A PHASE 1 HERITAGE IMPACT ASSESSMENT STUDY FOR THE PROPOSED LOSKOP QUARRY, KWAZULU-NATAL, SOUTH AFRICA.

PROJECTS & HERITAGE CONSULTANTS (PTY)LTD

VERSION: 01

28 MAY 2013

ACKNOWLEDGEMENT OF RECEIPT

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DECLARATION OF INDEPENDENCE

This report has been compiled by Nkosinathi Tomose, leading archaeologist and heritage consultant for NGT Project & Heritage Consultants. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the project.

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EXECUTIVE SUMMARY

NGT Projects & Heritage Consultants (Pty) Ltd was appointed by ENPROCON cc in terms of NEMA, 107 of 1998 (as amended & applicable EIA Regulations of 2010) as an independent CRM firm to conduct a HIA study (inclusive of Palaeontological desktop study (completed by Miss Nonhlanhla Vilakazi (PHD candidate Wits University) - Appendix 1), as required by Section 38 of the NHRA, No. 25 of 1999 (and other applicable legislations) for the proposed Loskop Quarry re-mining permit, Umtshezi Local Municipality, Thukela District, KwaZulu-Natal, South Africa.

The study yielded features - a reservoir and a historical kraal: Loskop-1 and Loskop-2 (Figure 11). The reservoir does not hold any heritage value. The kraal is of low heritage significance and has low impact significance in terms of the current project objectives. The site fall immediately outside the current mining area or reserves and potential quarry overburden.

Based on the results of literature review about Loskop Quarry and its surrounding, the physical site survey of the quarry, SAHRA minimum standards for evaluation and grading of archaeological (and other heritage) resources as well as the NHRA, No 25 of 1999 for the protection, conservation and management of the Nation Estate (Section 3 of the NHRA, No 25 of 1999), the KZNA, No. 10 of 1997 (at a provincial level), and the KNHB, 21 February 2008 it is concluded that there are no objections in terms of heritage resources management for the project to not go ahead as planned. Amafa can therefore issue the applicant with a Positive Review Comment. However, based on the nature of some archaeological resource such as those that are subterranean in nature which could not be identified by the current -
It is recommended that the developer and the appointed ECO should pay special attention to these resources during the excavations and ground clearance for roads during the re-mining process of Loskop Quarry. In the case that such resources are unearthed and brought to the surface of the earth by the project excavation activities the excavations in and around the area in which resources are found need to stop and the ECO and the environment consultant should consult an archaeologist and heritage consultant to immediately come to site to inspect and investigate the finds and make necessary recommendations. Amafa aKwaZulu-Natali should also be informed of such finds.

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ABBREVIATIONS

Acronyms	Description
AIA	Archaeological Impact Assessment
AMAFA	Amafa aKwaZulu-Natali
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DoE	Department of Energy
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
KZNHA	KwaZulu-Natal Heritage Act
KZNHB	KwaZulu-Natal Heritage Bill
K.y.a	Thousand years ago
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NEMA	National Environmental Management Act
PHRA	Provincial Heritage Resources Agency
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
PDAFP	Proposed Development Area Footprint
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SPV	Special Purpose Vehicle

TERMS & DEFINITION

Archaeological resources

This includes:

- material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and which is older than 100 years, including any area within 10m of such representation;
- wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- Features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means 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 the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- carrying out any works on or over or under a place;

- subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- constructing or putting up for display signs or boards;
- any change to the natural or existing condition or topography of land; and
- any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

1. INTRODUCTION

1.1. Project Background

1.1.1. Developer and Summary of the Proposed Project

The KwaZulu-Natal Provincial Department of Transport is applying for permits to re-mine Loskop Quarry located in Loskop, Umtshezi Local Municipality, Thukela District, KwaZulu-Natal, South Africa. The site is located some 22.6km north-west of the town of Escourt, 19.4km south-east of Winterton and Bergville On te backdrop is Cathedral Peak State forest (south-west), Monk's Cowl (south), Giant Castle Nature Reserve in the south and UKhahlamba Drakensberg Mountain Range. It found on Farm Droog Spruit 4935 and is situated west of the N3, south of the R74 from Winterton to the N3 and south of the old railway line and dirty/local road linking Winterton and Estcourt (Figure 1 and Figure 11).

The application for environmental and other related permits to re-mine Loskop Quarry is in-line with the KwaZulu-Natal strategic objectives of developing the province as one of the sort after provinces in South Africa - facilitating travel and trade. The concrete or gravels mined from will be used as reserves for future provincial roads construction activities. This includes contributing to Rural Development through development and construction of roads in areas that had no formalised roads.

1.1.2. Proposed Project Aims

The objective of the proposed project is to contribute to future road construction activities in and around Umtshezi Local Municipality, Thukela District, KwaZulu-Natal, South Africa. This involve among other processes application for rights to mine and/or re-mining some of the existing quarries for concrete to support road construction and improvement activities– in line with the objectives of the KwaZulu-Natal Provincial Department of Transport of modernizing its roads infrastructure and contributing to Rural Development through development and construction of roads in areas that had no formalised roads.

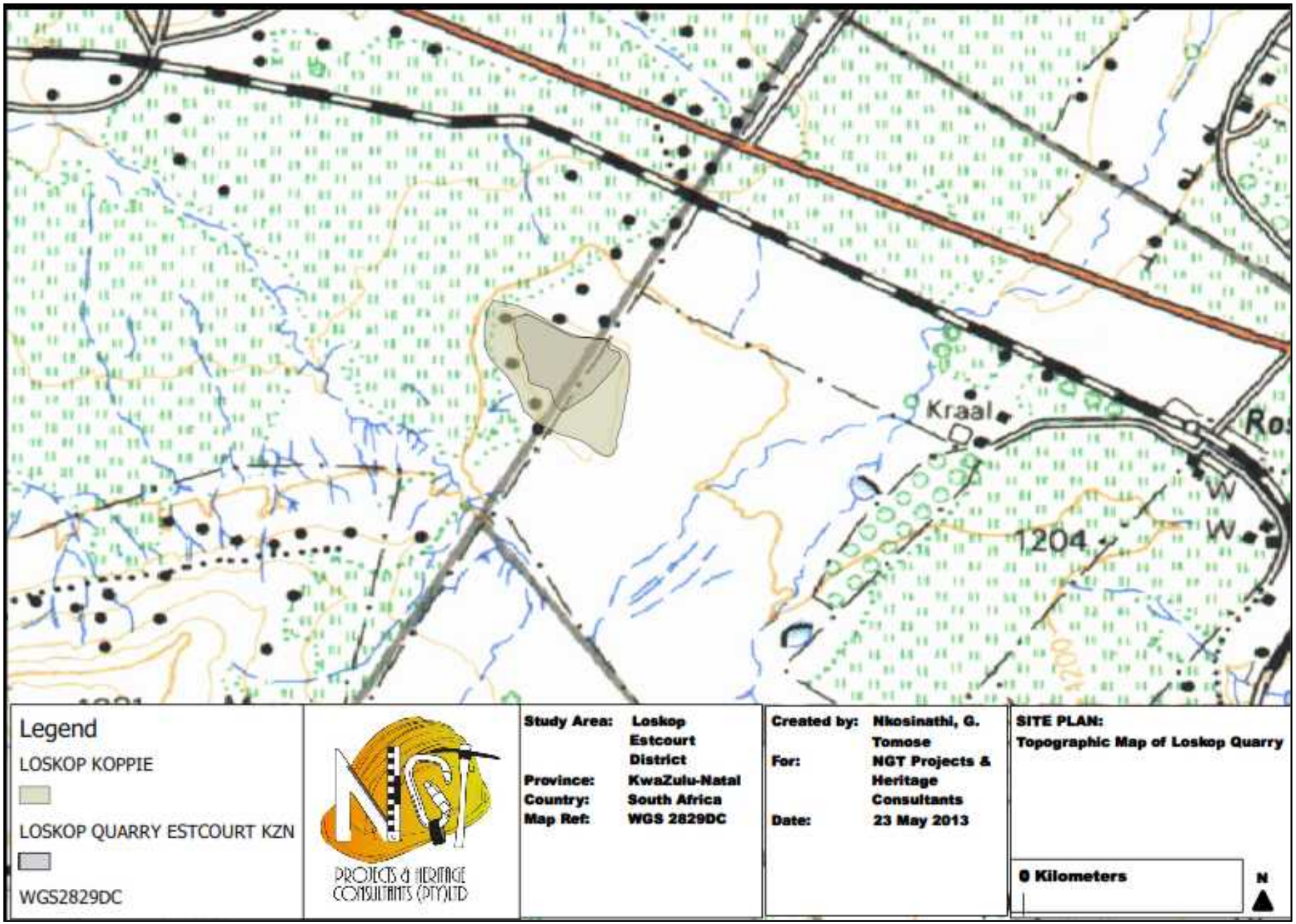
1.1.3. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

Because of the nature and size of the proposed development - re-mining of Loskop Quarry a quarry that exceeding a total area of 5000m^2 a need to conduct an BAR developed. In terms of the EIA Regulations of June 2010 (Government Notice 543-546 published in terms of the NEMA, No 107 of 1998) the re-mining of the Loskop Quarry is listed as an activity that requires environmental authorisation. The current process comprises of a BAR and it involves the identification and assessment of environmental impacts through specialist studies, as well as public participation.

