



**HERITAGE IMPACT ASSESSMENT FOR
THE PROPOSED BOKONI KLIPFONTEIN
OPENCAST MINE PROJECT,
KLIPFONTEIN 465 KS, SEKHUKHUNE,
LIMPOPO PROVINCE**

BOKONI PLATINUM MINE (PTY) LTD

19 JUNE 2013

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This document has been prepared by **Digby Wells Environmental**.

Report Title: Heritage Impact Assessment for the proposed Bokoni Klipfontein Opencast Mine Project, Klipfontein 465 KS, Sekhukhune, Limpopo Province

Report Type: Heritage Impact Assessment to Section 38(8) NHRA

Report Phase: MPRDA EMP Phase

Project Number: BOK 1630

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EXECUTIVE SUMMARY

Digby Wells Environmental (Digby Wells) has been appointed by Bokoni Platinum Mine (Pty) Limited (Bokoni) to conduct a Section 102 Amendment to the Environmental Management Plan (EMP) for the proposed Bokoni Klipfontein Opencast Mine Project in accordance with the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

Bokoni intends on operating an opencast mine on the farm Klipfontein 465 KS. The proposed Klipfontein project also entails the extension of the haul road. It is anticipated that Phase 1 opencast mining will be conducted over 18 months. This Heritage Impact Assessment (HIA) will form part of the associated studies undertaken for the Section 102 Amendment to the EMP. The HIA was only conducted for opencast mining. A Watching Brief was conducted for the haul road in July 2012 and no further heritage work is required for the haul road.

Nine archaeological sites, two burial sites comprising two single graves and one burial ground consisting of approximately 19 graves were identified and recorded in the proposed opencast mine area. The archaeological and historical sites are of negligible heritage value and impacts on these heritage resources were not assessed in this HIA report. These sites were recorded and can be destroyed. Grave relocation is recommended for the two single graves and for the burial ground.

Fossils are not found in igneous rock and because the Klipfontein Project Area is underlain by igneous rocks of the Bushveld Complex and mafic and chromitite rocks of the Rustenburg Suite, it is reasonable to suggest that there is a negligible probability of terrestrial fossil bones being turned up in excavations into *in situ* deposits.

A Letter of Exemption for the Palaeontological Impact Assessment is therefore requested. The Fossil Find Procedures should however be implemented during the course of the proposed Klipfontein Project in the event of possible fossil finds. See Appendix F for the Fossil Find Procedure and for a Fossil Monitoring programme.

GLOSSARY OF ABBREVIATIONS AND TERMS

ASAPA	Association of the Southern African Professional Archaeologists
BA	Bachelor of Arts
BEE	Black Economic Empowerment
BMS	Berlin Missionary Society
BSc	Bachelor of Science
CE	Common Era
DMR	Department of Mineral Resources
EAP	Environmental Authorisation Policy
EHS	Environmental Health and Safety
EMP	Environmental Management Plan
EP	Equator Principles
EPFI	Equator Principles Financial Institutions
ESA	Early Stone Age
FM-SDF	Fetakgomo Municipality Spatial Development Framework
HIA	Heritage Impact Assessment
HRA	Heritage Resources Authority
HRM	Heritage Resources Management
I&APs	Interested and Affected Parties
IFC	International Finance Corporation
Ka	Thousand years ago
LSA	Later Stone Age
MJS	Major Jackson Series
ML	Mining Licenses
MPRDA	Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002)
MSA	Middle Stone Age

MSc	Master of Science
Mya	Million years ago
NAARIS	National Automated Archival Information Retrieval System
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
OECD	Organisation of Economic Co-operation and Development
OES	Ostrich eggshell
OP	Operational Policies
PGM	Platinum Group Metals
PHRA	Provincial Heritage Resources Authority
SAHRA	South African Heritage Resources Authority
SAHRIS	South African Heritage Resources Information Systems
SAPS	South African Police Service
SEP	Stakeholder Engagement Plan
SIA	Social Impact Assessment
SoW	Scope of Work
WITS	University of the Witwatersrand
ZAR	Zuid-Afrikaansche Republiek

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1 INTRODUCTION

Digby Wells Environmental (Digby Wells) was appointed by Bokoni Platinum Mine (Pty) Limited (Bokoni) to complete a Heritage Impact Assessment (HIA) as one of several specialist studies required in terms of a Section 102 Amendment to the Bokoni Klipfontein Opencast Mine (Klipfontein Project) Environmental Management Plan (EMP). The Amendment is being completed in accordance with the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA).

Bokoni is a subsidiary of Anoroaq Resources Corporation (Anoroaq), a black economic empowerment (BEE) Platinum Group Metals (PGM) producing and Exploration Company. The Klipfontein Project is situated in the Bushveld Complex, to the north of and adjacent to the Ga-Phasha Project on the farm Klipfontein 465 KS.

2 PROJECT DESCRIPTION

Bokoni is in possession of two Mining Licenses (ML 6-2003 and ML 23-2003) that are underlain by the contiguous Merensky and UG2 Reefs. These Mining Licences were consolidated into a new EMP report submitted to the Department of Mineral Resources (DMR) in September 2012.

Bokoni intends on operating an opencast mine on the farm Klipfontein 465 KS. The proposed Klipfontein project also entails the extension of the haul road. It is anticipated that Phase 1 opencast mining will be conducted over 18 months. This Heritage Impact Assessment (HIA) will form part of the associated studies undertaken for the Section 102 Amendment to the EMP.

The HIA report was completed only considering opencast mining in the Klipfontein Project Area. The HIA was also informed by a Watching Brief that was completed in July 2012 for the haul road in July 2012 and as a result, no further heritage work is required for the haul road. Operation of the opencast mine is estimated to continue over a period of four to six years and result in an open pit of approximately 4 km long and 300 m wide. Workshops, offices, diesel bays and overburden dumps will be constructed during the operational life of the Klipfontein Project.

3 BACKGROUND INFORMATION OF PROJECT

3.1 Report Type: NHRA Section 38(8) Heritage Impact Assessment

The HIA was completed in terms of Section 38(8) of the NHRA and forms part of a Section 102 Amendment to the EMP in accordance with the MPRDA.

3.2 Context of Development

3.2.1 Type of development

The proposed Klipfontein Project will primarily constitute opencast mining to exploit PGM ore bodies. In addition to opencast mining, development will further include supporting infrastructure such as haul roads, box cuts and discard dumps.

3.2.2 Rezoning and/or land subdivision

The area is currently zoned for mining and no further rezoning and/or land subdivision will be required.

3.2.3 Development context of study area

The Fetakgomo Municipality Spatial Development Framework (FM-SDF) was reviewed to gain a more detailed understanding of the development context within which the Klipfontein Project is situated. With regards to heritage, such an understanding is important in order to identify and assess possible direct, indirect and cumulative impacts on the cultural landscape and identified heritage resources.

The FM-SDF represented a five-year plan to guide development within the municipality. The FM-SDF included the designation of 'nodal points' or areas within the municipality that are central to development and socio-economic growth. The FM-SDF also identified 'non-development' or restricted zones within each node.

The Klipfontein Project is located within the Atok nodal cluster. The FM-SDF stipulated that a 600 m 'no' development restriction zone should be introduced and implemented due to current and future mining activities. The FM-SDF also stipulated that a three year development restriction zone needs to be enforced on the farms Pasha's Kraal, Moeijelijk, Waterkop and Zwartkoppies around the Bokoni Klipfontein Opencast Mine area due to advanced prospecting activity.

Future exploitation of mineral resources was clearly identified as a focus area in the FM-SDF. Certain heritage resources will, therefore, be more at risk due to increased and more extensive mining activities. Sources of risk that should be considered include destruction or damage to archaeological and historical sites and features, loss of access or use of sacred sites, including burial grounds.

3.2.4 Client, Consultant and Land Owner Contact Details

Relevant contact details of the client, consultant and land owners are listed in Table 3-1, Table 3-2 and Table 3-3 respectively.

Table 3-1: Client contact details

ITEM	COMPANY CONTACT DETAILS
Company	Bokoni Platinum (Pty) Ltd
Contact person	Douglas Schult
Tel no	015 620 0018
Fax no	083 300 4823
E-mail address	douglas@atatsa.com
Postal address	PO Box 62179, Marshall Town

Table 3-2: Consultant contact details

ITEM	COMPANY CONTACT DETAILS
Company	Digby Wells Environmental
Contact person	Grant Beringer
Tel no	011 789 9495
Fax no	011 789 9498
E-mail address	grant.beringer@digbywells.com
Postal address	Private Bag X10046, Randburg, 2125, South Arica

Table 3-3: Land owner contact details

ITEM	CONTACT DETAILS
Contact person	Nicolas Avhashoni (Limpopo Department of Rural Development and Land Reform, Republic of South Africa)
Tel no	015 297 3539
Fax no	015 297 4988
E-mail address	anmagada@ruraldevelopment.gov.za

4 TERMS OF REFERENCE

4.1 Client Term of Reference

Bokoni has requested Digby Wells to undertake a Section 102 Amendment to the EMP in accordance with the MPRDA.

4.2 Heritage Resources Authority (HRA) Terms of Reference

4.3 Scope of Work

The Scope of Work (SoW) for the HIA was informed by the ToR received from Bokoni for the proposed Klipfontein Project. The SoW that was completed thus comprised:

- Updating data collected and presented in the Heritage Statement;
- Field survey;
- Evaluation of identified heritage resources;
- Assessment of impacts on heritage resources;

4.4 Aims and Objectives

The following aims and objectives formed part of this HIA:

- Identifying, recording and documenting cultural heritage resources within the proposed Project Area;
- Evaluate the significance of the cultural landscape and identified heritage resources;
- Identify potential positive and negative impacts on heritage resources that may result of proposed Project activities;
- Assess the intensity of identified impacts on heritage resources during construction, operation and decommissioning phases;
- Recommend Project-related mitigation and management measures to avoid or ameliorate any negative impacts on structures, objects or sites of cultural significance;
- Recommend appropriate mitigation of heritage resources where impacts cannot be sufficiently reduced or avoided through Project-related mitigation ; and
- Promote the overall conservation and protection of natural and cultural resources in the proposed Project Area and its surroundings.

4.5 Legislative Requirements

The HIA is governed by national legislation and minimum standards as well as international best practice summarised below.

4.5.1 Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA)

Section 102 of the MPRDA refers to the amendment of rights, permits, programmes, and plans. The MPRDA stipulates under Section 5(4) no person may prospect for or remove, mine, conduct technical co-operation operations, reconnaissance operations, explore for and produce any mineral or petroleum or commence with any work incidental thereto on any area without (a) an approved environmental management programme or approved environmental management plan, as the case may be.

4.5.2 National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA)

4.5.2.1 Section 35 – Archaeological and palaeontological resources and meteorites

Construction and operation activities associated with the Klipfontein Project – in the immediate receiving environment – are likely to impact on archaeological resources.

Section 35 of the NHRA provides for the general protection of archaeological and palaeontological resources, and meteorites. In the event that archaeological resources are discovered during the course of development, Section 38(3) specifically requires that the discovery must immediately be reported to the PHRA, or local authority or museum who must notify the PHRA. Furthermore, no person may without permits issued by the South African Heritage Resources Agency (SAHRA) destroy, excavate, or make any alterations to archaeological or palaeontological resources encapsulated in Section 38(4).

4.5.2.2 Section 36 – Burial grounds and graves

Construction and operation activities associated with the Klipfontein Project – in the immediate receiving environment – are likely to impact on burial grounds and graves.

Section 36 of the NHRA allows for the general protection of burial grounds and graves. Should burial grounds or graves be found during the course of development, Section 36(6) stipulates that such activities must immediately cease and the discovery reported to the responsible heritage resources authority and the South African Police Service (SAPS). Furthermore, as specified in Section 38(3) no person may destroy, damage, exhume or alter any burial site without a permit issued by SAHRA.

4.5.2.3 Section 38 – Heritage Resources Management (HRM)

Section 38(8): The provisions of this section do not apply to a development as described in Section 38(1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or any other legislation. Section 38(8) ensures cooperative governance between all responsible authorities through ensuring that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of Subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.

4.6 Expertise of Specialists

Shahzaadee Karodia has completed a Bachelor of Arts (BA) degree in archaeology and anthropology, a Bachelor of Science (BSc) Honours degree in palaeontology, and a Master of Science (MSc) degree in archaeology. She currently holds the position of Archaeology Consultant at Digby Wells.

Natasha Higgitt has completed a BA Honours degree in archaeology at the University of Pretoria. She currently holds the position of Archaeology Consultant at Digby Wells.

Johan Nel has completed a BA degree in archaeology and anthropology and a BA Honours degree in archaeology at the University of Pretoria. Johan holds the position of Unit Manager for HRM in the Social Science Department at Digby Wells. Refer to Appendix A for the curriculum vitae of specialists.

5 METHODOLOGY

This HIA comprised a desktop study - including literature reviews, aerial and historical map surveys and a review of relevant impact assessment reports. A heritage site visit was undertaken for the identification and documentation of potential heritage resources, as stipulated in the NHRA and the SAHRA Minimum Standards (2006). The methodology employed both qualitative and quantitative data collection. Qualitative data collection was based on desktop research. Quantitative data was collected during field work.

5.1 Qualitative data collection

Data acquisition was aimed at information gathering relating to known heritage resources within and surrounding the proposed area for development. Project information and data was obtained through intensive research and data gathering, including a variety of primary and secondary sources such as academic journals, textbooks and records, national and provincial websites, archaeological field guides, national guidelines, maps, photographs and plans. Surveys of historical aerial photographs, historical maps, topographical maps and satellite imagery were undertaken to plot potential sites. Some older maps such as the Major Jackson Series (MJS) maps of the early 20th century were also consulted and

integrated into the HIA where applicable. These are invaluable resources as they often include features and information not recorded on later maps.

