 19: A single grave in the middle of non-perennial stream

Figure 20: Open spaces site with low ceramic distributions near Lucerne cultivating area.

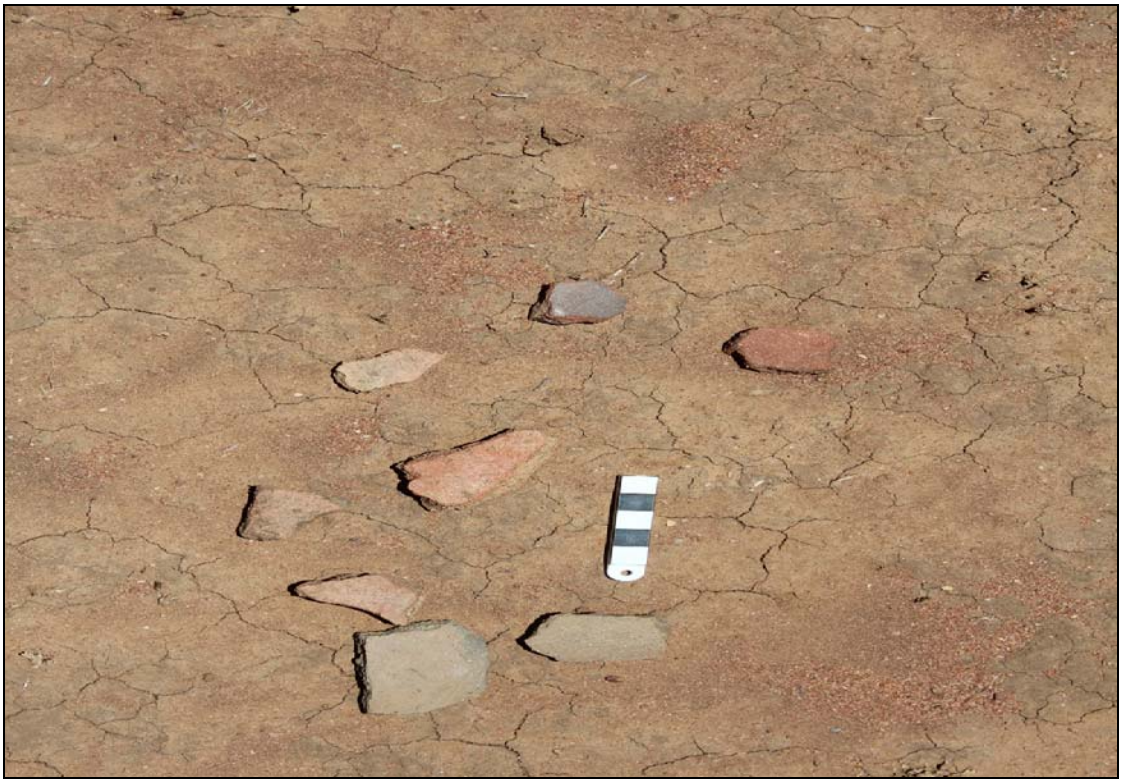

Figure 21: Some of the noted ceramics

Figure 22: View of an Iron Age site presumed to be Gumanye site, the area is dominated by *Colophospermum Mopane* bushveld complex

Figure 23: Some of the ceramics and stone tool noted on site

Figure 24:A site on rocky outcrop south of the Mutamba River bank

Figure 25: Cultural material remains from the surface of the site

Figure 26: Collapsed stone walls at the bottom slope of the mountain

Figure 27: Single grave indicated by parked stones as grave dressing, located near traversing Pylons

Figure 28: View of an Iron Age site near Mutamba River bank

Figure 29: Some of the cultural materials remains noted on site

Figure 30: The site is situated at the foot of the mountain, consist of livestock enclosure and scattered ceramics.

Figure 31: Low scattered undiagnostic ceramics

Below sites were documented on farms Lukin 643MS and Salaita 188MT these includes, Iron Age sites, burial grounds, historical and recent past sites.

Figure 32: The Kuvule burial grounds in proximity to a Wetland and Natural spring

Figure 33: Site 21, Large open area on calcrete outcrop, scattered diagnostic and undiagnostic ceramics.

Figure 34: Site 21, ceramics and top grinding stone

Figure 35: Site 46, Livestock dung deposit and scattered ceramics

Figure 36: Site 46: Possible grave

Figure 37: Site 85A & B, huge Iron Age site alongside the Mutamba River bank

Figure 38: Site 85A &B ceramics and top grinding stones

Figure 39: Site 24, with Mutamba ceramics in open mopane patch

Figure 40: Mutamba ceramics

Figure 41: Site 81

Figure 42: Middle stone age tools and Iron Age ceramics noted from Site 81 and 82

Figure 43: Site 32, which extend towards the north-eastern section alongside the gravel access road.

Figure 44: Ceramics collected from site 32

Figure 45: Site 33, located west of a non-perennial stream

Figure 46: Ceramics from Site 33

11. Conclusion and recommendations

In conclusion, and within limitations, the study established that there are heritage sites dating to different periods in the proposed development area. The study reached the following conclusions

- ✓ The assessment confirmed the existence of archaeological sites reported during the first study by Roodt (2011 and 2012).
- ✓ A reassessment of significance found that some sites on the proposed development footprint had potential to add more information to the history of farming communities in northern South Africa.
- ✓ Stone tools were observed on eroded waterways and appear mostly out of context.
- ✓ The study also confirmed the presence of burial grounds on the proposed site, while others noted exist outside the proposed development foot print, these are the Kuvule family grave yard. Furthermore, burial sites such as the (Mulaudzi, Grobler and a possible grave) exist within the proposed west and east pits development foot prints and therefore it is not possible to avoid these burial grounds during the establishment of mining activities and related infrastructure.

Based on these conclusions, the following recommendations were reached:

- ❖ The identified sites found in the proposed development footprint must be subjected to a Phase 1b, followed by a Phase 2 studies
- ❖ Following consultation, the graves must be relocated, those that fall within the proposed development footprint to a safer local cemetery.
- ❖ A Heritage Management Plan must be developed to protect sites outside development footprint including sacred heritage places such as springs and fountains.

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