ENPROCON cc was appointed by KwaZulu-Natal Provincial Department of Transport as a lead Environmental Impact Practitioner to manage the BAR process and associated impact studies for the proposed development project. As part of specialist inputs to fulfil the BAR process and its requirements ENPROCON appointed NGT Projects & Heritage Consultants (Pty) Ltd by Dovecall Property (Pty) Ltd as an independent and lead CRM firm to conduct an HIA (inclusive of Palaeontological desktop study - Appendix 1 of this HIA). Nkosinathi Tomose, the lead archaeologist & heritage consultant for NGT Projects & Heritage Consultants, conducted the HIA study for the proposed Loskop Quarry in Loskop, Umtshezi Local Municipality, Thukela District, KwaZulu-Natal, South Africa (Figure 1). Palaeontological component of the HIA was conducted by Miss Nonhlanhla Vilakazi (PHD candidate) and independent palaeontologist working under the banner NGT Projects & Heritage Consultants.

The appointment of NGT Projects & Heritage Consultants (as an independent CRM firm) is in terms of the KZNHA, No. 10 of 1997 (at a provincial level), NHRA, No. 25 of 1999 (as

amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations), as well as other applicable legislations and bills such as the KZNHB of 21 February 2008.


Kraal
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LOSKOP KOPPIE
LOSKOP QUARRY ESTCOURT KZN
WGS2829DC
PROJECTS & HERITAGE CONSULTANTS (PTY) LTD
Study Area: Loskop Estcourt District
Province: KwaZulu-Natal
Country: South Africa
Map Ref: WGS 2829DC
Created by: Nkosinathi, G. Tomose
For: NGT Projects & Heritage Consultants
Date: 23 May 2013
SITE PLAN:
Topographic Map of Loskop Quarry
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Figure 1 –Location of Loskop Quarry in the landscape in Loskop, Umtshezi Local Municipality, Thukela District, KwaZulu-Natal.

2. BACKGROUND OF THE STUDY AREA

2.1. Description of the affected environment

Table 1 - Loskop, Umtshezi Local Municipality, Thukela District, KwaZulu-Natal

Location	• The project area is located in Loskop, Umtshezi Local Municipality, Thukela District, KwaZulu-Natal, South Africa.
Study Site Land Uses	• Tribal: village housing and subsistence farming (Figure 1, 2 & 3) • Government Parastatal: Transnet railways line and Loskop Quarry- (Figure 1 & 4)
Land Owner(s)	• Tribal and KwaZulu-Natal Provincial Government
Applicant	• ENPROCON cc on behalf of KwaZulu-Natal Provincial Government - Department of Transport
Proposed Development	• Application for mining rights to re-mine Loskop Quarry, Loskop, KwaZulu-Natal
Access	• Existing national, provincial and local roads and routes • The study area is located south of the R74 from Winterton joining the N3; West of the N3; and immediate south the local road and railway line from Estcourt to Winterton and Bergville (Figure 1).
Defining natural features	• The area is also generally flat with the quarry being the highly raise natural feature (Figure 2)

Figure 2- Loskop Quarry, Loskop

Figure 3 - Loskop Village. Note the cow and the maize garden as indicated by the red arrow.

Figure 4- Old railway line linking Estcourt with Winterton and Bergville. (Refer to Figure 1 for location of this railway line in the landscape)

2.2. Description of proposed activities: Infrastructure Proposed

Table 2 - List of Activities

Activity 1	Application for mining right to re-mine Loskop Quarry in Umtshezi Local Municipality, Thukela District, Kwazulu-Natal
Activity 2	Application for mining right to re-mine Loskop Quarry in Umtshezi Local Municipality, Thukela District, Kwazulu-Natal

2.3. Needs & Desirability

Table 3 –List of activities in-line with the project scope

Activity 1	• Desktop study of the heritage value and integrity of the area under consideration and its surrounding with a particular focus on resources within the proposed alignment (refer to 2.4 below for detailed overview of resources in the region under consideration). • Physical identification, documentation and recording of heritage resources within and immediately outside the Loskop Quarry in Umtshezi Local Municipality, Thukela District, Kwazulu-Natal
Activity 2	• The mapping, assessment and evaluation of the heritage value and integrity of the identified heritage resources and assessment of potential impacts as a result of the proposed development on these resources.
Activity 3	• Proposing heritage management measures for inclusion in the BAR document • Making recommendations to SAHRA and Amafa aKwaZulu-Natali

2.4. Archaeological and Historic Heritage of KwaZulu-Natal:

2.4.1. Introduction:

KwaZulu-Natal province provides palaeoscientists and cultural scientists alike with rich canvas of heritage resources varying from natural to manmade or human influenced or altered resources.

The man made environment of KwaZulu-Natal dates from prehistoric to historic times (time of written documents). Among archaeological (and heritage) time periods it includes: the ESA (Early Stone Age)– 2.6 m.y.a to 250 k.y.a.; MSA (Middles Stone Age)–250 k.y.a to about 35 k.y.a.; LSA (Late Stone Age)– 25 k.y.a to about 2000 k.y.a; 2 Iron Age periods (i.e. Early Iron Age & Late Iron Age)– 2000 k.y.a ; Colonial period and historic period1800s.

This HIA assesses the range of heritage resources in and around Loskop Quarry in Umtshezi Local Municipality, Thukela District, Kwazulu-Natal. The heritage resources assessed include both palaeontological (pre-human), archaeological and built environment and landscape (manmade or human influenced/altered resources) (Figure 1 & 2). It makes recommendations on how to best manage them within a legal framework as stipulated in the NHRA, No. 25 of 1999, KZNHA, No. 10 of 1997 and KZNHB, 2008. The HIA has two component which covers various periods of palaeontology and archaeology to the recent historic and cultural heritage/landscape of the area under consideration. Below is the summary of the archaeological and historical background on the area under consideration - for a palaeontological study refer to Appendix 1 below (this report is also presented as a separate report).

2.4.2. Archaeological and Historic Heritage

The archaeology of KwaZulu-Natal like that of most parts of southern Africa covers four archaeological periods, namely – the Stone Age (Early, Middle & Late), the Iron Age and Historic Archaeology (the last 500 years). The study area falls with a region mostly known for Stone Age Archaeology material culture- the rock art sites of Escourt and in uKhahlamba Drakensberg Mountain Range in the west. The Iron Age archaeology and historical archaeology of the broader region is also documented - for example, the settlement of the area by the Zulu Bantu Language speakers and later the settlers.

The Stone Age archaeology of the region are recorded amongst others in Sibudu Cave on the coast of KwaZulu-Natal - it contains evidence for early forms of cognitive human behavioural patterns in the Middle Stone Age of South Africa some 40 000 years BP (e.g. Wadley, 2005; Wadley et al, 2004; Wadley, 2001). The caves, plains, valleys and hills of KwaZulu-Natal are also known to have once been occupied by the San people often referred to as San hunter-gathers or the Bushman. Evidence for this includes stone artefacts and an abundance of rock art, predominantly in the form of rock paintings in areas such as the Giants Castle Reserve

(e.g. Main Cave) and Kamberg Nature Reserve in the Drakensberg Mountains (e.g. Vinnicombe, 1976). These rock art regions are located west of the Loskop Quarry. Rock art sites are also documented in Estcourt, Mooi River and Dundee (e.g. Lewis- Williams, 1992). This form of archaeology material culture documents the last phase of the Stone Age Archaeology of the KwaZulu-Natal.

The second phase of occupation of the region is known as the Iron Age Archaeology. The Iron Age of southern Africa dates to the first millennium AD. The site of Mzonjani, located some 15 km from Durban is the oldest known Iron Age site in KwaZulu-Natal dating to the third millennium AD. By 1050 AD the Natal region is known to have been occupied by the Zulu people and this is the region in which Loskop Quarry is located (former Natal) and within the former Zululand further north east. Approaches used to arrive at these conclusions include drawing upon history, oral traditions, linguistics, anthropological, and archaeological data as presented through material culture and artefacts. The defining archaeological traits of the Iron Age people in this region and other parts of southern Africa is represented through distinct ceramic traditions, stone walls and other structural features such as grain bins and hut floor remains, kraals and often vitrified cattle dung (& often goat). The KwaZulu-Natal region of southern Africa is known to have been occupied by the Nguni language speakers of the Eastern Bantu Language Stream. Iron Age structural features characterised this region include stone wall structures defined as the Central Cattle Pattern (C.C.P) (e.g. Huffman, 2007). The earliest known "stonewalling type" in this region is known as Moor Park and it dates from 14th to 16th Centuries AD (Figure 5). The site of Moor Park is located in the defensive position on the hilltops in the Midlands, from Bergville to Dundee just south of the town of Newcastle (see Huffman, 2010, 2007).This is some distance south of the study area. Different theories or hypothesis have been argued for and against regarding the potential use of the site of Moor Park.