5.2 Quantitative data collection

A field-based reconnaissance survey of the opencast footprint areas of the Klipfontein Project was completed by Digby Wells' heritage specialists from 8 to 11 April 2013. A Watching Brief was conducted for the haul road in July 2012 so no further fieldwork is required for this area.

The reconnaissance survey used a judgemental survey strategy focussing on landscape and visible cultural features where the likelihood of heritage resources was considered highest. The survey aimed to identify, record, and document potential heritage resources within the Klipfontein Project Area and its immediate surrounds. General site conditions and features were recorded by means of photographs, GPS location, and description. A pedestrian survey was done to identify and record any sites found *in situ*.

5.2.1 Site naming

Sites identified during the survey were named using the Digby Wells Project number, followed by the map sheet number and the relevant NHRA section suffixed with the site number: **BOK1630/2429BD/S.35-001**

The archaeological sites were numbered according to Digby Wells's standard format: i.e. 001. However, many of the burials that were surveyed and numbered by Bokoni have retained their original site numbers in this report.

This number is abbreviated in tables and/or on plans or maps using the NHRA reference number suffixed with the site number: **S.35-001**.

5.3 Stakeholder Engagement

Stakeholder Engagement is an essential and legislative requirement for environmental authorisation in a number of the major Acts applicable to this proposed Project. The principles that demand communication with society at large are embodied in the principles of the MPRDA. The objectives of stakeholder engagement are to ensure that all stakeholders and interested and affected parties (I&APs) are given accurate and timeous Project information, and are given an opportunity to raise comments and concerns. In terms of the Bokoni Klipfontein Project, no consultation has taken place as part of the amendment. However, the heritage work was party to internal consultation that the mine undertook.

5.4 Assessment

The assessment of heritage resources includes two distinct but complimentary stages: evaluation of a heritage resource's significance or value and assessment of impacts on the resource. A brief description of the assessment methodology will be presented here. See Appendix B for a full description of the assessment methodology.

5.4.1 Evaluation of Significance/Value

The significance of heritage resources was evaluated in terms of five dimensions - aesthetic, scientific, historic and/or social value – and integrity. Each dimension included certain relevant assessment criteria defined in Section 3 of the NHRA and summarised in Table 5-1. The resource was further evaluated in terms of relevant dimensions, for example burial grounds without any recorded historical significance would only be evaluated on a social level. The significance of a heritage resource in terms of its importance relative to a particular dimension was informed by accessing various credible information sources such as peer reviewed articles that contribute to establishing its authenticity.

A heritage resource's value is a direct indication of its sensitivity to change (impacts) and must, therefore, be determined before any assessment of impacts can be completed.

Table 5-1: Criteria defined in the NHRA Section 3 that are used to determine value and significance of heritage resources, NHRA Section 3

NHRA reference	Description of defining criteria
3(1)(a)	its importance in the community, or pattern of South Africa's history;
3(1)(b)	its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;
3(1)(c)	its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
3(1)(d)	its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
3(1)(e)	its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
3(1)(f)	its importance in demonstrating a high degree of creative or technical achievement at a particular period;
3(1)(g)	its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
3(1)(h)	its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and
3(1)(i)	sites of significance relating to the history of slavery in South Africa.

5.4.2 Impact assessment

Potential impacts on the heritage resources were assessed in terms of Digby Wells' standard impact assessment methodology that has been adapted to consider the value of a resource. The impact rating takes into account the special scale, the expected duration, the severity, the consequence, and the probability of the impact as well as the value of the heritage resource. The impact rating is then applied to pre-mitigation and post-mitigation scenarios with the intention of removing all impacts on heritage resources.

As stated above, the value of a resource determines its sensitivity to change. As a result, low ranked impacts on highly valued heritage resources may result in high intensity changes to the resource. Conversely, high ranked impacts – such as destruction – on a resource of low or negligible value will result in low intensity change.

In addition, significance values assigned to heritage resources by the specialist (field ratings) places heritage resources in certain grades or levels of protection as defined in Section 7 of the NRHA. Field ratings or the proposed grading of heritage resources are required by SAHRA in terms of Section 7(1) of the NHRA and summarised in Table 5-2. Field ratings prescribe management and mitigation measures consistent with Section 3(3) of the NHRA. Consequently, field ratings and grades must be considered when management and mitigation measures are recommended subsequent to assessing impacts. As a result, a distinction is made between *Project-related mitigation* and *mitigation of heritage resources*.

Project-related mitigation should ultimately aim to avoid any negative impacts on heritage resources, commensurate with the value and grading of a resource. Where impacts are not sufficiently mitigated through Project-related actions, for example redesign of proposed infrastructure to avoid impacts, mitigation of the affected resources may be required.

Table 5-2: Field ratings

FR/Grade	Significance	Mitigation recommendation
<i>National and Provincial Protection, NHRA 7(1)(a, b)</i>		
I	National SAHRA responsibility High significance	Heritage resource conserved/preserved; No mitigation as part of development recommended
II	Provincial SAHRA responsibility High significance	Heritage resource conserved/preserved; No mitigation as part of development recommended
<i>Local Protection, NHRA 7(1)(c)</i>		
IIIA	Local PHRA responsibility High significance	Retained as heritage register site; Mitigation as part of development not advised
IIIB	Local PRHA responsibility High significance	Could be mitigated and part retained as heritage register site
<i>General Protection, NHRA 7(1)(c)</i>		
IV A	Local PRHA responsibility Medium significance	Heritage resource should be mitigated before destruction
IV B	Local PRHA responsibility Low significance	Heritage resource should be recorded before destruction
IV C	Local PRHA responsibility Negligible significance	Heritage resource has been sufficiently recorded and thus requires no further action

5.5 Stakeholder Engagement Plan

The Stakeholder Engagement Plan (SEP) that will be conducted for the Project will follow a consultative and inclusive approach. This will be achieved by encouraging active engagement from stakeholders so that suggestions and comments can be incorporated into the Project design and that concerns and conflicts can be openly addressed in an on-going manner. Through the SEP, adequate and timely information will be provided to all I&APs to ensure they are given sufficient opportunity to voice their opinions, concerns and issues. The SEP will provide a platform for issues and comments to be raised that will add value to the EMP process, thereby influencing the decision-making process. The following tasks will be undertaken:

- Stakeholder identification;
- Development of appropriate documentation;
- Stakeholder notification (through the dissemination of information and meeting invitations);
- One-on-one meetings undertaken with relevant local authorities, directly affected and surrounding landowners, farm occupiers and land claimants;
- The compilation of a Draft Scoping Report in terms of MPRDA process; and
- The compilation of a Draft EMP Report.

A list of registered stakeholders is provided in Appendix C.

6 STATE OF RECEIVING ENVIRONMENTAL / CULTURAL LANDSCAPE

This Section will describe the receiving environment of the Study and Project Areas. The Study Area was considered to include the cultural landscape in an approximately 100 km radius of the Project Area within the borders of South Africa. The Project Area is defined as the boundaries supplied by Bokoni for the proposed development. The Study Area allowed inferences to be made of potential sites that could exist within the Project Area based on certain sources of information such as previously completed relevant heritage studies.

6.1 Description of current environment

The Project Area is located within the B52J quaternary catchment area that includes two major surface water systems namely the Monametsi River and the Rapholo River. Both rivers are non-perennial and only inundated during periods of high rainfall resulting in occasionally flooding. Due to extensive subsistence agriculture and overgrazing sparse surface vegetation occurs that further contributed to erosion. Extensive erosion further contributed to undefined river tributaries and the creation of many smaller tributaries. Flooding in conjunction with overgrazing and poor soil management has resulted in considerable erosion of river banks and channel widening illustrated in Figure 6-1.



Figure 6-1: Example of extent of erosion and sparse ground cover on river banks.

Poor soil management was further identified in areas where dense, thorny scrub vegetation occurred – predominantly species of *Acacia* and *Dichrostachys cinerea*. These areas, illustrated in Figure 6-4, may be associated with fallow agricultural fields and grazing areas seen in Figure 6-3. The tilling and continuous use of field such as the example in Figure 6-3 may also have damaged and/or destroyed many surface and subsurface heritage resources that may have occurred in these areas.



Figure 6-2: Example of dense vegetation in an abandoned field.



Figure 6-3: An example of a fallow field. Note encroaching thorny vegetation.



Figure 6-4: An example of a contemporary field typical of the landscape.

In addition to field and grazing areas, other changes in the natural landscape included graded dirt tracks (Figure 6-5) and calcrete quarries (Figure 6-6). Such impacts increased erosion and damage to any potential heritage resources.



Figure 6-5: An example of a dirt track in the Project Area. Note the potential for erosion in the foreground.



Figure 6-6: An example of a calcrete quarry that would have destroyed any heritage resources that may have been present.

Table 6-1: Location Data

Province	Limpopo Province
Municipality	Sekhukhune District Municipality
Property Name and Number	Klipfontein 465 KS
1: 50 000 Map Sheet	2425 BD Ga-Mankopane
GPS Co-ordinates (relative centre point of study area)	South: 24°21'02.82"
	East: 29°57'01.23"

6.1.1 Location maps

The regional settings of the Klipfontein Project are depicted in Plan 1, Plan 2, and Plan 3 in Appendix D. The geological setting is presented in

6.1.2 Site maps

The GPS track log is depicted in Plan 4. The position of sites in the Study Area is presented in Plan 5 while the position of sites in the Project Area is illustrated in Plan 6. All plans are located in Appendix D.

6.2 Literature Review

6.2.1 Geological Setting and Palaeontological Potential

The Klipfontein Project is situated within the north eastern limb of the Bushveld Complex and includes the current Lebowa Platinum Mines (Plan 7). The Merensky Reef has for many years been mined at Bokoni (then known as Atok) and more recently the UG2 in the Middlepunt Hill section. The entire Klipfontein Project Area is underlain by mafic and ultramafic rock successions of the Upper Critical Zone and overlying Main Zone of the Bushveld Complex.

The Upper Critical Zone and the overlying Main Zone comprise rocks of the Dwars River Sub-suite and the Dsjate Sub-suite of the Rustenburg Layered Suite (Bushveld Complex).

The stratigraphy of the Klipfontein Project Area is presented, in order of increasing age, in Table 6-2 below.

Table 6-2: Stratigraphy of the Klipfontein Project Area

Proterozoic	Vaalian	2050 million years ago	<i>Dsjate Sub-suite</i>
			<i>Dwars River Layered Sub-suite</i>
			Rustenburg Layered Suite
			BUSHVELD COMPLEX

Useful overviews of the Bushveld Complex geology in general include Lee (1996) and Eales & Cawthorn (1996). The Bushveld Complex is a large layered igneous intrusion within the Earth's crust which has been tilted and eroded and now outcrops around the edge of the Transvaal Basin (Lee, 1996; Eales & Cawthorn, 1996). The Bushveld Complex contains a large reserve of platinum group metals (PGMs) which includes platinum, iron, chromitite, titanium, and norite to name a few. The eastern lobe of the Bushveld Complex stretches from Mpumalanga to Limpopo.

The Rustenburg Layered Suite of the Bushveld Complex is the largest and oldest mafic layered complex on Earth (Wilson, 2012). This formation can be up to 9 km thick and comprises anorthocites, mafic and ultramafic cumulates. The Rustenburg Layered Suite is associated with acid (largely granite) rocks of the Lebowa Granite and Rashoop Granophyre Suites (Wilson, 2012). These geological formations can be found near the Klipfontein Project Area.

The Dwars River Sub-suite and the Dsjate Sub-suite all contain platinum-group metals. The Dwars River Sub-suite, in particular, is a UG2 chromitite layer within the Rustenburg Layered Suite of the Bushveld Complex (Wilson, 2012).

The bedrock in the area is of the Bushveld Complex and comprises igneous rocks. Igneous rocks do not contain inherent palaeontological potential. Overall, the geological formations found in the Klipfontein Project Area are of no overall palaeontological sensitivity.

6.2.2 Stone Age

South Africa has been inhabited by tool producing hominins for at least two million years. Much of the evidence for the presence of hominin activity is derived from stone tools. These tools are not only indicative of their presence in the landscape, but also attest to the technological developments of our genus. Varying factors, including geology, geomorphology, climate, fauna and flora have resulted in a complex record of social and technological changes through time.

Classification of these tools is done on three levels, namely:

- Form;
- Function; and
- Technique.

Based on the criteria for classification, it is evident that the initial model¹ of Early Stone Age (ESA), Middle Stone Age (MSA) and Later Stone Age (LSA) (*with variants*) developed by Goodwin and Van Riet Lowe (1929) is appropriate. Having stated this, the last formal summary of the southern African Stone Age Sequence prior to Lombard et al. (2012) was conducted in 1984.

The approach adopted by Lombard et al. (2012) is to acknowledge that archaeological assemblages are not exact replicas of one another even though they may overlap economically, chronologically and/or regionally. The classification is based on *technocomplexes*, also known as industrial complexes, defined as assemblages that share a polythetic range (a context or a class of things having many but not all properties in common). Through time, changes in an industry may be expressed as phases, whereas regional variations (spread less widely than a technocomplex but found at several sites) may be expressed as distinct industries in a technocomplex where there is a high level of similarity in design, but not necessarily frequency, of artefact types (Lombard, et al., 2012).

¹ This model has been reassessed and modified through time (Clark, 1959; Clark et al., 1966; Sampson, 1974).