Huffman (2007:33), for example argues that the wall served defensive purposes based on the location and setting of the walling - it is "located on the spurs and ends of hills, stone walls cut the settlement off from remaining terrain perimeter walls enclose about two thirds of the settlement, leaving the back free". However, it has to be noted that the C.C.P and other forms of Iron Age stonewalling features are not restricted and/or endemic to the eastern Bantu Language Speaking groups or the Nguni people whom the Zulu people form part of. Stone walling is found elsewhere in the country – in regions such as Limpopo Province, North West Province and Gauteng Province in South Africa and in other southern African countries such as

Zimbabwe and Botswana etc. For example, Huffman argues that, “Iron Age stonewalling occurs over much of Southern Africa "and that “as the most visible sign of agro-pastoral settlement, there are several classifications, mostly for specific areas and few for larger regions” (Huffman 2007: 31). Later on beehive structure became a dominant feature in Zulu Nation material culture (Figure 6)

In terms of stonewalling, other known stonewall features in the former Natal region resulted during the times of war - for example, during the South African Wars (i.e. Anglo-Boer Wars), the prehistoric wars such as Mfecane, and Anglo-Zulu and Zulu and Boer wars.

The KwaZulu-Natal region is known to have been characterised by historical wars and battles. These wars and battles were within and between the different Zulu clans, Zulu’s and other ‘tribal groups’ such as the Swati and Ndebele, the Zulu’s and the Boers, the Zulu’s and the British (e.g. Anglo-Zulu War), and the British and the Boers with participation from local Zulu’s ,Indian and other groups (e.g. the South African War a.k.a the Anglo-Boer War). This gives a different layer to the history of the region and in particular of the region between Estcourt, Ladysmith, Winterton, Bergville. These are some of the known towns that ensconced the Loskop Quarry.

Among the well documented and well known battle site located in close proximity to the Loskop region is the battle of Spioenkop on Farm Rhenoster Fontein 1051, Bergville District. This battle is known as the most fearers battle with the former Natal region in KwaZulu-Natal. The battle took place between the 24 and the 25 January 1900 on the hills of Spioenkop. It is estimated that between 2 500 and 2 700 British soldiers and 58 Boers died during this encounter (KwaZulu-Natal Heritage Sites Online Directory - Accessed 24/05/2013).

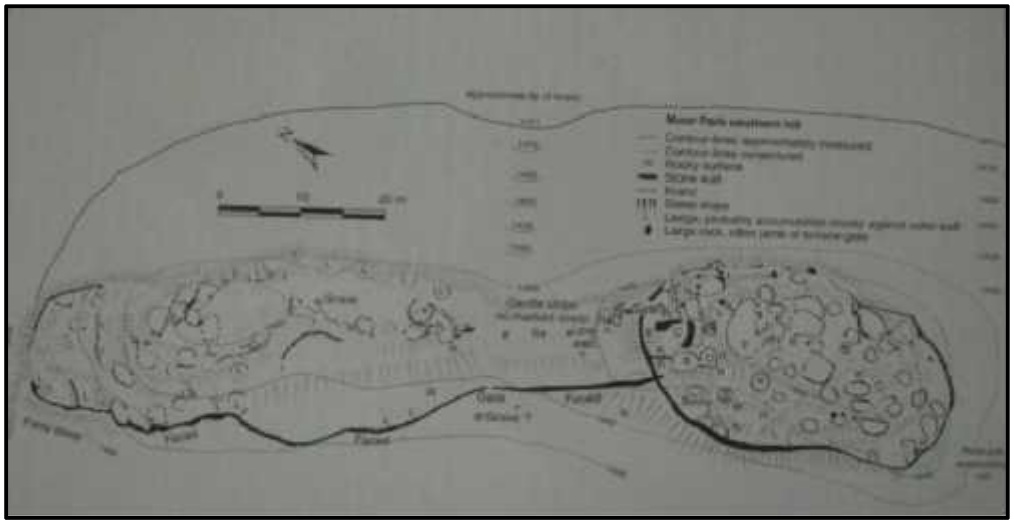

Figure 5- Site of Moor Park; picture taken from T, N. Huffman (2007) to illustrate the C.C.P stonewalling (see also Davies 1974 from which the picture was initial taken).

Figure 6-Pre-industrial Zulu village: beehive huts, note homestead built using thatch material (Colonial time picture) © Laband & Thompson, 2000

The above mention battle of Spioenkop falls within the colonial settler period of the KwaZulu-Natal. The third phase of occupation in current day KwaZulu-Natal was the Late Iron Age – a period just before the contact with the colonial settlers. In KwaZulu-Natal and other parts of southern Africa this period was characterised by a variety of expansionists' battles fought by different chiefdom, culminating to the pre-colonial southern African war called Imfecane (Ommer-Cooper, 1993). In the province of KwaZulu-Natal it started during the early 1800's when the amaZulu were still under the 'static kingdom' of Senzangakhona (Ommer-Cooper, 1993; Knight 1998). In KZN, the Imfecane brought about many battles between and within the different local Zulu chiefdoms.

In other parts of the country the Imfecane also affected the Koni (Limpopo Province), the Tswana by the Ndebele ka-Mzilikazi (interior regions of the country) and the amaMpondo, amaHlubi, abaThembu and amaXhosa in the Eastern Cape regions (Wright, 1991). The Estcourt area also known as iSizwe samaHlubi or amaBhungane was also affected by these expansionist events. The Imfecane featured very prominent in KwaZulu-Natal during the reign of King Shaka KaSenzangakhona (Ommer-Cooper, 1993). Some of these battle and

raids spread as far north to countries like Zimbabwe and Zambia. In Zululand, one of the bigger local chiefdoms that were conquered was the Ndwandwe chiefdom of Zwide kaLanga which were situated north of Shaka's territory around the modern day kwaNongoma (Knight, 1998).

Shaka managed, to some degree, to achieve his ideal kingdom by strategically expanding/extending the traditional amabutho system. The amabutho were the brigade of young men of similar age gathered together for a period of national service (Laband& Thompson, 2000; Torlage & Watt, 1999; Knight, 1998; Ommer-Cooper, 1993; Wright, 1991). The amabutho were quartered at large royal homestead, amakhanda (Figure 7)- which were sited strategically above the surrounding country to guard against both outside attack and internal dissension like the site of Moor Park discussed above. During the times of need, amabutho would be organised into impi to fight and protect the Zulu kingdom. The amabutho, organised into impi, would also be sent out to attack and take over rival chiefdoms that were opposed to King Shaka's rule and in the process incorporating them under his monarchy.

As powerful as it may have been, King Shaka's reign as the Zulu King did not last long as he was assassinated by his younger brothers in September 1828. One of them, Dingane KaSenzangakhona later became King. It is argued that by the time of his assassination he had not yet fully managed to assume and reconcile into his kingdom all the local Zulu chiefdoms: "much chiefdom within the kingdom were still unreconciled to Zulu rule, while Zulu influence south of Thukela [was still]patchy" (Knight, 1998: 14). The area south of the Thukela River (Natal) was to some degree not in King Shaka's hold. He did not manage to assimilate all the chiefdoms south of uThukela under his rule and this had negative ramification to the Zulu kingdom for the years to come. King Shaka moved the royal homestead to KwaDukuza, Stanger, south of upper Thukela River before his assassination by Dingane (and Mpande) who later re-relocated and rebuilt it at eMgungundlovu, 'The Place Surrounding the Elephant' in the Emakhazeni valley where King Shaka and King Dingane's forefathers are buried. The moving of the royal homestead by both Shaka and Dingane presents an interesting 'thesis' into the internal dynamics and politics of the Royal House and possibly one of the reasons for the assassination of King Shaka by his brothers. One important reason for the relocation of the royal homestead back to uMgungundlovu- north of the upper Thukela River was the growing influence of the white community at Port Natal (settlers) and the encroaching Trek Boers who crossed UKhahlamba Mountains into Natal in the 1837 (Knight, 1998). The period of encroachment of first Natal, then Zululand represents a fourth phase of settlement or

occupation of KwaZulu-Natal. Before it became open to most people during the Union (1910-1961), Nationalist rule (1947-1994), and democratic South Africa (1994- current)

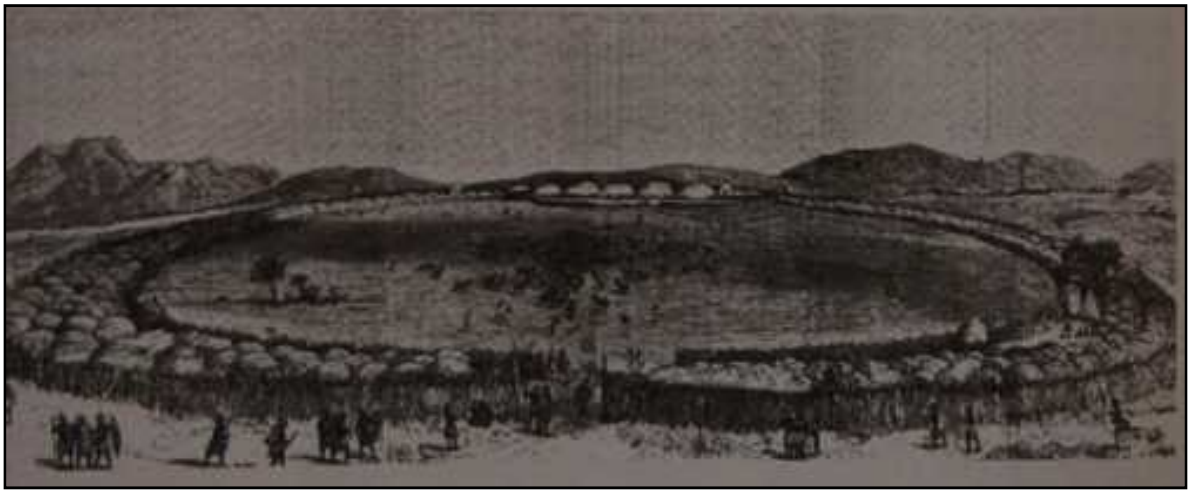

Figure 7 - An illustration of iKhanda or the royal homestead © Laband& Thompson, 2000

The fourth period of occupation of the KwaZulu-Natal came about with the settlement of KwaZulu-Natal by the colonial settlers. The settler and Boer influence south of upper Thukela (uThukela) River and the strong Zulu influence north of the river during the late 1830s become important in understanding the development of the two territories divided by the river that later became known as Natal and Zululand (Figure 8)

Since the 1830s the KwaZulu-Natal landscape was divided into north and the south; Natal in the south and Zululand in the north. Zululand can be broadly defined as the land between the uThukela River (some 100km north of present day Durban) and Swaziland and Mozambique to the north with Natal as the area south of the u-Thukela River. Initially this border was blurry and unmarked by any geographic or physical feature until the colonial times:
"Certainly, this was the extent of the Zulu kingdom during its most static phase, although at times the Zulu kings exercised authority over the country considerable further south, while their hold over the northern borders was always tenuous. In fact, the kings defined their boundaries in term of people who gave them allegiance, rather than by geographical features, and the idea of a single Zulu identity is largely mythical" (Knight, 1998:13)

Knight goes on to argue that "the history of the Zululand and its southern neighbour Natal has always been inextricably mixed, and the physical boundaries between them blurred". The political border that existed between Zululand and Natal was in prehistoric times not marked

by any geographic features. Natal came to exist when, "the south-eastern seaboard had remained unknown to the European world until Christmas Day 1497, when the Portuguese explorer, Vasco da Gama, had noted its existence in his log as he sailed around the Cape and up the east coast of Africa, searching for a route to the Indies. He christened it Terra Natalis, in honour of the birth of Christ, and for the centuries Natal was used to describe the country south of uThukela" (idem: 15). Existing archival evidence for the formal proclamation of uThukela River as the political boundary dividing Zululand (in the north) and Natal (in the South) dates to the 1850's during KingCetshwayokaMpande rule as the Zulu King

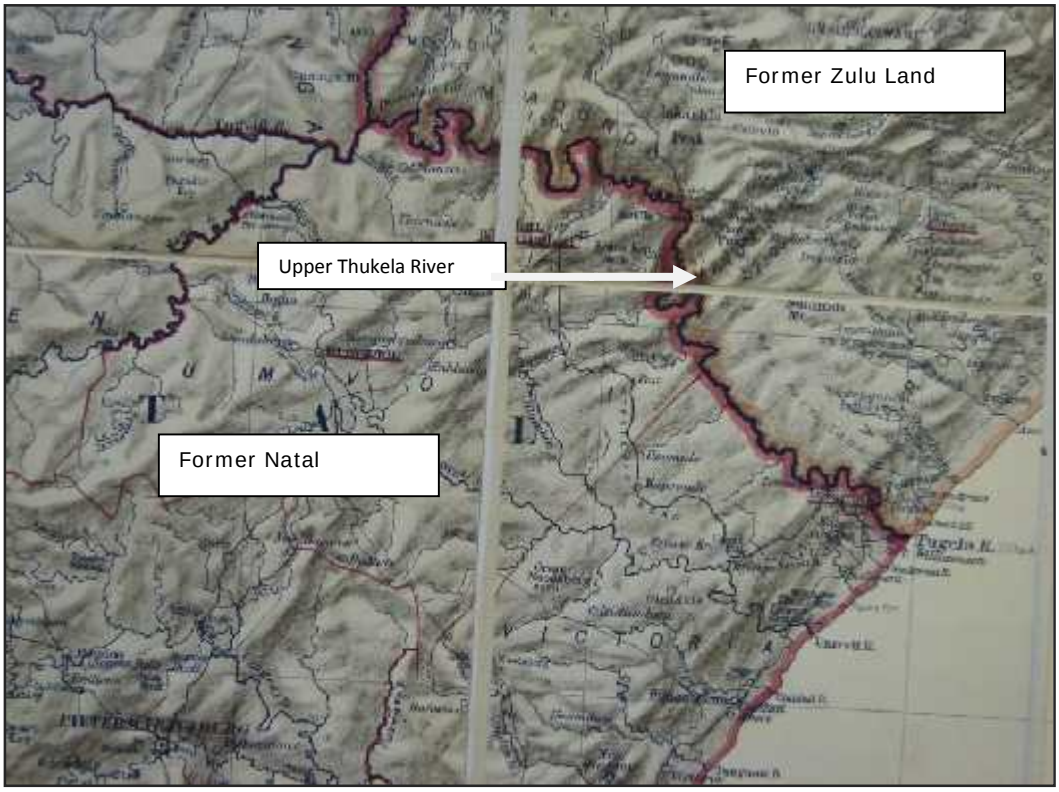

Figure 8- Map showing the Natal (south of Thukela River) and Zululand (north of Thukela River) Boundary.
Stanford's Large Scale Map of Zulu Land with adjoining parts of Natal, Transvaal and Portuguese Africa, March 4th 1879 © Map Archives, Cullen Library, University of the Witwatersrand, Johannesburg, South Africa.

The above give brief overview of the archaeological and historical accounts of the modern day KwaZulu-Natal and our current study area falls within the former Natal region of KwaZulu-Natal

3. METHODOLOGY

3.1. Legislative Requirements

The NEMA, No. 107 of 1998 stipulated that for any development in South African to be granted permission to go ahead an assessment of the potential impacts of the proposed development on both the natural and cultural environment need to be conducted. As such, this HIA fulfils the requirements of NEMA and is conducted in-line with Section 38 (1) of the NHRA, No. 25 of 1999 and the KwaZulu-Natal Heritage Act, No. 10 of 1997 (various sections as applicable) as well as applicable 2010 EIA Regulations.

3.2. Methodology

This chapter outline the methodologies used in conducting the study. This HIA report was compiled by Nkosinathi Tomose, lead archaeologist and heritage consultant for NGT Projects & Heritage Consultants, for the application of right to re-mine the Loskop Quarry located with Umtshezi Local Municipality, Thukela District, KwaZulu-Natal. The Palaeontological component of the report attached as Appendix 1 of this report was compiled by Miss Nonhlanhla Vilakazi (PHD candidate Wits University).

3. 2.1. Step I – Literature Review (Desktop Phase):

- There is limited published material about Loskop as such background information search focused on the broader historic account of the KwaZulu-Natal following the acceptance of NGT Project & Heritage Consultants Quotation for the Loskop Quarry HIA by ENPROCON.cc. Sources used included, but not limited to published academic papers and HIA studies conducted in and around the region where the current development will take place.
- Map Archives - Historical maps of the proposed area of development and its surround were assessed to aid information about the proposed area of development and its surround.
- This also included a review and assessment of relevant environmental and heritage legislations, and Bills such as the KwaZulu-Natal Heritage Bill, 21 February 2008.
-

3.2.2. Step II – Physical Survey:

- The physical survey of the Loskop Quarry took place proposed development area footprint (PDAFP) was conducted by a qualified archaeologist and general heritage specialist on the 8th of April 2013. The survey covered the area in which the previous quarrying activities took place. From an archaeological perspective the objective of the survey was to locate and identify archaeological and heritage resources and/or sites in and around the Loskop Quarry and there are mitigate them according to prescribed archaeological and heritage mitigation as prescribed in the SAHRA Minimum Standards for the completion of an HIA. For a palaeontological perspective it was to ascertain whether or not there are any sensitive palaeontological remains that could potentially influence the proposed future re-mining of the quarry and to mitigate them according to prescribe palaeontological mitigation measures.
- The physical survey was deemed necessary since the desktop phase of the project area did not yield any archaeological and heritage resources about Loskop Quarry.
- The survey also paid special attention to disturbed and exposed layers of soils as such as eroded surfaces because these areas are more likely to exposed or yield archaeological and other heritage resources that may be buried underneath the soil and brought to the earth surface by animal and human activities. Such as animal barrow pits and human excavated grounds. The dirty roads edges/sides leading to the quarry were also inspected for possible Stone Age scatters as well as exposed Iron Age implements and other resources.