Table 6-3: The South African and Lesotho Stone Age Sequence (after Lombard et al., 2012)

Period	Technocomplex	Also known as (including regional variants)
Later Stone Age <40 ka	ceramic final LSA <2 000 (ka)	Ceramic post-classic Wilton, Late Holocene with pottery (Doornfontein, Swartkop)
	final LSA 0.1 - 4 ka	Post-classic Wilton, Holocene microlithic (Smithfield, Kabeljous, Wilton)
	Wilton 4 ka - 8 ka	Holocene microlithic
	Oakhurst 7 ka - 1 ka	Terminal Pleistocene / early Holocene non-microlithic (Albany, Lockshoek, Kuruman)
	Robberg 12 ka - 18 ka	Late Pleistocene microlithic
	early LSA 18 ka - 40 ka	(informal designation) Late Pleistocene microlithic
Middle Stone Age >20 ka - <300 ka	final MSA 20 ka - 40 ka	(informal designation) MSA IV at Klasies River, MSA 4 generally
	Sibudu 45 ka - 58 ka	late MSA / post-Howieson's Poort or MSA III at Klasies and MSA 3 generally (all informal designations)
	Howieson's Poort 58 ka - 66 ka	
	Still Bay 70 ka - 77 ka	
	pre-Still Bay 72 ka - 96 ka	(informal designation)
	Mossel Bay 77 ka - 105 ka	MSA II at Klasies River, MSA 2b generally (Pietersburg, Orangian)
	Klasies River 105 ka - 130 ka	MSA I at Klasies River, MSA 2a generally (Pietersburg)
early MSA 130 ka - 300 ka	(informal designation)	
Early Stone Age >200 ka	ESA-MSA transition >200 ka - 600 ka	(informal designation) (Fauresmith, Sangoan)
	Acheulean 300 ka - 1.5 million years ago (mya)	
	Oldowan 1.5 mya - 2 mya	

The LSA dates between 20 000 and 40 000 years ago ('ka' – thousand years ago). The economy of the LSA may be associated with hunter-gatherer or herder societies. Within the LSA, stone tool assemblages are often microlithic but in some areas they are dominated by long scrapers and few backed microliths. General characteristics of the LSA include:

- Variability between assemblages;
- A wide range of formal tools such as:
 - Scrapers;
 - Backed artefacts;
 - Hafted stone and bone tools;
 - Borers;
 - Bored stones;
 - Upper and lower grindstones;
 - Grooved stones;
 - Ostrich eggshell (OES) beads;
 - Undecorated and decorated OES fragments;
 - Flask and/or flask fragments;
 - Bone tools;
 - Fishing equipment;
 - Rock art; and
 - Ceramics.

The MSA dates between 20 ka and 300 ka. A key technique characteristic of the MSA is the Levallois or prepared core technique in which triangular flakes with convergent dorsal scars, often with faceted striking platforms, are produced. Discoidal systems and intentional blade production from volumetric cores also occur within the MSA. The general characteristics of the MSA include:

- Formal tools such as:
 - Unifacially and bifacially retouched points;
 - Backed artefacts; and
 - Scrapers and denticulates.
- Evidence of hafted tools;
- Occasionally marine shell beads;
- Bone points;
- Engraved ochre nodules;

- Engraved OES fragments;
- Engraved bone fragments; and
- Grindstones.

The ESA dates between 200 ka and 2 million years ago (mya). General characteristics of the ESA include:

- Simple flakes struck from cobbles, cores and pebble tools;
- Intentionally shaped handaxes, cleavers and picks during the later stages; and
- Large blades in the final or transitional stages.

ESA assemblages have been investigated from the Maleoskop Site near Groblersdal, approximately 100 km south of the Project Area (Esterhuysen, 2007). Other prolific Stone Age sites in Mpumalanga include Bushman Rock Shelter and Heuningneskrans Shelter, located approximately 70 km southeast of the Project Area (Louw, 1969; Plug, 1982; Klein, 1984).

Within the Study Area, previous impact assessment surveys have shown that MSA and LSA stone tools are widely distributed as scatters across the landscape. The results of previous impact assessment reports are discussed in Section 6.5 on Page 25.

6.2.3 Iron Age

The Iron Age has been studied by classifying different ceramic styles into various facies. These facies help track the migration of different groups, as well as the shifting and dynamic identities within these various groups and time periods of the Iron Age (Hall, 1987). The Iron Age is divided into three periods: the Early Iron Age spans from 300 CE to 900 CE (Common Era), the Middle Iron Age spans a period from 900 CE to 300 CE, and the Late Iron Age spans a period from 1300 CE to 1840 CE.

In the Study Area, the Rapholo River, which forms part of the Greater Olifants River, is rich in Early and Middle Iron Age remains. According to Huffman (2007), this region encompasses various cultural groups originating from two distinct migration traditions: the eastern stream known as the Urewe tradition and the western stream known as the Kalunda tradition. Using ceramic facies distributions outlined by Huffman (2007), two different ceramic styles may occur within the Project Area (Table 6-4).

Table 6-4: Possible ceramic facies occurring in the Project Area (Huffman, 2007)

Tradition	Branch/Sub-Branch	Ceramic facies	Period	Key features
Kalundu	Happy Rest	<i>Doornkop</i>	750 CE – 1000 CE (Early Iron Age)	Multiple herringbone bands on the neck
		<i>Eiland</i>	1000 CE – 1300 CE (Middle Iron Age)	Fine herringbone with ladder stamping

Within the Study Area, previous impact assessment surveys have shown that Iron Age sites are a common occurrence across the landscape. The results of previous impact assessment reports are discussed in Section 6.5 on Page 25.

6.2.4 Historical Period

The historic period covers a period from 1840 to 1994. This period comprises important episodes such as:

- Arrival of Europeans in the South African interior (from 1830s onwards);
- The creation of modern states such as the *Zuid-Afrikaansche Republiek* (ZAR) (1840 onwards);
- The Colonial era (including Boer Wars of 1880-1881 and 1899-1902);
- The creation of the Union of South Africa (1910);
- The emergence of the Apartheid system (1948);
- The creation of the Republic of South Africa (1961);
- The ensuing freedom struggle; and
- The period up to the first democratic election (1994).

In the 1830s, the Boers began the Great Trek from the Cape colony to the interior of South Africa. The political landscape from this time was characterised by conflicts and wars. The arrival of the Boers in Mokopane (previously known as Potgietersrus) led to a number of hostile encounters with the local Kekana Ndebele. These hostile encounters ultimately led to the famous Mugombane Siege of 1854 at Historic Cave. The Mugombane siege was followed by, but unrelated to, the Anglo-Pedi war from 1876 to 1879 and the First Anglo-Boer war from 1880 to 1881.

The Project Area is located within the Sekhukhune District Municipality. Sekhukhune was king of the Marota or baPedi. The baPedi people are an offshoot of the baKgatla of the Sotho-Tswana language group who settled near Steelpoort in 1650 CE. For many years, the baPedi were scattered until they were united by Thulare who established his capital at

Manganeng, approximately 15 km northwest of the Project Area. The baPedi prospered during his reign until his death in 1824. Two years after his death, Mzilikazi attacked the baPedi, causing them to flee into caves and the mountains (Kinsey, 1973).

Thulare's oldest son, Sekwati and his followers fled north and settled at Phiring, approximately 60 km north east from the Project Area, and moved to Thaba Mosega in 1853. In 1857, Sekwati came to an agreement with the Boers and declared the Steelpoort River as the boundary to the Pedi Kingdom (Kinsey, 1973). His son, Sekhukhune led the war against the Boers in the so-called First Sekhukhune War. The *Volksraad* declared war upon Sekhukhune on the 16 May 1876 (Anonymous, 2012). President Thomas Francois Burgers of the *Zuid-Afrikaansche Republiek* (ZAR) marched on Thaba Mosega on 1 August 1876 and suffered a humiliating defeat at the hands of Sekhukhune. When the ZAR (old Transvaal) was annexed, the baPedi Kingdom came under British rule. Sekhukhune's opposition led to the Second Sekhukhune War or Anglo-Pedi War. Sekhukhune was defeated and captured during the Anglo-Pedi War but was set free in 1881 by the Boers who regained their independence after the First Anglo-Boer War.

During this time, the missions such as the *Berliner Missionsgesellschaft* or Berlin Missionary Society (BMS) missionaries were also operating in the area.

6.2.5 Social History

At present, the community residing on Klipfontein 465 KS is the Ga-Selepe. The communities currently residing in the surrounding area include the Ga-Phasha, Ga-Mampa and the Bogalatladi. The people in these communities predominantly belong to the baPedi and the baRoka under Kgoši Phaša (Roodt & Roodt, 1996). This community is settled at the base of hills found in the area. The valley, according to Roodt & Roodt (1996), appears to have been extensively cultivated. This observation is supported by the results of the cartographic survey discussed in Section 6.4 on Page 24. Many of these communities were formed due to eviction and relocation that took place during the 19th and 20th centuries.

During the 19th century, the *Voortrekkers* (Boers) surveyed and fenced off land in an area to the south of the Steelpoort River in the current Mpumalanga Province (formerly known as the Eastern Transvaal). This fenced-off land was then allocated to white settlers and farmers (Delius & Cope, 2007, p. 142). After the Second Boer War (1899 – 1902), patterns of land use and occupation were established along racial lines as Government Commissions began to designate the Steelpoort River as the boundary between white South Africa and the 'native reserve' (Mulaudzi & Schirmer, 2000, p. 295; Schirmer, 2007).

In 1972, the native reserve to the north of the Steelpoort River was proclaimed a self-governing homeland for the North Sotho people who were relocated from the Eastern Transvaal (now known as Mpumalanga). Today, this former homeland known as Lebowa forms part of the Limpopo Province. Lebowa is located approximately 45 km west of the Project Area.

Heritage resources that may be found in the area could include burial grounds and graves associated with the Ga-Selepe, Ga-Phasha, Ga-Mampa and the Bogalatladi communities.

Built-up areas in this region may also include buildings associated with the establishment of 'native locations' for the evicted and displaced black groups. These 'native locations' were established in the 20th century and therefore any buildings in these areas may be older than 60 years and legally protected heritage resources in terms of Section 34 of the NHRA.

6.3 Relevant Databases and Collections

The archival and database survey was conducted by consulting the following resources:

- Chief Surveyor General;
- National Automated Archival Information Retrieval System (NAAIRS);
- University of the Witwatersrand (WITS) Archaeology Site Database;
- Genealogical Society of South Africa; and
- South African Heritage Resources Information Systems (SAHRIS).

The Chief Surveyor General database was surveyed. Three documents pertaining to the farm Klipfontein 465 KS were found. The results showed that the farm Klipfontein 119 (now Klipfontein 465 KS) was surveyed in 1889 in 1892 and that the farm was subdivided into Portions 1 to 4 (10654/1892). In October 2002, the farm Klipfontein 465 KS was surveyed. A powerline servitude from Brakfontein 464 KS through Klipfontein 465 KS to Portion 1 Paschas Kraal 466 KS was documented (8706/2002).

The NAAIRS database was surveyed. A total of eight records were found relevant to the Bokoni Klipfontein Project Area. In 1958 to 1966, mining occurred on Klipfontein 465 KS in Sekhukhuneland (BAO-10151-D52/1608/61). Mining also occurred on Brakfontein 464 KS in Lydenburg by Dawson and Dobson (BAO-10151-D52/1608/9). Of the eight records found, five were in relation to the Manotwane community adjacent to Klipfontein 465 KS outside the Project Area. In 1968, an application was made by Captain CM Maisela (Manotwane) to the 'Bantu Authority' of Sekhukhuneland (KGL-169-PRAK/N11/1/3(16) and BAO-5/391-F54/1608/63). This application was approved in 1977 and Manotwane was appointed as captain of Manotwane (Maesela) (URU-7014-1008).

A total of 49 sites on farms surrounding the Project Area were identified during a survey of the WITS Archaeological Site Database: 23 are located within 9 km from the Project Area. For a complete list of these 23 sites, see Table 6-5 below. No sites were identified within the boundaries of the Project Area.

Table 6-5: A total of 23 sites identified during a survey of the WITS archaeological site database were recorded within a 9 km distance from the Bokoni Klipfontein Project Area

Site No.	Site Name	Latitude	Longitude	Farm Name
2430AC 7	Paschakraal Shaft 1	-24.37669400	30.00941700	Paschas Kraal 466 KS
2430AC 8	Paschakraal Shaft 2	-24.37655600	30.00966700	Paschas Kraal 466 KS
2430AC 9	Paschakraal Shaft 3	-24.37522200	30.01002800	Paschas Kraal 466 KS
2430AC 10	Paschakraal Shaft 4	-24.38061100	30.00747200	Paschas Kraal 466 KS
2430AC 11	Paschakraal Shaft 5	-24.38097200	30.00802800	Paschas Kraal 466 KS
2430AC 12	Paschakraal Shaft 6	-24.38391700	30.00713900	Paschas Kraal 466 KS
2430AC 13	Twickenham 1	-24.39133300	30.01186100	Twickenham 144 KT
2430AC 14	Twickenham 2	-24.39736100	30.01725000	Twickenham 144 KT
2430AC 15	Twickenham 3	-24.41575000	30.01802800	Twickenham 144 KT
2430AC 16	Twickenham 4	-24.40988900	30.02708300	Twickenham 144 KT
2430AC 17	Twickenham 5	-24.41222200	30.02813900	Twickenham 144 KT
2430AC 18	Twickenham 6	-24.40955600	30.02697200	Twickenham 144 KT
2430AC 19	Twickenham 7	-24.41150000	30.03097200	Twickenham 144 KT
2430AC 20	Twickenham 8	-24.41169400	30.03100000	Twickenham 144 KT
2430AC 21	Makgake	-24.41369400	30.03286100	Twickenham 144 KT
2430AC 29	Tailings Dam 1	-24.37388900	30.04611100	Paschas Kraal 466 KS
2430AC 30	Tailings Dam 2	-24.37638900	30.03880600	Paschas Kraal 466 KS
2430AC 31	Tailings Dam 3	-24.37897200	30.04147200	Paschas Kraal 466 KS
2430AC 32	Tailings Dam 4	-24.37733300	30.03822200	Paschas Kraal 466 KS
2430AC 37	Twickenham	-24.40555600	30.02611100	Twickenham 144 KT
2430AC 38	Twickenham	-24.40833300	30.03138900	Twickenham 144 KT
3430AC 48	Twickenham	-24.40750000	30.02777800	Twickenham 144 KT
3430AC 49	Twickenham	-24.40250000	30.02861100	Twickenham 144 KT

The Genealogical Society of South Africa database was surveyed. All known cemeteries recorded on the South African Genealogical Society of Gravestones database occurred outside of the Project boundaries and will not be impacted upon.