- The following technological tools were deemed important for documenting and recording located and/or identified sites:
    - Garmin GPS (i.e. Garmin 62s) – to take Lat/Long coordinates of the identified sites and to track the site.
    - Lenovo ThinkPad aided Garmin Basecamp Software, Google Earth – to plot the propose project footprint. If any site or resources were identified - ArcGIS Software was used to map them in the landscape.
    - Maps provided by the client during the physical survey of the Loskop Quarry proved invaluable
    - Samsung – to take photos of the affected environment and identified sites (if any were to be located within the Loskop Quarry)

3.2.3. Step III – Data Consolidation and Report Writing:

- The final step involved the consolidation of the data collected using the various sources as described above.
- This involved the manipulation Shapefiles/KMZ files through Quantum GIS (1.8)
- Assessing the significance and potential impact of the identified sites, discussing the finds, report writing and making recommendation on the management and mitigation measures of the identified sites and resources as well as the impact and influence of these sites and resources on the proposed development project and project area.

3.3. Assessment of Site Significance in Terms of Heritage Resources Management Methodologies

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context)
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
    - Density of scatter (dispersed scatter)
    - Low - <10/50m^2
    - Medium - 10-50/50m^2
    - High - >50/50m^2
- Uniqueness and
- Potential to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and
- E - Preserve site
- Impacts on these sites by the development will be evaluated as follows:

Site Significance

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by the ASAPA for the SADC region were used for the purpose of this report.

Table 4: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	-	Low Significance	Destruction

3.4. Methodology for Impact Assessment in terms of Environmental Impact Assessment Methodologies including Measures for Environmental Management Plan Consideration:

The Basic Assessment Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effects of environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the Basic Assessment & Environmental Impact Assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts:

The Basic Assessment included:

- an indication of the methodology used in determining the significance of potential environmental impacts
- a description of all environmental issues that were identified during the environmental impact assessment process
- an assessment of the significance of direct, indirect and cumulative impacts in terms of the following criteria:

    - the nature of the impact, which shall include a description of what causes the effect, what will be affected and how it will be affected
    - the extent of the impact, indicating whether the impact will be local (limited to the immediate area or site of development), regional, national or international
    - the duration of the impact, indicating whether the lifetime of the impact will be of a short-term duration (0–5 years), medium-term (5–15 years), long-term (> 15 years, where the impact will cease after the operational life of the activity) or permanent
    - the probability of the impact, describing the likelihood of the impact actually occurring, indicated as improbable (low likelihood), probable (distinct possibility), highly probable (most likely), or definite (impact will occur regardless of any preventative measures)
    - the severity/beneficial scale, indicating whether the impact will be very severe/beneficial (a permanent change which cannot be mitigated/permanent and significant benefit, with no real alternative to achieving this benefit), severe/beneficial (long-term impact that could be mitigated/long-term benefit), moderately severe/beneficial (medium- to long-term impact that could be mitigated/ medium- to long-term benefit), slight or have no effect
    - the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high
    - the status, which will be described as either positive, negative or neutral
    - the degree to which the impact can be reversed
    - the degree to which the impact may cause irreplaceable loss of resources
    - the degree to which the impact can be mitigated

- a description and comparative assessment of all alternatives identified during the environmental impact assessment process

- recommendations regarding practical mitigation measures for potentially significant impacts, for inclusion in the Environmental Management Plan (EMP)
- an indication of the extent to which the issue could be addressed by the adoption of mitigation measures
- a description of any assumptions, uncertainties and gaps in knowledge
- an environmental impact statement which contains:

    - a summary of the key findings of the environmental impact assessment;
    - an assessment of the positive and negative implications of the proposed activity ;
    - a comparative assessment of the positive and negative implications of identified alternatives

Assessment of Impacts

Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase must be assessed in terms of the following criteria:

- The nature, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- The extent, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- The duration, wherein it will be indicated whether:

    - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
    - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
    - medium-term (5–15 years) – assigned a score of 3;
    - long term (> 15 years) - assigned a score of 4; or
    - permanent - assigned a score of 5;

- The magnitude, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will

cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The probability of occurrence, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- the significance, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- The status, which will be described as positive, negative or neutral.
- The degree to which the impact can be reversed.
- The degree to which the impact may cause irreplaceable loss of resources.
- The degree to which the impact can be mitigated.

The significance is calculated by combining the criteria in the following formula:

S= (E+D+M) P

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The significance weightings for each potential impact are as follows:

- < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),

- > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Assessment of impacts must be summarised in the following table format. The rating values as per the above criteria must also be included.

Table 5-Example of Impact table summarising the significance of impacts (with and without mitigation).

Nature:		
	Without mitigation	With mitigation
Extent	High (3)	Low (1)
Duration	Medium-term (3)	Medium-term (3)
Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	36 (Medium)	24 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Mitigation Measures		
Cumulative impacts: Cumulative Impacts		
Residual Impacts: Residual Impacts		

Table 6 -Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies			
Project component/s	List of project components affecting the objective		
Potential Impact	Brief description of potential environmental impact if objective is not met		
Activity/risk source	Description of activities which could impact on achieving objective		
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion		
Mitigation: Action/control		Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above		Who is responsible for the measures	Time periods for implementation of measures
Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.		
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting		

4. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations exist in terms of the present study:

- The current study is a Phase 1 Heritage Impact Assessment. As such, a historical and archival desktop study as well as a field survey were undertaken to identify tangible heritage resources located in and around the proposed development area footprint. No formal heritage social consultation took place with.
- Since the quarry is located within tribal land it was not deemed necessary to conduct a Deeds Search of the study area.
- No detail archival map search of the quarry to place based on the fact the quarry was mine in the 1980s.

5. FINDINGS

The desktop phase and map search of the Loskop did not yield any archaeological and heritage resources about the study area. However, because the quarry is located near a quarry ancestral graves and cemeteries were anticipated.

5.1. Field Survey:

The physical survey of Loskop Quarry made a number of observations about the site and its surrounding landscape as described in the 'affected environment' section above. However, no archaeological resources were identified within the proposed mining area. The 2 sites identified and recorded during the physical survey of Loskop Quarry are cultural and historic in nature and they include:

- 1 Kraal ruins and a reservoir on the edges of Loskop Quarry

Below is the description and field assessment of each of the 2 identified features:

Site	Loskop-1
Type	Reservoir
Density	1 structures
Location/Coordinates	S28 57 29.3 E29 38 50.2 S28 57 29.3 E29 38 50.2
Approximate Age (More than 60 0r Less than 60 years old)	Less than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	Section 34
Applicable Sections of the KZNHA, No.10 of 1997	Section 26 (1)
Applicable Sections of the KZNHB, 2008	Chapter 8 section 39.1
Description: This is not a heritage but rather a recent reservoir locate on the edges of Loskop Quarry along the road leading the quarry mining area (Figure 9)	

Note! – There are no further actions recommended for this site because it falls outside the Loskop Quarry mining area and it is not a heritage site(Figure 9).

Figure 9- Reservoir located on the edges of Loskop Quarry

Site	Loskop-2
Type	Historic kraal
Density	1 Structure
Location/Coordinates	S28 57 31.1 E29 38 41.2 S28 57 31.1 E29 38 41.2
Approximate Age (More than 60 0r Less than 60 years old)	More than 60 years old
Applicable Section of the NHRA, No 25 of 1999:	35 (kraal)
Applicable Sections of the KZNHA, No.10 of 1997	Section 26 (6)
Applicable Sections of the KZNHB, 2008	Chapter 8 section 42
Description: The site consists of stone kraal foundations and fallen entrance stone slabs. The stone kraal is not	

complete some sections of stone walling look to have been salvaged to be used elsewhere. The kraal was completely covered in grass during the survey month. A close examination of interior walls did not yield any burial grounds and graves (Figure 10).

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Field Rating	Grade	Impact	Impact Significance	Heritage Significance	Certainty of Impacts	Duration	Mitigation
LS	3A	Localised	Low	Low significance	Improbable	None –the historic kraal falls outside the Loskop Quarry mining area and possible overburden	A – this historic kraal falls outside the Loskop Quarry

Nature of Activities:

1. Construction Phase: The kraal fall outside the mining area it might possible be affected by the quarry mining overburden. However, the chances of this occurring are very slight

2. Operation Phase: It might be affected the rehabilitation process

	WOM	WM
Probability	Highly probable (2)	Improbable (1)
Duration	Short term(1)	Short term (1)
Scale	Local (1)	Local (1)
Magnitude/Severity	Low (2)	Low (2)

Significance	(10)Negligible	(4) Negligible
Status (positive or negative)	Negative	Positive
Reversibility	Low	High
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: The site should be avoided and be treated as a no-go area to avoid an potential impacts during the quarry re-mining process.		
Cumulative impacts: Cumulative impacts are predicted to arise from grounding clearance and development of overburden.		
Residual Impacts: • The project will positively contribute to infrastructure development in the KwaZulu-Natal Province in terms of road construction activities		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development area footprint i.e. the proposed Loskop Quarry. The site consist of stone wall foundations. It is of low heritage significance with negligible impact significance, but should be avoided if possible - reason in that in some cases Nguni Kraals have graves inside.

Project component/s	Construction phase of the project
Potential Impact	In case the kraals is not avoided the following impacts are predicted: destruction of the kraals and loss of a heritage/historic resource.
Project component/s	Operational phase of the project
Potential Impact	In case the kraals are not avoided the following impacts are predicted: destruction of the kraals and loss of a heritage/historic resource.

Activity/risk source	Exclusion of the above objectives from the overall BAR		
Mitigation: Target/Objective	The kraal should be avoided		
Mitigation: Action/control		Responsibility	Timeframe
To ensure that the above mitigation objective are met. There should be monitoring of the site at all times during the construction phase of the project and during servitude maintenance.		ECO	During the excavation phase of the project
Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the EMP against their actual implementation.		
Monitoring	The ECO should ensure that construction activities and machinery avoid the site by all means. He/she should do physical monitoring of the site.		

Figure 10 -Stone walling of the kraal found west of Loskop Quarry. Note the 2 big stone blocks/slabs that look to have been used to mark the kraal entrance point.

6. DISCUSSION

The physical survey of the Loskop Quarry yielded 2 features that consists of a kraal (Loskop-2) and a water reservoir (Loskop 1). The kraal is the only feature that has some heritage significance based on its probable age (Figure 10). The reservoir is recent in age (Figure 9). Based on the type of the identified features the following NHRA, No. 25 of 1999 sections are applicable:

- Section 34 for the built environment and landscape features
- Section 35 for the stone kraal

In accordance to the KZNHB, 21 February 2008 - the management of structures which in the report are referred as built environment and landscape feature will fall under Chapter 8 and Section 39 (1). These are managed under Section 26 (1) of the KZNHA, No. 10 of 1997. The management of the stone kraal which is typically associated with archaeological resources will in this case will be managed in accordance to Chapter 8 and Section 42 of the KZNHB. It is managed in terms of Section 26 (6) in accordance to the KZNHA, No. 10 of 1997. Chapter 9 of the KZNHB also assist to give guidance on the processes followed in managing the heritage resources in terms of General Protection.

The yielded heritage resource (stone kraal) was assessed and evaluated in terms of the above heritage legislations and bill and their impact significance as well heritage significance conducted in accordance to impact evaluation methods given in the methodology chapter of this report. As a result of the above mentioned integrated processes: the site was assessed and evaluated and given a low heritage significance status.

7. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, this Phase 1 HIA has covered all aspects that should be covered by a Phase 1 HIA. This included a desktop survey and physical survey of the Loskop Quarry and its surrounding to locate and identify archaeological and heritage resources in the landscape. This process was followed by consolidation of data and completion of this report. Following all these important steps in an integrated manner – a total of 2 features were identified immediately outside the Loskop Quarry and they include Loskop-1 and Loskop-2 (Figure 11).

Out of the 2 features identified, only 1 is considered a historic site with heritage value - Loskop-2. However the site fall outside the Loskop Quarry mining area.

Based on the above integrated processes inclusive of literature review, surveys, assessment of sites significance and impacts evaluation and calculations - it is the author's view that Amafa should grant the applicant a Positive Review Comment. Because there were no Stone Age, Iron Age, Rock Art and some historic period archaeological resource found within the mining area of the Loskop Quarry with exception to the historic stone kraal. But, because of the nature of some archaeological resources which are often found buried underneath the earth surface. It is recommended that the developer and the appointed ECO should pay special attention to these resources during the excavation activities associated the project. In the case that such resources are unearthed and brought to the surface of the earth by the project excavation activities including ground clearance for roads leading to Loskop Quarry mining area - excavation activities the area in which resources are found need to stop, the ECO and the environment consultant should consult an archaeologist and heritage consultant to immediately come to the site to inspect and investigate the finds and make necessary recommendations. Amafa aKwaZulu-Natali should also be informed of such finds.

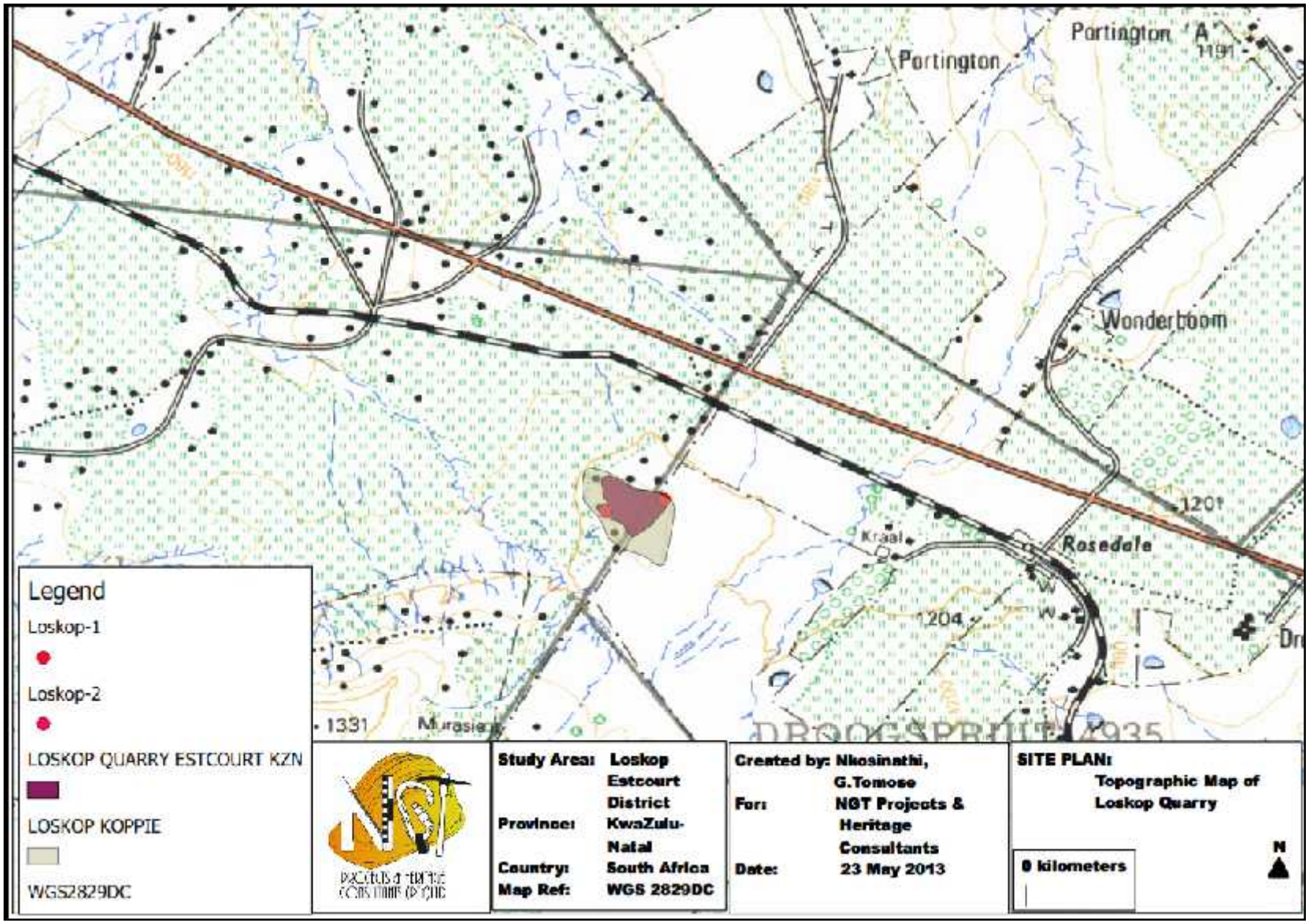

Figure 11- Distribution of heritage sites in and around Charlestown PDAFP (areas marked with brown ink) – green dots

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9. APPENDIX 1

A PALAEONTOLOGICAL IMPACT ASSESSMENT: DESKTOP STUDY PROPOSED LOSKOP QUARRY RE-MINING, UMTSHEZI LOCAL MUNICIPALITY, THUKELA DISTRICT, KWAZULU-NATAL, SOUTH AFRICA.

VERSION: 01

28 MAY 2013

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ACKNOWLEDGEMENT OF RECEIPT

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DECLARATION OF INDEPENDENCE

This report has been compiled by Nonhlenhla Vilakazi, M.S.c (PHD Candidate Palaeontology), Institute for Human Evolution, University of the Witwatersrand, Private Bag 3, Wits 2050, Johannesburg, South Africa working as the leading paleontologist for NGT Project & Heritage Consultants on sub-contraction basis. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the project.

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1. INTRODUCTION:

ENPROCON cc is proposing to re-mind the Loskop Quarry for future roads construction purposes. Loskop in KwaZulu-Natal is close to the industrial town of Estcourt (20 km by railway and road). Simultaneously it is functionally linked to the rural municipality of Bergville (25 km away by railway and road), and the medium sized city of Ladysmith (30 km by road) (Gastaldo, et.al, 2005).