The SAHRIS database was consulted for all available and relevant previous impact assessment reports. The results are discussed in Section 6.5 on Page 25.

6.4 Desktop Cartographic Survey

A desktop cartographic survey was conducted in order to determine the potential of sites to exist within the Project Area and the surrounding region, as well as relative age based on the dates of the maps. Historical aerial photographs, historical maps, current topographic maps and satellite imagery were used to this end.

The 1902 to 1909 Transvaal Degree map of Geluk was surveyed for potential heritage resources. Two 'native' locations were indicated on the map. The first is M'phatlele's Location to the west of the Project Area. The second is Secocoeni's Portion to the south of the Project Area. A proclaimed main road was indicated on Klipfontein 119 (now

Klipfontein 465 KS). No sites of heritage significance were recorded on the map for the farm Klipfontein 119 or its surrounding farms. However, there is a koppie as well as rocky outcrops and it may be possible for stone tool scatters, and potential Late Iron Age to early Historic sites to exist near these outcrop.

Historical aerial photographs from 1950 were surveyed for potential built structures. Any built structures such as house or homestead, a residential complex, or industrial and mining buildings that were identified in these photographs would be older than 60 years and would therefore be protected in terms of Section 34 of the NHRA.

The historical aerial photographs from 1950, 1964, 1971, 1977, 1987 and 1995 showed that the landscape to the north of Klipfontein 465 KS comprised open fields and cultivated fields with no industrial development visible within the Project boundaries. Fields were observed along the perennial streams, whilst most uncultivated land appears to occur on and around koppies and rocky outcrops. The photographs surveyed showed several landscape features such as field and rivers where heritage resources may exist. Based on the literature review, there is a high likelihood that Stone Age material and Iron Age settlements will occur along perennial streams. Other heritage resources such as graves may be present in and around the fields.

In contrast, the historical aerial photographs, particularly from 1971 to 1995, showed buildings, homesteads and residential settlements occurring to the south of Klipfontein 465 KS. Structures identified the 1971 aerial photographs would be older than 60 years and therefore protected under Section 34 of the NHRA. However, these occur outside the Project development footprint and will not be impacted upon.

The topographical map 2429 BD Ga-Mankopane was surveyed for potential heritage resources. No heritage resources were identified.

6.5 Relevant Previous Impact Assessment Reports

Archaeological studies have been undertaken for the Bokoni since 1996:

- Roodt, F. & Roodt, H., 1996. *Preliminary Report of an Archaeological Survey on the Farms Diamant, Zeekoegat, Middlepunt, and Umkoanes Stad*. Unpublished report compiled for the Lebowa Platinum Mines.
- Roodt, F., 2002. *Statement in Respect of Heritage Resources at the UG2 TSF*. A Statement of Respect prepared for the Lebowa Platinum Mines.
- Roodt, F., 2003. *Lebowa Platinum Mines: Atok Brakfontein Shaft and Associated Infrastructure, Limpopo Province*. A Phase 1 Heritage Impact Assessment prepared for the Lebowa Platinum Mines. On file at SAHRA as 2003-SAHRA-0072.
- Roodt, F., 2006. *Lebowa Platinum Mines (LPM) MPH 120 KTPM UG2 and Vertical Shaft 55 EMPR Amendment for the Proposed Expansion Project*. A Heritage Impact Assessment report prepared for Lebowa Platinum Mines.

- Roodt, F., 2008. *Heritage Impact Assessment of Ventilation Shafts and a Re-assessment of Previously Recorded Archaeological Sites*. A Heritage Assessment prepared for the Lebowa Platinum Mines.

The results of each report will be discussed separately below.

6.5.1 Roodt, F. & Roodt, H. 1996

During the survey conducted by Roodt & Roodt (1996), MSA and LSA cores and flakes were identified as surface scatters all over the survey area. In addition, a total of 34 Late Iron Age sites were identified by the remains of inorganic material such as pottery, grinding stones, middens and burnt debris. Although all 34 sites are located outside of the Project Area, there is a possibility that Late Iron Age sites may occur within the boundaries of the Project Area.

Roodt & Roodt (1996) also recorded a number of old homesteads at the base of hills. A number of these homesteads contain grind stones and pottery. These homesteads may be older than 50 years. Although no historical homesteads were identified during the cartographic survey, the existence and distribution of historical homesteads at the base of hills on the neighbouring farms suggests that there is a likelihood that they do exist on Klipfontein 465 KS.

Based on the results of the survey, Roodt & Roodt (1996) suggest that a settlement pattern can be distinguished for the pre-colonial and early colonial period. The people did not live on the turf soil and instead opted to locate their villages and homesteads at the bases of small hills in the valley and on the calcrete rich soil outcrops. They also preferred to settle near water. For these reasons, heritage resources are found and are expected to be found at the base of small hills and along rivers and perennial streams.

The recommendations made by Roodt & Roodt (1996) include the systematic collection of Stone Age material and the recording of the Iron Age sites prior to destruction.

6.5.2 Roodt, F. 2002

A Phase 1 HIA was conducted for Lebowa Platinum Mines on the farm Umkoanes Stad 419 KS. According to the report, no heritage resources were identified on the property (Roodt, 2002).

6.5.3 Roodt, F. 2003

According to Roodt (2003), MSA flakes were observed as surface scatters over the Bokoni Klipfontein Project Area on Klipfontein 465 KS but no concentration of material was found anywhere. A total of eight Iron Age sites represented by weathered, unidentified pottery fragments and Middle Iron Age *Eiland* pottery were also recorded. In addition, seven clearly identifiable Early and Middle Iron Age sites were recorded (Roodt, 2003). Although all 15 Iron Age sites are located outside of the Project Area, there is a possibility that Iron Age sites may occur within the boundaries of the Project Area particularly along the north side of the perennial stream and at the base of small hills.

Roodt (2003) also recorded 28 sites consisting of informal graveyards, homestead ruins with graves as well as graves in yards of houses of the existing two villages. Of these 28 sites, only one falls within the Bokoni Klipfontein Project Area (31/2003-SAHRA-0072). This site comprises a homestead ruin with three graves (Roodt, 2003). The previous heritage report by Roodt (2003) indicates that informal graveyards are distributed in and around fields. Based on these results, it can be determined that there is a high likelihood that informal graves exist within and around the fields located in the Project Area.

6.5.4 Roodt, F. 2006

In 2006, Roodt conducted a HIA for the expansion of the Lebowa Platinum Mines Project. A heritage survey was conducted at the expansion sites on the Umkoanesstad and Zeekoegat Farms. The heritage resources that were found include Iron Age remains consisting of a midden or livestock dung deposit, Early Iron Age pottery belonging to the *Doornkop* facies, upper grinding stones and other ceramic potsherds (Roodt, 2006). Although the sites recorded during the survey (Roodt, 2006) are located outside the Project Area, there is a high likelihood that similar Iron Age sites exist on Klipfontein 465 KS particularly around small hills.

6.5.5 Roodt, F. 2008

A HIA was conducted for Lebowa Platinum Mines on the farms Zeekoegat 421 KS, Middlepunt 420 KS, Umkoanesstad 419 KS and Brakfontein 464 KS. The study aimed to assess the impact of the proposed new development on heritage sites that were previously recorded during surveys conducted by Roodt (2008). According to the report, no heritage resources, in addition to the previously recorded sites, were identified on the property (Roodt, 2008).

6.6 Summary of Heritage Resources Identified in the Project Area

Two categories of general protected heritage resources were identified and recorded in the Project Area. These resources included archaeological resources as defined in Section 35 and burial grounds and graves as defined in Section 36 of the NRHA.

Identified Section 35 archaeological resources included scattered concentrations of ceramic fragments and grinding stones in abandoned fields and erosion gulleys, as well as isolated occurrences of ceramic fragments and MSA lithics. These resources were evaluated and determined as insignificant in terms of aesthetic historical, scientific and social significance as well as having no and/or negligible integrity. As a result, these resources have not been described further in this HIA report and potential impacts were not assessed sites. Illustrations and site descriptions are however included in Appendix E.

Table 6-6: Identified heritage resources in the Project Area

GPS type and model used	Garmin eTrex Legend HCx
Datum	WGS 84
Average accuracy	~5 m

Site co-ordinates	Site Name	Description	Significance	Field rating
South: 24°20'34.70" East: 29°57'50.90"	S.35-008	Iron Age/Historic open scatter	None	Field rating IV C
South: 24°20'59.06" East: 29°58'08.61"	S.35-570	Isolated Stone Age/Iron Age occurrence	None	Field rating IV C
South: 24°20'48.11" East: 29°57'57.92"	S.35-728	Isolated Iron Age/Historic occurrence	None	Field rating IV C
South: 24°20'47.57" East: 29°57'57.10"	S.35-729	Isolated Iron Age/Historic occurrence	None	Field rating IV C
South: 24°20'45.61" East: 29°57'51.94"	S.35-730	Iron Age/Historic open scatter	None	Field rating IV C

Site co-ordinates	Site Name	Description	Significance	Field rating
South: 24°20'43.80" East: 29°57'53.91"	S.35-731	Isolated Iron Age/Historic occurrence	None	Field rating IV C
South: 24°20'52.28" East: 29°58'06.53"	S.35-021	Iron Age/Historic feature	None	Field rating IV C
South: 24°20'56.18" East: 29°58'09.20"	S.35-030	Isolated Iron Age/Historic occurrence	None	Field rating IV C
South: 24°21'00.10" East: 29°58'09.59"	S.35-031	Iron Age/Historic feature	None	Field rating IV C
South: 24°20'59.02" East: 29°58'07.43"	S.36-748	Burial ground comprising at least two graves	Medium-high	Field rating IV A
South: 24°20'49.73" East: 29°58'04.26"	S.36-001	Burial ground comprising approximately 19 graves	Medium-high	Field rating IV A

7 RESTRICTIONS AND KNOWLEDGE GAPS

The following restrictions were encountered during the course of this study:

- Dense vegetation obscured surface visibility thereby reducing potential to identify surface material or features (Figure 6-2).
- Erosion gullies and non-perennial rivers are common occurrences in the Project Area (Figure 6-1). Due to the high likelihood that these features may have washed away any archaeological sites that could have been present, the HIA survey was not
- Existing and old agricultural fields and farm roads occur in the area (Figure 6-3, Figure 6-4 and Figure 6-5). These features may have damaged or destroyed any archaeological sites that may have been present.
- Excavations for calcrete took place in the area which may have damaged or destroyed any heritage resources that may have been present (Figure 6-6).

The following knowledge gaps were identified:

- Heritage resources do not exclusively constitute visible and tangible remains, but also more intangible aspects such as sense of place and associations. This study did not include focussed consultation with communities in relation to heritage resources. However, any issues that were raised during the public participation process and Social Impact Assessment (SIA) were integrated into this report.

Considering the above restrictions, limitations and knowledge gaps there is potential that additional heritage resources may be exposed or identified during the course of the Project. Consequently, a Watching Brief and Chance Find Procedure must be implemented as required by the NHRA. See Appendix F.

8 DESCRIPTION OF SIGNIFICANT HERITAGE RESOURCES

This Section describes heritage resources that were evaluated as significant, i.e. with heritage significance values higher than six (refer to Section 5.4 of the report and Appendix B). Impact assessments were also completed for these resources and appropriate management and mitigation recommendations were provided to discuss the values ascribed to the heritage resources as well as to assess the impacts on the identified heritage resources.

8.1 NHRA Section 35 Resources – Archaeological Sites

8.1.1.1 Statement of value

Field rating: Grade IV C

The following heritage resources have a negligible value in aesthetic and technical characteristics, scientific information potential, and social association. The rating was informed by credible information sources such as peer-reviewed publications and other

impact assessment reports which indicate that ceramic scatters and associated grinding stones occur frequently within the Study Area:

- S.35-008;
- S.35-570;
- S.35-728;
- S.35-729;
- S.35-730;
- S.35-731;
- S.35-021;
- S.35-030; and
- S.35-031.

In terms of their social association, the heritage resources have no value as they are not well represented and therefore cannot provide an indication of its association with any particular social group. The sites are in a poor condition with active decay visible. Site context was considered secondary as the ceramics may have been exposed due to activities associated with the agricultural field and the erosion gully, and integrity could not be determined. Taking these characteristics into account, the heritage resources were given a negligible heritage value.

The heritage resources are of a negligible value and an impact assessment does not need to be conducted for the sites. Heritage-related mitigation of the site S.35-008 by means of detailed site recording and mapping was completed. No further mitigation of either site is required. The sites have been significantly recorded and can be destroyed.

8.1.1.2 Recommendations

Recommendations for destruction

For the Project, the Section 35 archaeological sites were sufficiently recorded and do not require any mitigation measures.

8.2 NHRA Section 36 resources – Burial grounds and graves

Two burial grounds (S.36-001 and S.36-748) were identified and recorded that consisted of two and approximately 22 graves respectively.

8.2.1 BOK1630/2429BD/S.36-748 (Informal burials)

Two burials were identified and recorded next to an old agricultural field near the base of a small koppie (Figure 8-1). The burials included one informal stone-packed burial and one possible stone-pack burial (Figure 8-2 and Figure 8-3). The burials are approximately 46.510 square meters in extent.

The site is located approximately in the opencast area.

Table 8-1: Summary of Grave S.36-748

Context	Primary context
Site location	<p>Site co-ordinates</p> <p>South: 24°20'59.02"</p> <p>East: 29°58'07.43"</p> <p>The site is located in the opencast area.</p>
Type	Informal burials
Extent	46.510 m ²
Orientation	North to south
Condition	Fair to good condition
Dressing	Stone-packed
Inscriptions/identifying features	None
Age	Unknown
Possible Affinity	Possible affinity with local community
Persons consulted	None
Threats or sources of risk and Legal Implications	
<ul style="list-style-type: none"> ■ Immediate threats include site clearance for development such as the opencast pit. ■ Potential sources of threats and risk include vandalism by workers on site, accidental destruction or alteration of burial site by construction workers on site. ■ Legal implications based on Section 36 of the NHRA and Regulations Chapter XI (Sections 38-40), consultation with affected families and permit application for possible grave relocation. 	