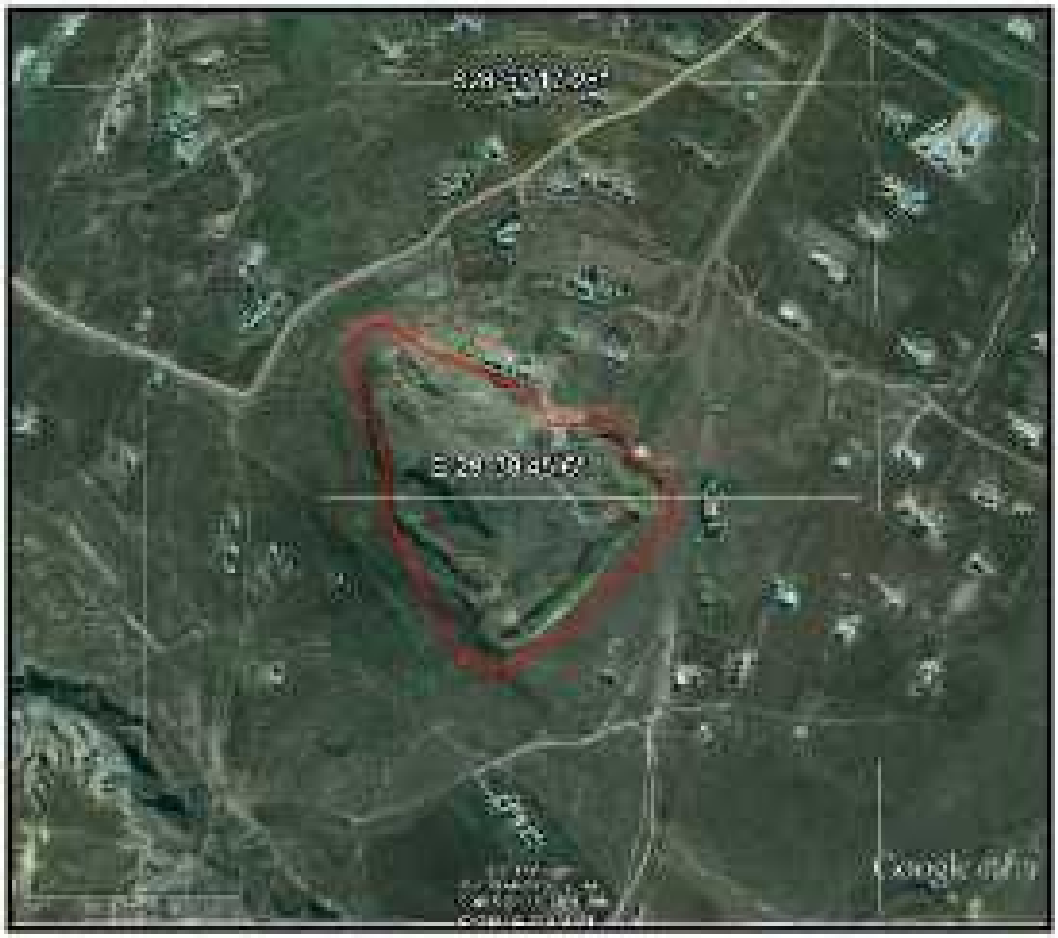

Figure 1-Extract showing Loskop Quarry, KwaZulu-Natal with GPS Co-ordinates (Google Earth).

2. GEOLOGICAL CONTEXT:

The Karoo Basin in the southwestern Gondwana consists of the Cape Fold Belt, a mountain chain consisting of folded and thrust-faulted rock, formed approximately 1300 km north of the collisional margin (Smith, 1995). Within the Karoo Supergroup, the Beaufort Group represents fluviatile deposition spanning the Late Permian to Middle Triassic, and this group shows the most extensive aerial outcrop distribution (Prevec, *et.al*, 2009). The exposures are assigned to the Normandien Formation, previously known as the Estcourt Formation (South African Committee for Stratigraphy, 1980; Smith, 1995). According to work by Botha and Lindstrom (1978), Normandien Formation stratigraphically and sedimentologically separates the open shelf to lacustrine deposits of the Volksrust Formation (Ecca Group) from the fluviatile sandstones of the Triassic Katberg Formation (Beaufort Group). The Loskop Quarry is located in a region whose geological formation can be defined as the Karoo Supergroup (*Figure 2*) and Ecca Group (*Figure 3*). The upper and lower boundaries of the Normandien Formation are poorly defined and the unit incorporates widely differing rock types and depositional environments in different parts of the basin (Prevec, *et. al*, 2009). As a result, the Normandien Formation shows characteristics of both Ecca and Beaufort Groups. The Beaufort Group is defines regions located to the west of the study area (*Figure 3*)

The Normandien Formation consists of grain size trends grading from medium and fine grained channel cross-stratified sandstones, at the base, to shale and claystone at the top, together with a contemporary change in observed sedimentological structures, indicating and upward decrease in flow energy (Prevec, *et.al*, 2009). Figures 5 and 6 are examples sediments geological features and show stratigraphic layering or formation of the Loskop Quarry.

The overall thickness of the channel fill and the trough cross-stratification of the lowermost sandstone bedsets indicate deposition in deep, fluvial channels, with the lower sandstones probably representing channel sandbars - refer to Figure 4 for a diagram showing stratigraphic order of localities plotted against the depositional environment (Prevec, et.al, 2009).