Figure 8-1: General view of Site S.36-748 in landscape. The red arrow indicates the koppie.



Figure 8-2: An informal stone-packed grave identified at Site S.36-748.



Figure 8-3: A possible informal stone-pack grave identified and recorded at site S.36-748.

8.2.1.1 Statement of value

Field rating: Grave IV A, high local significance

The heritage resource has medium-high heritage significance.

Burial grounds have a high local value in terms of their social importance and association with local communities for social, cultural and spiritual reasons. This importance has been demonstrated through numerous articles and case studies where burials grounds have been accidentally or purposefully damaged or destroyed.

The burial ground as a whole did not display any attributes that could be assessed in terms of aesthetic, historical or scientific dimensions. No credible records were found to associate the burial ground, or deceased persons buried in the burial ground, with important aspects in the history of the area, region, province or country. The grave dressings and design of the burial ground was of a generic nature commonly found in similar sites through out the region and no assessment in terms of the aestheitic to be commonplace.

The burial ground is in a fair to good condition and is well preserved with evidence of relatively recent upkeep by presumably family members.

8.2.1.2 Impact assessment

8.2.1.2.1 Pre-mitigation assessment

This section considered potential impacts that may result from Project activities if no Project-related mitigation measures were to be implemented. Given the high local significance of the site, the intensity of any impact on the site would be high.

Type of Impact		Negative indirect impact as a result of open cast mining and indirect impact on next-of-kin
Rating of Impacts		
Designation	Rating	Summary of Reasoning
Scale	National	Although direct impact may be localised to the burial ground, indirect impacts will extend to next-of-kin who may reside elsewhere in the country, should the site be damaged or destroyed.
Duration	Permanent/ mitigated	As the site is situated about 200 m from the open cast footprint, damage to the site result from construction and operation activities.
Severity	High	Should the site be damaged, this may result in high severity impacts and potential jail terms for executives and/or very high fines for company. In addition, damage and/or destruction of the burial ground may result in prolonged, multiple litigation.
Probability	Probable	Damage to the site could occur during construction and operation of the opencast mine, however as the site is located approxiamtely 200 m from the opencast area, appropriate project-related mitigation will avoid impacts.
Intensity		Minor
Value of the heritage resource		Grade IV A, medium-high heritage value and high local significance

8.2.1.2.2 Post-mitigation assessment

This section considered potential impacts that may result from Project activities subsequent to the implementation of appropriate Project-related mitigation measures. Given the high local significance of the site, the intensity of any impact on the site would be high.

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	Impacts that will change the integrity of the site will be limited to specific isolated parts of the site due to fencing.
Duration	Project life	Any potential impacts will cease after the operational life span of the Project.
Severity	Negligible	Mitigation will change the site only in so far as the site will be fenced and access regulated.
Probability	Unlikely/low probability	There is a low possibility that the impact will occur.
Magnitude		Minor
Value of the heritage resource		Low to medium
The heritage resource is of a low to medium heritage value. Furthermore, the burials may have a strong association to the community or cultural group for social, cultural and spiritual reasons. Its importance is also based on highly credible information sources.		

8.2.1.3 **Recommendations**

Heritage-related mitigation

No project-related mitigation measures such as changes to design or mine plan was considered as the burial ground is located within the footprint of Adit A and will never be preserved. It is therefore recommended that heritage-related mitigation measures include grave relocation.

Grave Relocation Process

The Grave Relocation Process (GRP) consists of three phases that must be adhered to. A summary of each of these three phases is presented here.

Relocation of the site may proceed only after public consultation process has been followed and the relevant permit has been issued. The public consultation must include the following objectives:

- Public notification on intent to exhume and relocate burials;
- Identification of I&APs including relevant government and public organisations, relatives and/or family representatives of deceased;
- Focus group meetings with I&APs that could include negotiations regarding exhumation and relocation and customary practices.

The following minimum standards for the public consultation must be adhered to:

- Appropriate legislation must be followed;
- Respect must be shown to the customs, beliefs and practices of the community and I&APs;
- I&APs must be notified of the GRP through various media which must include the following:
 - Geographical location of burial grounds and graves;
 - The number of graves proposed to be exhumed;
 - A period of more than 60 days between advertising and exhumations must be allowed for comments to be submitted;
 - A concerted effort must be made to identify all I&APs, where they were registered as such, and all relevant information must be recorded.
- Public meetings must be held in which I&APs could attend, raise concerns and register themselves;
- Copies of the agreements made between Kangra and the I&APs must be made available; and
- I&APs that are registered or identified, including the affected families or communities and government structures, receive scheduled consultation at group meetings.

Phase two of the GRP includes survey, registration and mapping of the burial grounds and graves. This entailed unique numbering of burial sites and individual graves: providing the primary reference for the registration process. Each must be marked using a concrete marker on which the unique identification number was present. The numbering system should be designed to include the burial site number, and individual graves located in the site, for example 001/0001 (Burial Ground 1, Grave 0001). After the marking and recording were completed, the registration process must be initiated.

Site mapping must be done by land surveyors, creating an accurate record of original grave locations. The relocation cemetery must also be laid out and mapped. The result of which is a presentation of accurate maps of burial sites that can be cross referenced to the relocation cemetery, as well as facilitating design planning and management of *in situ* burial grounds.

Phase three of the GRP includes exhumation, relocation and reburial. Established archaeological field and excavation methodologies must be employed during exhumations to

recover all the remains, minimise the damage to the remains and record the context of the burial.

Bokoni must ensure that they will cover all costs for the GRP.

8.2.2 BOK1630/2429BD/S.36-001 (Informal burial ground)

A formal burial ground was recorded on and around a small koppie (Figure 8-4). Approximately 19 burials were noted. The burials range from being informal stone-pack burials to informal soil mounds with grave markers (wooden stakes). The burial ground is generally maintained and there are a number of stone walls and grass fences demarcating the burial ground. The burial ground is associated with the local community. The burial ground is approximately 11 130 square meters in extent. The burial ground is located between in the opencast mining area.

Table 8-2: Summary of Site S.36-001

Context	Informal burial ground
Site location	<p>Site co-ordinates</p> <p>South: 24°20'53.40"</p> <p>East: 29°58'05.90"</p> <p>The site is located in the opencast area.</p>
Physical Description	Approximately 19 graves present, 11 130 m ² in extent
Condition	Excellent condition, generally maintained
Age	Unknown
Possible Affinity	Affinity with local community
Persons consulted	Local community members
Threats or sources of risk and legal implications	
<ul style="list-style-type: none"> ■ Immediate threats include site clearance for development such as the opencast pit. ■ Potential sources of threats and risk include vandalism by workers on site, accidental destruction or alteration of burial site by construction workers on site. ■ Legal implications based on Section 36 of the NHRA and Regulations Chapter XI (Sections 38-40), consultation with affected families and permit application for possible grave relocation. 	



Figure 8-4: Burial Ground S.36-001.

8.2.2.1 Statement of value

Field rating: Grave IV B

The heritage resource has a medium heritage value in social association and integrity. The burial ground may have a strong association to the community or cultural group for social, cultural and spiritual reasons. Its importance is also based on highly credible information sources. It is in a fair to good condition and is well preserved. There is some decay present but it can easily be restored. Based on these attributes, the burial ground was given a low to medium heritage value.

The burial ground is located in the opencast area. Residual post-mitigation impacts will require mitigation of the burial ground through grave relocation.

8.2.2.2 Impact assessment

8.2.2.2.1 Pre-mitigation assessment

This section considered potential impacts that may result from Project activities if no Project-related mitigation measures were to be implemented. Given the high local significance of the site, the intensity of any impact on the site would be high.

Type of Impact		Negative indirect impact as a result of open cast mining and indirect impact on next-of-kin
Rating of Impacts		
Designation	Rating	Summary of Reasoning
Scale	National	Although direct impact may be localised to the burial ground, indirect impacts will extend to next-of-kin who may reside elsewhere in the country, should the site be damaged or destroyed.
Duration	Permanent/ mitigated	As the site is situated about 200 m from the open cast footprint, damage to the site result from construction and operation activities.
Severity	High	Should the site be damaged, this may result in high severity impacts and potential jail terms for executives and/or very high fines for company. In addition, damage and/or destruction of the burial ground may result in prolonged, multiple litigation.
Probability	Probable	Damage to the site could occur during construction and operation of the opencast mine, however as the site is located approxiamtely 200 m from the opencast area, appropriate project-related mitigation will avoid impacts.
Intensity		Minor
Value of the heritage resource		Grade IV A, medium-high heritage value and high local significance

8.2.2.2.2 Post-mitigation assessment

This section considered potential impacts that may result from Project activities subsequent to the implementation of appropriate Project-related mitigation measures. Given the high local significance of the site, the intensity of any impact on the site would be high.

Type of Impact		Positive change
Rating of Impacts		
Characteristic	Designation	Summary of Reasoning
Scale	Limited	Impacts that will change the integrity of the site will be limited to specific isolated parts of the site due to fencing.
Duration	Project life	Any potential impacts will cease after the operational life span of the Project.
Severity	Negligible	Mitigation will change the site only in so far as the site will be fenced and access regulated.
Probability	Unlikely/low probability	There is a low possibility that the impact will occur.
Magnitude		Minor
Value of the heritage resource		Low to medium
The heritage resource is of a low to medium heritage value. Furthermore, the burials may have a strong association to the community or cultural group for social, cultural and spiritual reasons. Its importance is also based on highly credible information sources.		

8.2.2.3 Recommendations

Heritage-related mitigation

No project-related mitigation measures such as changes to design or mine plan was considered as the burial ground is located within the footprint of Adit A and will never be preserved. It is therefore recommended that heritage-related mitigation measures include grave relocation.

Grave Relocation Process

The Grave Relocation Process (GRP) consists of three phases that must be adhered to. A summary of each of these three phases is presented here.

Relocation of the site may proceed only after public consultation process has been followed and the relevant permit has been issued. The public consultation must include the following objectives:

- Public notification on intent to exhume and relocate burials;
- Identification of I&APs including relevant government and public organisations, relatives and/or family representatives of deceased;
- Focus group meetings with I&APs that could include negotiations regarding exhumation and relocation and customary practices.

The following minimum standards for the public consultation must be adhered to:

- Appropriate legislation must be followed;
- Respect must be shown to the customs, beliefs and practices of the community and I&APs;
- I&APs must be notified of the GRP through various media which must include the following:
 - Geographical location of burial grounds and graves;
 - The number of graves proposed to be exhumed;
 - A period of more than 60 days between advertising and exhumations must be allowed for comments to be submitted;
 - A concerted effort must be made to identify all I&APs, where they were registered as such, and all relevant information must be recorded.
- Public meetings must be held in which I&APs could attend, raise concerns and register themselves;
- Copies of the agreements made between Kangra and the I&APs must be made available; and
- I&APs that are registered or identified, including the affected families or communities and government structures, receive scheduled consultation at group meetings.

Phase two of the GRP includes survey, registration and mapping of the burial grounds and graves. This entailed unique numbering of burial sites and individual graves: providing the primary reference for the registration process. Each must be marked using a concrete marker on which the unique identification number was present. The numbering system should be designed to include the burial site number, and individual graves located in the site, for example 001/0001 (Burial Ground 1, Grave 0001). After the marking and recording were completed, the registration process must be initiated.

Site mapping must be done by land surveyors, creating an accurate record of original grave locations. The relocation cemetery must also be laid out and mapped. The result of which is a presentation of accurate maps of burial sites that can be cross referenced to the relocation cemetery, as well as facilitating design planning and management of *in situ* burial grounds.

Phase three of the GRP includes exhumation, relocation and reburial. Established archaeological field and excavation methodologies must be employed during exhumations to

recover all the remains, minimise the damage to the remains and record the context of the burial.

Bokoni must ensure that they will cover all costs for the GRP.

9 DISCUSSION OF RESULTS AND FINDINGS

Based on literature reviews, including previous heritage reports the Study Area was shown to include diverse cultural heritage elements some of which were identified within the proposed Project Area. Considering that development of the mining sector constituted a key growth area in terms of the FM-SDF, potential positive and negative impacts on cultural heritage will increase. Positive impacts may be described as the identification of previously unknown resources due to increased exposure that can contribute to a better understanding of the cultural landscape. However, this may inherently result in damage and/or destruction cultural heritage.

Heritage resources that were identified and recorded in the proposed Project Area included burial grounds, graves and occurrences of archaeological resources. Archaeological resources that were identified were predominantly without any context. The relative extensive contemporary and past land use has impacted on most sites to the point that site integrity was degraded to the extent that inherent value was negligible. This was demonstrated by the prevalence of isolated occurrences of artefact scatters. The two burial grounds that were identified were evaluated as being of high local significance.

The primary identified sources of risk to cultural heritage would result from construction activities for and subsequent operation of the proposed opencast mine. These activities will ultimately cause damage to and/or the destruction of sites and artefacts. Impacts that would result from the activities were considered negligible in terms of most archaeological resources. As a result, no specific mitigation measures were recommended.

Impacts on burial grounds were considered major due to attributed value in terms of social significance. Appropriate mitigation of these sites was recommended.

10 CONCLUSION

This HIA will form part of the associated studies undertaken for the Section 102 Amendment to the EMP. The HIA was only conducted for the opencast mining area on Klipfontein 465 KS. A Watching Brief was conducted for the haul road in July 2012 and no further heritage work is required for the haul road. A total of nine archaeological sites, two informal burials, and a single informal burial ground with approximately 19 informal burials were identified and recorded in the opencast mine footprint.