Figure 2 - Karoo Supergroup

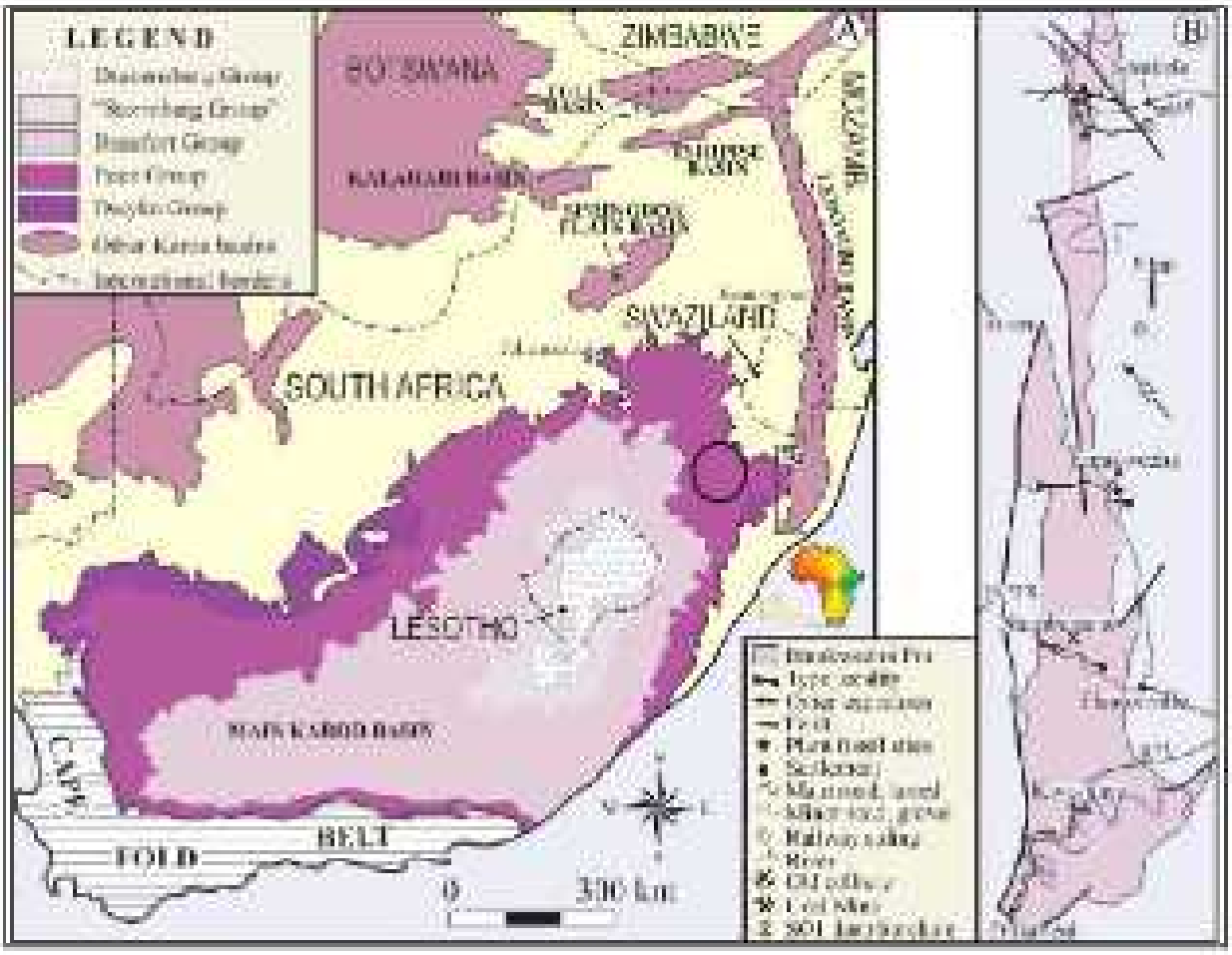

Figure 3- Location of the study area within Ecca Group

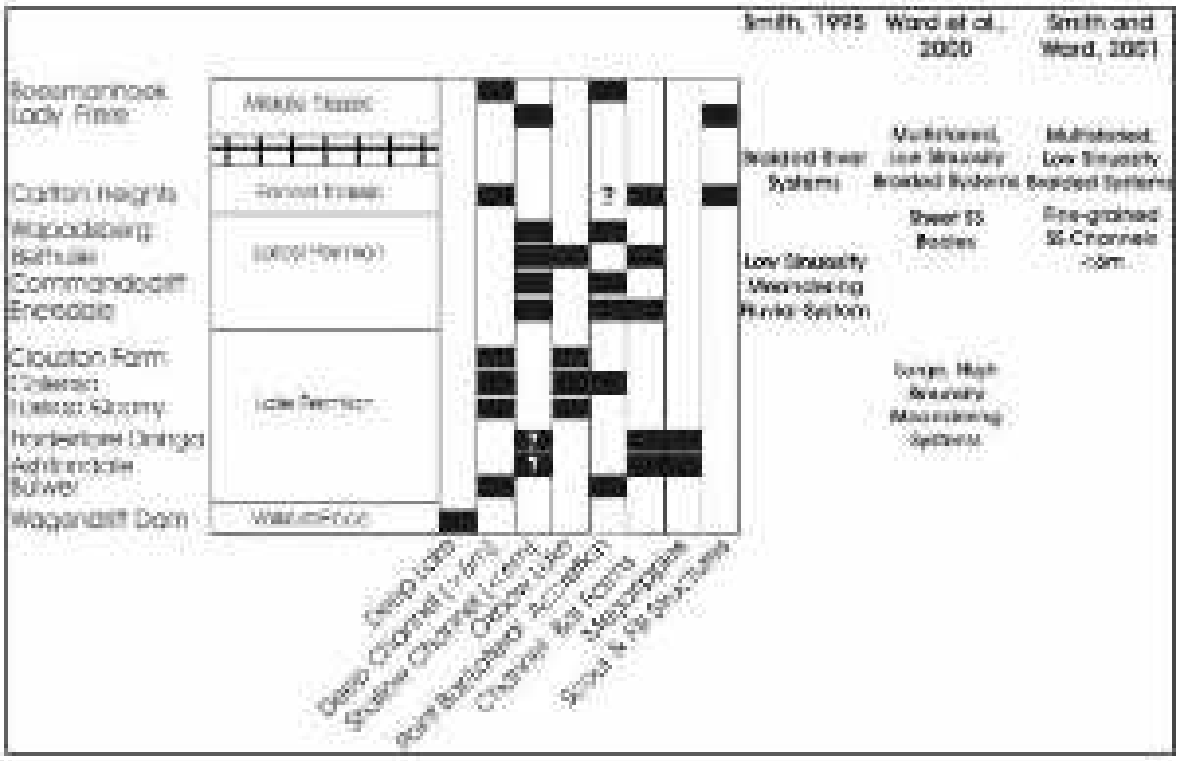

Figure 4 – Diagram showing stratigraphic order of localities plotted against the depositional environment. The generalized change in fluvial style from the Permian to Triassic within the Karoo Basin provided here is based on Smith (1995), Ward et. al. (2000), and Smith and Ward (2001). Note the Loskop Quarry within the late Permian period. Also note the surrounding areas such as Colenso, Clouston Farm, Tradestove Donga etc.

Figure 3- Photo of the sediments showing geological features of Loskop Quarry.

Figure 8- Sediments of the quarry shown in detail.

3. PALAEONTOLOGICAL CONTEXT:

Based on the evidence provided by Smith (1995), Ward (*et. al.* 2000), and Smith and Ward (2001) - the Loskop Quarry is known to only contain plant fossils and some of them are suggested to be unique (see also e.g. Ward *et. al.* 2000; Prevec *et.al.* 2009). The macroflora of the quarry appears to be of the late Permian of South Africa as seen from other localities under the Upper Normandien Formation of the Main Karoo Basin in the Western KwaZulu-Natal area (Prevec, *et.al*, 2009). These assemblages are mostly dominated by the glossopterid leaf types (*Figure 7*) (Prevec, *et.al*, 2009). Other fossil plants that have been found in the quarry so far are the *Sphenopteris alata (Figure 8)*, *Eretmonia natalensis*, *Lidpettonia africana*, and some Samaropsoid seeds (Prevec, *et.al*, 2009) also see (Anderson & Anderson, 1983). . The glossopterid leaf types found were classified using some of the criteria adopted by McLoughlin (1994a), and the midrib of *Glossopteris* was not considered here to be a true midvein, but rather a medio-longitudinal concentration of veins that may be emphasized by the presence of supportive tissues (Prevec, *et.al*, 2009).

Figure 7- Pictures showing examples of glossopterid leaf types. These are some of the plants discovered in the area.

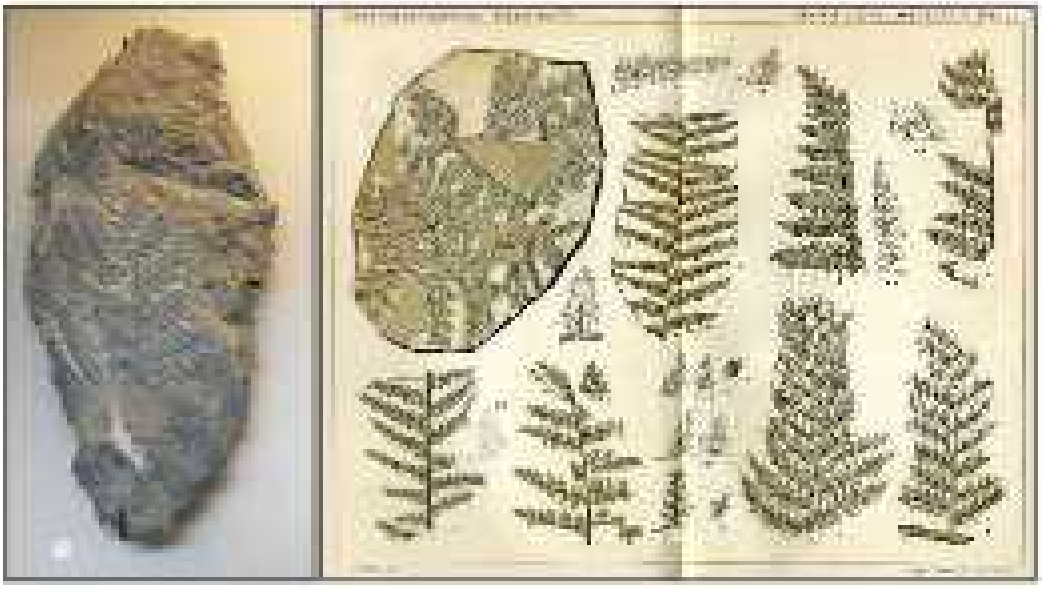

Figure 8 - Example of Sphenopteris alata

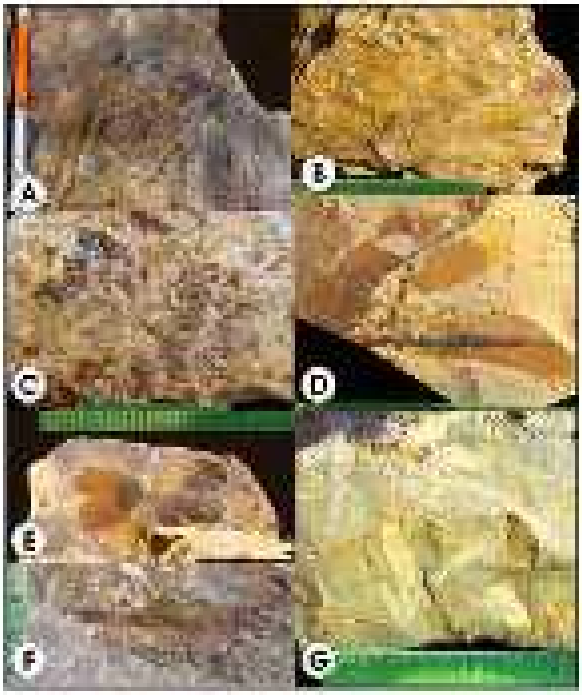

Figure 9- Example of Lidgettonia africana

4. CONCLUSION AND RECOMMENDATIONS:

Based on existing palaeontological database of the Loskop Quarry - the quarry is known to only contain plant fossils - other fossils such as insect fossils have been found not far from the quarry (e.g. Prevec et.al, 2009). The Late Permian doesn't contain many fossils and the *Lystrasaurus* remains have been recovered from a site about 3.5 km east and approximately 80m above the Loskop site (Gastaldo, et.al, 2005). It is, therefore, unlikely that the excavations during the construction phase of the project (re-mining of the quarry) will yield abundance of previously unknown or undiscovered fossils.

Therefore, the proposed re-mining of the Loskop Quarry site has a small footprint, and the sensitivity of these sedimentary rocks ranges from medium to low.

The above mentioned reasons, therefore, suggest that no further palaeontological studies are recommended for this development. Should substantial fossil remains be exposed during construction however, proper procedures should be followed. These included safeguarding the fossils preferable in situ and alerting SAHRA as soon as possible so that appropriate action (e.g. recording, sampling, and collection) can be taken by a qualified palaeontologist.

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