Fossils are not found in igneous rock and because the Klipfontein Project Area is underlain by igneous rocks of the Bushveld Complex and mafic and chromitite rocks of the Rustenburg Suite, it is reasonable to suggest that there is a negligible probability of terrestrial fossil bones being turned up in excavations into *in situ* deposits.

A Letter of Exemption for the Palaeontological Impact Assessment is therefore requested. The Fossil Find Procedures should however be implemented during the course of the proposed Klipfontein Project in the event of possible fossil finds. See Appendix F for the Fossil Find Procedure and for a Fossil Monitoring programme.

The archaeological and historical sites are of negligible heritage value and impacts on these heritage resources were not assessed in this HIA. These sites were sufficiently recorded and no further mitigation measures are recommended. Opencast mining will result in the destruction of the burials and it is recommended the burial ground be relocated.

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Appendix A: Curriculum Vitae of Specialist



DIGBY WELLS
ENVIRONMENTAL

SHAHZAADEE KARODIA

Ms Shahzaadee Karodia
Archaeology Consultant
Social Science Department
Digby Wells Environmental

1 EDUCATION

- 2006 BA Anthropology & Archaeology, University of the Witwatersrand
- 2007 BSc Honours. Palaeontology, University of the Witwatersrand
 - Courses included: comparative vertebrate anatomy; cladistics analysis; primate and human evolution; Karoo biostratigraphy; dinosaurs and the origins of birds; Cenozoic mammals; taphonomy; and palaeoecology
 - Honours Thesis: "Encephalization and its relationship to orbit size in modern humans and a small bodied population from Palau, Micronesia".
- 2012 MSc Archaeology, University of the Witwatersrand
 - MSc Thesis: "Naturally mummified human remains from Historic Cave, Limpopo, South Africa".
 - Skills obtained during MSc included: stereo microscopy; light microscopy; scanning electron microscopy; and histology

2 LANGUAGE SKILLS

English (read, write, speak)

Currently completing French training for beginners

3 EMPLOYMENT

2012:	Archaeology consultant, Digby Wells Environmental
April 2012 – June 2012:	External archaeology research consultant, EcoAfrica
April 2011 – November 2011:	Archaeology intern, University of Pretoria



2007 – 2008: Palaeontology collections assistant, BPI
University of the Witwatersrand

2006 – 2007: Tour guide, Sterkfontein Caves

4 EXPERIENCE

- Archaeology Field School in Klipriviersberg with Dr Karim Sadr, University of the Witwatersrand
- Archaeology Field School in Swartkrans and Maropeng with Dr Kathy Kuman, University of the Witwatersrand
- Archaeology Field School in Ottosdaal with Dr Thembi Russell, University of the Witwatersrand
- Palaeontology Field School in the Karoo with Professor Bruce Rubidge, University of the Witwatersrand
- Palaeontology Field School in Gladysvale with Professor Lee Berger, University of the Witwatersrand
- Palaeontology Field School in Wonderkrater with Dr Lucinda Backwell, University of the Witwatersrand

5 PROJECT EXPERIENCE

- Heritage Statement and Letter of Recommendation from Exemption for the Central Basin, Witwatersrand Acid Mine Drainage Project
- Heritage Impact Assessment for the Witwatersrand Gold Fields Acid Mine Drainage Project (Western Basin)
- Archaeological Watching Brief on Access Road for Bokoni Platinum Ltd
- Heritage Statement and Notification of Intent to Develop for Eskom Transmission Division – Roodepoort Strengthening Project;
- Heritage Statement and Notification of Intent to Develop for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IR and Bosmans Spruit 364 IS, Standerton, Mpumalanga
- Heritage Statement and Notification of Intent to Develop for Rhodium Reef Limited Platinum Operation, 2430 CA & CC, De Goedverwachting 332 KT, Boschloof 331 KT and Belvedere 362 KT
- Heritage Statement and Notification of Intent to Develop for the Thabametsi Project, 2327CB, Vaalpensloop 313 LQ, Lephalale, Limpopo Province
- Heritage Impact Assessment for the Proposed Thabametsi Project, Lephalale, Limpopo Province



6 PROFESSIONAL AFFILIATIONS

- Association of Southern African Professional Archaeologists (ASAPA)
- The South African Archaeology Society (SAAS)
- Society of Africanist Archaeologists (SAfA)
- The Geological Survey of South Africa (GSSA)
- The Palaeontological Society of Southern Africa (PSSA)
- The South African Society for Amateur Palaeontologists (SASAP)



DIGBY WELLS
ENVIRONMENTAL

NATASHA HIGGITT

Ms Natasha Higgitt
Archaeology Consultant
Social Department
Digby Wells Environmental

1 EDUCATION

- University of Pretoria
- BA Degree (2008)
- Archaeology Honours (2009)
- Title of Dissertation- Pass the Salt: An Archaeological analysis of lithics and ceramics from Salt Pan Ledge, Soutpansberg, for evidence of salt working and interaction.

2 LANGUAGE SKILLS

- English - Excellent (read, write and speak)
- Afrikaans - Fair (read, write and speak)
- Italian – Poor (Speaking only)

3 EMPLOYMENT

- July 2011 to Present: Archaeology Consultant at Digby Wells Environmental
- April 2011 to June 2011: Lab assistant at the Albany Museum Archaeology Department, Grahamstown, Eastern Cape
- April 2010 to March 2011: Intern at the Archaeology Department, Albany Museum, Grahamstown, Eastern Cape under the Department of Sports, Recreation, Arts and Culture, Eastern Cape Government, South Africa (DSRAC)

4 EXPERIENCE

- Human remains rescue excavation at St Francis Bay, Eastern Cape
- Human remains rescue excavation at Wolwefontein, Eastern Cape

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- Recorded two rock art sites at Blaauwbosch Private Game Reserve, Eastern Cape
- Attended a 2 week excavation/study tour in the Friuli Region in Italy, organised by the *Società Friulana di Archeologia*, sponsored by *Ente Friuli nel Mondo*, and excavated a 12th century medieval castle
- Attended a 2 week excavation in Limpopo, Waterpoort Archaeological Project organised by Xander Antonites (Yale PhD Candidate)
- A total of 5 University of Pretoria Archaeology field schools in Limpopo and Gauteng spanning over 4 years

5 PROJECT EXPERIENCE

- Phase 1 Heritage Impact Assessment for the Thabametsi Coal Mine, Lephalale, Limpopo for Exxaro Coal (Digby Wells Environmental)
- Heritage Statement for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IR and Bosmans Spruit 364 IS, Standerton, Mpumalanga for Xtrata Coal South Africa (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Brakfontein Thermal Coal Mine, Mpumalanga for Universal Coal (Digby Wells Environmental)
- Development of a RAP for Aureus Mining for the New Liberty Gold Mine Project, Liberia (Digby Wells Environmental)
- Phase 1 Archaeological Impact Assessment for the MBET Pipeline, Steenbokpan, Limpopo (Digby Wells Environmental)
- Notice of Intent to Develop and Cultural Resources Pre-Assessment for Orlight SA (PTY) Ltd Solar PV Project. 2012. (Digby Wells Environmental)
- Agricultural Survey for Platreef ESIA, Mokopane, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for the Proposed Sylvania Everest North Mining Development in Mpumalanga, near Lydenburg. 2011. (Digby Wells Environmental)
- Phase 2 Mitigation of Archaeological sites at Boikarabelo Coal Mine, Steenbokpan, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for Proposed Platinum Mine Prospecting in Mpumalanga, near Bethal for Anglo Platinum. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for proposed Platinum Mine at Mokopane, Limpopo for Ivanhoe Platinum. 2011. (Digby Wells Environmental)
- Phase 1 AIA Mixed-use housing Development, Kwanobuhle, Extension 11, Uitenhage, Eastern Cape. 2011.
- Phase 1 AIA Centane to Qholora and Kei River mouth road upgrade survey, Mnquma Municipality, Eastern Cape. 2011. (SRK Consulting)



- Phase 1 AIA Clidet Data Cable survey, Western Cape, Northern Cape, Free State and Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Karoo Renewable Energy Facility, Victoria West, Northern Cape. 2011. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Hamburg, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Molteno, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Housing Development at Motherwell, P.E. 2010. (SRK Consulting)
- Phase 1 AIA Sand quarry survey in Paterson, Eastern Cape. 2010. (SRK Consulting)
- Phase 1 AIA Quarry Survey at Victoria West. 2010. (Acer [Africa] Environmental Management Consultants)
- Phase 1 AIA Quarry Survey at Port Elizabeth. 2010. (E.P Brickfields)

6 PROFESSIONAL AFFILIATIONS

- Association of Southern African Professional Archaeologists (ASAPA): Professional member
- Association of Southern African Professional Archaeologists (ASAPA): CRM Practitioner (Field Supervisor: Stone Age, Iron Age and Rock Art)
- South African Museums Association: Member



JOHAN NEL

Mr Johan Nel

Unit manager: Heritage Resources Management

Social Sciences

Digby Wells Environmental

1 EDUCATION

2002 BA Honours - Archaeology

2001 BA Anthropology & Archaeology

1997 Matriculated Brandwag Hoërskool

2 LANGUAGE SKILLS

Fluent in English and Afrikaans

3 EMPLOYMENT

2011 to present Unit manager: Heritage Resources Management, Digby Wells Environmental

2010-2011 Archaeologist, Digby Wells Environmental

2005-2010 Manager and co-owner, Archaic Heritage Project Management

2003-2005 Freelance archaeologist

Resident archaeologist, Rock Art Mapping Project, Ndidima, Ukhahlamba-Drakensberg World Heritage Site

2002-2003 Special Assistant: Anthropology, Department of Anatomy, University of Pretoria

2001-2002 Technical Assistant: Department of Anatomy, University of Pretoria

1999-2001 Assistant: Mapungubwe Project, National Cultural History Museum & Department of Anthropology and Archaeology, UP

4 EXPERIENCE

I have 13 years of combined experience in the field of cultural heritage resources management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. I have gained experience both within urban settings and remote rural landscapes. Since 2010 I have been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into environmental impact assessments (EIA). Many of the projects since have

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required compliance with International Finance Corporation (IFC) requirements and other World Bank standards. This exposure has allowed me to develop and implement a HRM approach that is founded on international best practice and leading international conservation bodies such as UNESCO and ICOMOS. I have worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo and Sierra Leone. I am fluent in English and Afrikaans, with excellent writing and research skills.

5 PROJECT EXPERIENCE

PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENTS:

- Above Ground Storage Tanks survey, SASOL Oil (Pty) Ltd, Free State Province, South Africa
- Access road establishment , AGES-SA, Tzaneen, South Africa
- Boikarabelo Railway Link, Resgen South Africa, Steenbokpan, South Africa
- Conversion of prospecting rights to mining rights, Georock Environmental, Musina, South Africa
- Galaxy Gold Agnes Mine, Barberton, South Africa
- HCI Khusela Palesa Extension, Bronkhorstspuit, South Africa
- Kennedy's Vale township establishment, AGES-SA, Steelpoort, South Africa
- Koidu Diamond Mine, Koidu Holdings, Koidu, Sierra Leone
- Lonmin Platinum Mine water pipeline survey, AGES-SA, Lebowakgomo, South Africa
- Mining right application, DERA Environmental, Hekpoort, South Africa
- Mogalakwena water pipeline survey, AGES-SA, Limpopo Province, South Africa
- Nzoro Hydropower Station, Environmental and Social Impact Assessment, DRC
- Randgold Kibali Gold Project, Environmental and Social Impact Assessment, Kibali, Democratic Republic of the Congo
- Randwater Vlaktefontein-Mamelodi water pipeline survey, Archaeology Africa cc, Gauteng, South Africa
- Residential and commercial development, GO Enviroscience, Schoemanskloof, South Africa
- Temo Coal, Limpopo, South Africa
- Transnet Freight Line survey, Eastern Cape and Northern Cape, ERM, South Africa
- Van Reenen Eco-Agri Development Project, GO Enviroscience, South Africa
- Platreef Platinum Mine, Ivanhoe Nickel & Platinum, Mokopane, South Africa

MITIGATION PROJECTS:

- Mitigation of Iron Age archaeological sites: Kibali Gold Project, DRC



- Mitigation of Iron Age metalworking site: Koidu Diamond Mine, Sierra Leone
- Mitigation of Iron Age sites: Boikarabelo Coal Mine, South Africa
- Exploratory test excavations of alleged mass burial site: Rustenburg, Bigen Africa Consulting Engineers, South Africa
- Mitigation of Old Johannesburg Fort: Johannesburg Development Agency (JDA), South Africa
- Site monitoring and watching brief: Department of Foreign Affairs Head Office, Imbumba-Aganang Design & Construction Joint Venture, South Africa

GRAVE RELOCATION

- Du Preezhoek-Gautrain Construction, Bombela JV, Pretoria, South Africa
- Elawini Lifestyle Estate social consultation, PGS (Pty) Ltd, Nelspruit, South Africa;
- Motaganeng social consultation, PGS (Pty) Ltd Burgersfort, South Africa
- Randgold Kibali Mine, Relocation Action Plan, Kibali, DRC
- Repatriation of Mapungubwe National Park and World Heritage Site, DEAT, South Africa
- Smoky Hills Platinum Mine social consultation, PGS (Pty) Ltd Maandagshoek South Africa
- Southstock Colliery, Doves Funerals, Witbank, South Africa
- Tygervallei. D Georgiades East Farm (Pty) Ltd, Pretoria, South Africa
- Willowbrook Ext. 22, Ruimsig Manor cc, Ruimsig, South Africa
- Zondagskraal social consultation, PGS (Pty) Ltd, Ogies, South Africa
- Zonkezizwe Gautrain, PGS, (Pty) Ltd, Midrand, South Africa

OTHER HERITAGE ASSESSMENTS AND REVIEWS:

- Heritage Scoping Report on historical landscape and buildings in Port Elizabeth: ERM South Africa
- Heritage Statement and Cultural Resources Pre-assessment scoping report on Platreef Platinum Mine, Mokopane: Platreef Ltd
- Heritage Statement and Scoping Report on five proposed Photo Voltaic Solar Power farms, Northern Cape and Western Cape: Orlight SA
- Land claim research Badenhorst family vs Makokwe family regarding Makokskraal, Van Staden, Vorster & Nysschen Attorneys, Ventersdorp South Africa
- Research report on Cultural Symbols, Ministry for Intelligence Services, Pretoria, South Africa
- Research report on the location of the remains of kings Mampuru I and Nyabela, National Department of Arts and Culture, Pretoria, South Africa
- Review of Archaeological Assessment: Resources Generation, Coal Mine Project in the Waterberg area, Limpopo Province



- Review of CRM study and compilation of Impact Assessment report, Zod Gold Mine, Armenia

6 PROFESSIONAL AFFILIATIONS

Society for Africanist Archaeologists (SAfA)

7 PROFESSIONAL REGISTRATION

Association for Southern African Professional Archaeologists (ASAPA)

Accredited by ASAPA Cultural Resources Management section

International Association of Impact Assessors (IAIA)

8 PUBLICATIONS

Nel, J. 2001. Cycles of Initiation in Traditional South African Cultures. *South African Encyclopaedia* (MWEB).

Nel, J. 2001. *Social Consultation: Networking Human Remains and a Social Consultation Case Study*. Research poster presentations at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: National Museum, Cape Town.

Nel, J. 2002. *Collections policy for the WG de Haas Anatomy museum and associated Collections*. Unpublished. Department of Anatomy, School of Medicine: University of Pretoria.

Nel, J. 2004. Research and design of exhibition for Eloff Belting and Equipment CC for the Institute of Quarrying 35th Conference and Exhibition on 24 – 27 March 2004.

Nel, J. 2004. *Ritual and Symbolism in Archaeology, Does it exist?* Research paper presented at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: Kimberley

Nel, J & Tiley, S. 2004. The Archaeology of Mapungubwe: a World Heritage Site in the Central Limpopo Valley, Republic of South Africa. *Archaeology World Report*, (1) United Kingdom p.14-22.

Nel, J. 2007. *The Railway Code: Gautrain, NZASM and Heritage*. Public lecture for the South African Archaeological Society, Transvaal Branch: Roedean School, Parktown.

Nel, J. 2009. *Un-archaeologically speaking: the use, abuse and misuse of archaeology in popular culture*. *The Digging Stick*. April 2009. 26(1): 11-13: Johannesburg: The South African Archaeological Society.

Nel, J. 2011. 'Gods, Graves and Scholars' returning Mapungubwe human remains to their resting place.' In: *Mapungubwe Remembered*. University of Pretoria commemorative publication: Johannesburg: Chris van Rensburg Publishers.

Nel, J. 2012. *HIAs for EAPs*. Paper presented at IAIA annual conference: Somerset West.

Appendix B: Heritage Impact Matrix Methodology and Impact Assessment



HERITAGE IMPACT MATRIX METHODOLOGY

CRM UNIT MANAGE: JOHAN NEL

MAY 2013

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1 INTRODUCTION

The impact assessment stage includes several steps aimed to evaluate the way in which environmental aspects will/may interact with the cultural landscape (the environment) resulting in environmental impacts to heritage resources. Environmental aspects and impacts are defined as:

- *Environmental aspects*: an element of an organisation's activities or products or services that can interact with the environment' (ISO 14001: 2004 - 3.6); and
- *Environmental impacts*: any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects (ISO 14001: 2004 - 3.7).

However, in terms of cultural heritage resources, environmental impacts should be assessed relative to the heritage value or significance of a resource. The methodology employed in the various stages of the impact assessment process is described in more detail below.

2 STATEMENT OF SIGNIFICANCE OR VALUE

Heritage resources – both cultural and natural – are finite, non-renewable and irreplaceable. They characterise community identity and cultures and are therefore are intrinsic to the history and beliefs of communities. As sources of information, heritage resources have inherent potential to contribute significantly to research, education and tourism, as well as allowing capacity for reconciliation, understanding and mutual respect.

Considering the innate value of heritage resources, the foundation of heritage resources management (HRM) is the acknowledgement that heritage resources have lasting worth as evidence of the origins of life, humanity and society. Every generation is therefore morally obligated to act as trustees of heritage for future generations through conservation, preservation and protection.

Accordingly, HRM must take into account rights of affected communities to be consulted and to participate. Where heritage resources are developed and presented the dignity and respect of diverse cultural values must be ensured. In addition, heritage in its broadest sense must never be used for sectarian purposed or political gain.

Notwithstanding the fundamental value ascribed to heritage, significance of individual resources needs to be determined to allow implementation of appropriate management measures. This is achieved through assessing a heritage resource's value relative to certain prescribed criteria, encapsulated in international conventions as well as national legislation. This is addressed in Section 2.1 below.

The significance/value is established by determining the level of importance taking and assessing the degree of integrity of cultural heritage resources. A resource's value thus influences the intensity of environmental impacts. As a result, environmental impacts that



are rated low may cause severe change in a heritage resources rated as highly significant. Vice versa, severe impacts may cause negligible change to an insignificant resource.

The steps involved in determining the value of a heritage resource is described in more detail below.

2.1 Importance

The importance of a heritage resource is determined on four dimensions – aesthetic, historic, scientific, and social. In turn, each dimension is measured against one or more descriptive attributes, defined in national legislation and international convention: NHRA (1999), UNESCO World Heritage Convention (1972), ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties and the Australian ICOMOS Charter for Places of Cultural Significance (1999) (Burra Charter). These attributes, or criteria, are aimed to provide a guide as to whether a resource should be included in the national estate as defined in these documents and presented in Table 2-1 below.

Importance of each dimension and subsequent attributes must be considered in relation to the resource's authenticity. Notions of authenticity are addressed under Section 2.1.1. Importance ratings must be informed and motivated by certain information sources. The credibility of information sources must therefore be evaluated and referred to when importance is discussed. Credibility is addressed under Section 2.1.2.

Table 2-1: Summary of dimensions and attributes

Dimension	Attributes considered		NHRA Ref.	UNESCO Ref.
Aesthetic & technical	1	Importance in aesthetic characteristics	S.3(3)(e)	
	2	Degree of technical / creative skill at a particular period	S.3(3)(f)	
Historical importance & associations	3	Importance to community or pattern in country's history	S.3(3)(a)	
	4	Site of significance relating to history of slavery	S.3(3)(i)	
	5	Association with life or work of a person, group or organisation of importance in the history of the country	S.3(3)(h)	
Information potential	6	Possession of uncommon, rare or endangered natural or cultural heritage aspects	S.3(3)(b)	
	7	Information potential	S.3(3)(c)	
	8	Importance in demonstrating principle characteristics	S.3(3)(d)	
Social	9	Association to community or cultural group for social, cultural or spiritual reasons	S.3(3)(g)	



2.1.1 Authenticity

Authenticity is an integral concept in cultural heritage resources management and must be considered when determining significance/value of cultural landscapes and heritage resources. The Nara Document on Authenticity (Nara Document) (1993) forms the basis of determining authenticity. Authenticity can refer to design, material, workmanship and setting of a resource. Aesthetic and historical aspects of a landscape or site including its physical, social and historical context, use and function are also covered (Winter & Baumann, 2005, p. 4).

Determining authenticity of a resource requires a sound knowledge of the type of heritage resource as well as the context within which occurs – the cultural landscape. This knowledge can only be gained through a detailed baseline accessing credible information sources.

2.1.2 Credibility

The Nara Document (1993) accepts that understanding authenticity and thus determining importance attributed to heritage resources rely on credible information sources. Information sources are defined as all physical, written, oral, and figurative sources, which make it possible to know the authenticity – nature, specificities, meaning, and history – of cultural heritage resources. This requires knowledge and understanding of information sources employed in relation to original and subsequent characteristics of heritage resources, and their meaning.

Information that should be considered are published, peer reviewed literature, archival research, popular publications, and any other information source that may be relevant (Nara Document on Authenticity, 1993).

Information sources need to be assessed as credible and truthful and referenced when determining importance of a resource and in motivation of its authenticity. Credibility of information sources forms the basis in determining the importance of heritage resources. The importance rating per dimension and attribute discussed above is thus intrinsically linked to the credibility of information sources used.

2.2 Integrity

Integrity is determined by examining the physical condition of a heritage resource – as witnessed at the time of assessment – compared to an ideal or other existing example. Integrity ought to be assessed only after the resource's authenticity has been determined, as the information source/s used should provide comparative examples against which its present condition may be measured. Thresholds and definitions for integrity are described in Table 2-2 below.

Table 2-2: Integrity definitions

Integrity	
0	Resource degraded to extent where no information potential exists; resource cannot be restored; single, isolated find, without any site context;
1	Poor condition, active decay visible; excessive restoration required; little information potential
2	Fair to good condition; well preserved; some decay present; can be easily restored/conserved/preserved; good information potential
3	Excellent/pristine; extremely well preserved; little to no decay present; little restoration required/restoration will greatly enhance resource; excellent information potential



3 IMPACT ASSESSMENT

Assessing environmental impacts on heritage resources are based first on the value of a resource and second how that value may change due to environmental aspects. Environmental management systems employ relative standard terminology that characterises impacts. This terminology has been adapted to provide a well-defined descriptive terminology for use in assessing environmental impacts on heritage resources summarised in Table 3-1.

Table 3-1: Impact characteristic terminology

Characteristic	Description	Designation
Type	Relationship of an assumed impact to a heritage resource (in terms of cause and effect)	Direct Indirect Induced
Scale of change	The physical area (size) of a heritage resource that may change	None Isolated parts / aspects will change Large parts / aspects will change Most or entire resource will change
Duration	Time period over which resource will change	Immediate, non-permanent and fully reversible Long-term, non-permanent and reversible Long-term, permanent and irreversible Immediate, permanent and irreversible
Intensity	How an impact could change the authenticity and integrity, thus importance, of a resource	None Change in integrity without affecting authenticity Change in integrity will affect aspects of authenticity Change in integrity will affect overall authenticity



Characteristic	Description	Designation
Probability	Likelihood of change occurring	None Project-related mitigation will remove change Project-related mitigation will reduce change Project-related mitigation will not reduce change

The rating takes into account:

- Spatial scale of impact;
- Expected duration of impact; and
- Severity of impact;
- Consequence of impact;
- Probability of impact occurring; and
- Value of heritage resource

$$\text{Impact significance} = \text{Value} \times \text{Magnitude}$$

Where

$$\text{Value} = \text{Importance} + \text{Credibility} + \text{Integrity}$$

And

$$\text{Magnitude} = \text{Consequence} \times \text{Probability}$$

And

$$\text{Consequence} = \text{Spatial scale} + \text{Duration} + \text{Severity}$$

The impact rating is applied to pre- and post-mitigation scenarios. The ideal is to remove all impacts to a heritage resource. Where post mitigation significance is not zero, the recommended field rating (heritage) mitigation must be undertaken. The tables below provide the various descriptions and thresholds applicable to the impact assessment ratings.



Table 3-2: Description of magnitude ratings

Score	Description	Rating
0	No/negligible environmental impacts expected on heritage resource	None/negligible
1-8	Low magnitude of environmental impacts on heritage resource	Low
9-16	Medium magnitude of environmental impacts on heritage resource	Medium
17-27	High/exceptional magnitude of environmental impacts on heritage resource	High

Magnitude											
		Consequence									
		0	1	2	3	4	5	6	7	8	9
Probability	0	0	0	0	0	0	0	0	0	0	0
	1	0	1	2	3	4	5	6	7	8	9
	2	0	2	4	6	8	10	12	14	16	18
	3	0	3	6	9	12	15	18	21	24	27

Magnitude = Consequence x Probability

where

Consequence = scale + duration + severity

**Table 3-3: Scores, descriptions and ratings determining consequence of impact**

Scale		
Score	Description	Rating
0	No effect on any part/aspect of heritage resource	None
1	Isolated parts/aspects of heritage resource will be affected	Low
2	Large parts/aspects of heritage resource will be affected	Medium
3	Most or entire heritage resource will be affected	High
Duration		
Score	Description	Rating
0	No impact will occur during life of project	None
1	Impact will be short and reversible	Low
2	Impact will occur throughout life of project, but is reversible	Medium
3	Impact is permanent and irreversible	High
Severity		
Score	Description	Rating
0	Negligible to no change/alteration/damage/destruction of heritage resource	None
1	Reversible changes/alterations to heritage resource	Low
2	Parts/aspects of heritage resource will be permanently altered/changed/destroyed	Medium
3	Entire heritage resource will be permanently altered/changed/destroyed	High



Probability		
Score	Description	Rating
0	Impact will not occur	None
1	Impact could occur, but implementation of appropriate project mitigation measures reduce/remove impacts	Unlikely
2	Impact may occur during life of project regardless of implementation of project mitigation measures	Probable
3	Impact will definitely occur, project mitigation measures will not reduce or remove impacts	Certain

**Table 3-4: Significance of impact on categories of heritage resources**

Score	Magnitude of Impact			
	Rating	Archaeology, Palaeontology	Built Environment/Structures	Historic Landscape
0	No change	No change	No change to fabric or setting	No changes to landscape elements, parcels or components; no visual or audible changes; no changes in amenity or community factors.
1-49	Low	Very minor changes to key archaeological materials, or setting.	Slight changes to historic building elements or setting that hardly affect it.	Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise or sound quality; very slight changes to use or access; resulting in very small change to historic landscape character.
50-98	Medium	Changes to key archaeological materials, such that the resource is slightly altered; slight changes to the setting.	Change to key historic building elements, such that the resource is slightly different; change to setting of an historic building, such that it is noticeably changed.	Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of the historic landscape; limited changes in noise or sound quality; slight changes to use or access; resulting in limited changes to historic landscape character.
99-147	High	Changes to many key archaeological materials, such that the resource is clearly modified; changes to the setting that affect the character of the asset	Change to many key historic building elements, such that the resource is significantly modified; change to setting of an historic building, such that it is significantly modified.	Change to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character.



Score	Magnitude of Impact			
	Rating	Archaeology, Palaeontology	Built Environment/Structures	Historic Landscape
		Changes to attributes that convey outstanding national value of national estate; Most or all key archaeological materials, including those that contribute to ONV such that the resource is totally altered; comprehensive changes to setting	Change to key historic building that contributes to outstanding national value of national estate such that the resource is totally altered; Comprehensive changes to setting.	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit and loss on outstanding national value.



4 FIELD RATING (SOUTH AFRICAN PROJECT)

Field ratings, or proposed grading of heritage resources, are required by SAHRA in terms of Section 7(1) of the NHRA. Field ratings are based on the assessments of heritage resources in relation to criteria contained in Section 3(3) of the NHRA (see above). Section Y of the NHRA further outlines a three-tier system for heritage resources management of the national estate based on proposed grading:

- National: SAHRA is responsible for identification and managing of Grade I heritage resources;
- Provincial: Provincial Heritage Resources Authorities (PHRAs) are responsible for identification and managing of Grade II heritage resources; and
- Local: Local authorities (municipalities, metros, local government) are responsible for identification and managing of Grade III heritage resources.

Field ratings are based on (equal to) the value of a heritage resource. The thresholds for field ratings are present in Table 4-1 below.

Table 4-1: Field rating thresholds and descriptions

NHRA SECTION 7 GRADING			
Score	Grade	Protection	Recommended Heritage Mitigation
41-45	Grade I	National	Heritage resource should be nominated as a National Site/Object, included in National Estate
36-40	Grade II	Provincial	Heritage resource should be nominated as a Provincial Site/Object, included in National Estate
31-35	Grade III A	Local	Heritage resource should be nominated as a Regional Site/Object, included in National Estate
16-30	Grade III B	Local	The heritage resource must be mitigated and partly conserved/preserved
8-15	Grade IV A	General	The heritage resource must be mitigated before destruction
1-7	Grade IV B	General	The heritage resource must be recorded before destruction
0	Grade IV C	General	No mitigation required - application for destruction permit



5 REFERENCES

Nara Document on Authenticity, 1993. *ICOMOS: The Nara Document on Authenticity*, United Nations Educational, Scientific and Cultural Organisation: International Council on Monuments and Sites.

Winter, S. & Baumann, N., 2005. *Guideline for Involving Heritage Specialist in EIA Process Edition 1: CSIR Report No ENV-S-C 2005 E*, Cape Town: Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning.

STATEMENT OF SIGNIFICANCE/HERITAGE VALUE									IMPACT ASSESSMENT											HERITAGE MITIGATION							
Details of Heritage Resource			STATEMENT OF SIGNIFICANCE/VALUE						NHRA Trigger	Source of Risk	Impact	Impact Rating							Impact Rating (after project mitigation)							FIELD RATING	MINIMUM REQUIRED MITIGATION
			Authenticity				INTEGRITY	VALUE				Before project mitigation				After project mitigation											
Resource ID	Resource Type	Reference in HIA	Artistic	Historic	Scientific	Social							Nature of Change (N/P)	Scale of Change	Duration of Change	Intensity of Change	Consequence	Probability	MAGNITUDE	Nature of Change (N/P)	Scale of Change	Duration of Change	Intensity of Change	Consequence	Probability	MAGNITUDE	
			I	I	I	I																					
S.35-008	Iron Age/Historic open scatter	10.1	1	-	1	0	1	1	38(c)(i)	Construction of the boxcut	Archaeological material may be unintentionally exposed as a result of activities associated with the construction and operation of the boxcut.					0	0					0		0	No heritage mitigation required	None	
S.35-570	Isolated Stone Age/Iron Age occurrence	10.2	0	-	0	0	0	0	38(c)(i)	Construction of the opencast mine	Archaeological material may be unintentionally exposed as a result of activities associated with the construction and operation of the boxcut.					0	0					0		0	No heritage mitigation required	None	
S.35-728	Isolated Iron Age/Historic occurrence	10.3	0	-	0	0	0	0	38(c)(i)	Construction of the opencast mine	Archaeological material may be unintentionally exposed as a result of activities associated with the construction and operation of the boxcut.					0	0					0		0	No heritage mitigation required	None	
S.35-729	Isolated Iron Age/Historic occurrence	8.1	0	-	0	0	0	0	38(c)(i)	Construction of the opencast mine	Archaeological material may be unintentionally exposed as a result of activities associated with the construction and operation of the boxcut.					0	0					0		0	No heritage mitigation required	None	
S.35-730	Iron Age/Historic open scatter	8.1	1	-	0	0	0	0	38(c)(i)	Construction of the opencast mine	Archaeological material may be unintentionally exposed as a result of activities associated with the construction and operation of the boxcut.					0	0					0		0	No heritage mitigation required	None	
S.35-731	Isolated Iron Age/Historic occurrence	8.1	0	-	0	0	0	0	38(c)(i)	Construction of the opencast mine	Archaeological material may be unintentionally exposed as a result of activities associated with the construction and operation of the boxcut.					0	0					0		0	No heritage mitigation required	None	
S.35-021	Iron Age/Historic feature	8.1	1	-	0	0	1	0	38(c)(i)	Construction of the opencast mine	Archaeological material may be unintentionally exposed as a result of activities associated with the construction and operation of the boxcut.					0	0					0		0	No heritage mitigation required	None	
S.35-030	Isolated Iron Age/Historic occurrence	8.1	1	-	0	0	0	0	38(c)(i)	Construction of the opencast mine	Archaeological material may be unintentionally exposed as a result of activities associated with the construction and operation of the boxcut.					0	0					0		0	No heritage mitigation required	None	
S.35-031	Iron Age/Historic feature	8.1	0	-	0	0	0	0	38(c)(i)	Construction of the opencast mine	Archaeological material may be unintentionally exposed as a result of activities associated with the construction and operation of the boxcut.					0	0					0		0	No heritage mitigation required	None	

STATEMENT OF SIGNIFICANCE/HERITAGE VALUE									IMPACT ASSESSMENT											HERITAGE MITIGATION							
Details of Heritage Resource			STATEMENT OF SIGNIFICANCE/VALUE						NHRA Trigger	Source of Risk	Impact	Impact Rating							Impact Rating (after project mitigation)							FIELD RATING	MINIMUM REQUIRED MITIGATION
			Authenticity				INTEGRITY	VALUE				Before project mitigation				After project mitigation											
Resource ID	Resource Type	Reference in HIA	Artistic	Historic	Scientific	Social						Nature of Change (N/P)	Scale of Change	Duration of Change	Intensity of Change	Consequence	Probability	MAGNITUDE	Nature of Change (N/P)	Scale of Change	Duration of Change	Intensity of Change	Consequence	Probability	MAGNITUDE		
S.36-748	Two informal burials	8.2.1	-	-	-	5	2	10	38(c)(i)	Construction of the opencast mine	Immediate threats include site clearance for development such as the opencast pit. Potential sources of threats and risk include vandalism by workers on site and accidental destruction or alteration of burial site by construction workers on site.	N	6	6	7	11	7	74	P	2	5	2	10	3	30	Grade III B - Local	Part retained as heritage register site; destructive or alteration mitigation may be possible.
S.36-001	Informal burial ground	8.2.2	-	-	-	5	2	10	38(c)(i)	Construction of the opencast mine	Immediate threats include site clearance for development such as the opencast pit. Potential sources of threats and risk include vandalism by workers on site and accidental destruction or alteration of burial site by construction workers on site.	N	6	6	7	11	7	74	P	2	5	2	10	3	30	Grade III B - Local	Part retained as heritage register site; destructive or alteration mitigation may be possible.

Appendix C: Registered Stakeholders

Name	Organisation	Contact Number	Email
Avhashoni Nicholas Magada	Department of Rural Development and Land Reform	015 297 3539 082 465 7848	ANMagada@ruraldevelopment.gov.za
Sporo Masemola	Greater Sekhukhune District Municipality	013 262 7300 013 262 7301 013 262 7302	masemolas@sekhukhune.gov.za
Ms Letsoalo	Fetakgomo Local Municipality- Environmental officer	015 622 8000	nyatjad@webmail.co.za
Ms Lebeti	Fetakgomo Local Municipality Municipal Manager	015 622 8008	motlanano@fetakgomo.gov.za
Mr Jacques van Niekerk	SAMANCOR Chrome (Pty) Ltd	013 230 8228 082 327 4308	jacques.vanniekerk@samancorcr.com
Mr Masula	Kopanong Shopping Centre	012 711 0381	
Mr Andrew Letlape	Bokoni Platinum Mines: Community Liaison Officer	083 455 7882	andrew@atlatsa.com
Mr Steven Baytop	WESSA		admin@bushpigsedu.co.za
Mr Nkosana Rakitla	Earth Life	011 339 3662	Nkosana@earthlife.org.za
Wilma Prinsloo	Transvaal Agricultural Union	012 804 8031	wilma@ntlu.co.za
Pam Barret	Birdlife SA	011 789 1122	advocacy@birdlife.org.za
R.C Sekgobela	Selepe Tribal Authority		
R.C Sekgobela	Selepe Tribal Authority		
D.A Selepe	Selepe Tribal Authority		
Ephraim Mosamedi	Selepe Tribal Authority	076 505 5709	
Letsogo Malatsi	Selepe Tribal Authority	082 837 6164	

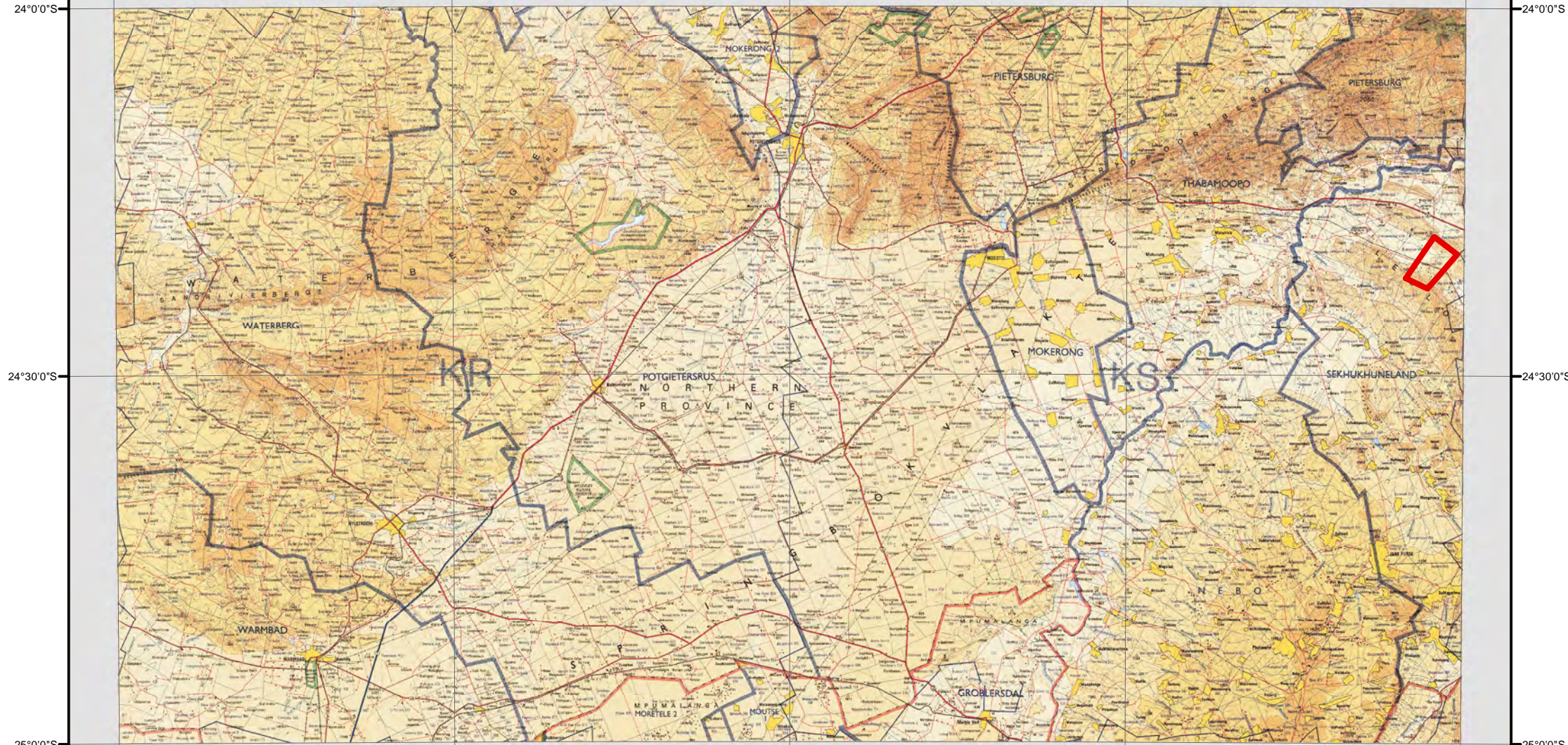
Appendix D: Location and Site Maps

Bokoni Platinum Mines (Pty) Ltd

Topographical Map
1: 250 000

Legend

 Project Area



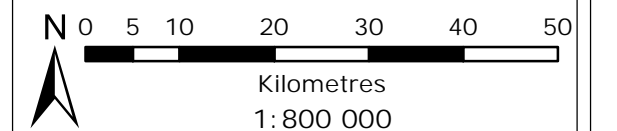
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2428 Modimolle



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Projection: Transverse Mercator Ref #: anp.BOK1630.201206.069
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Central Meridian: 29°E Date: 14/09/2012



Bokoni Platinum Mines (Pty) Ltd Topographical Map 1:50 000

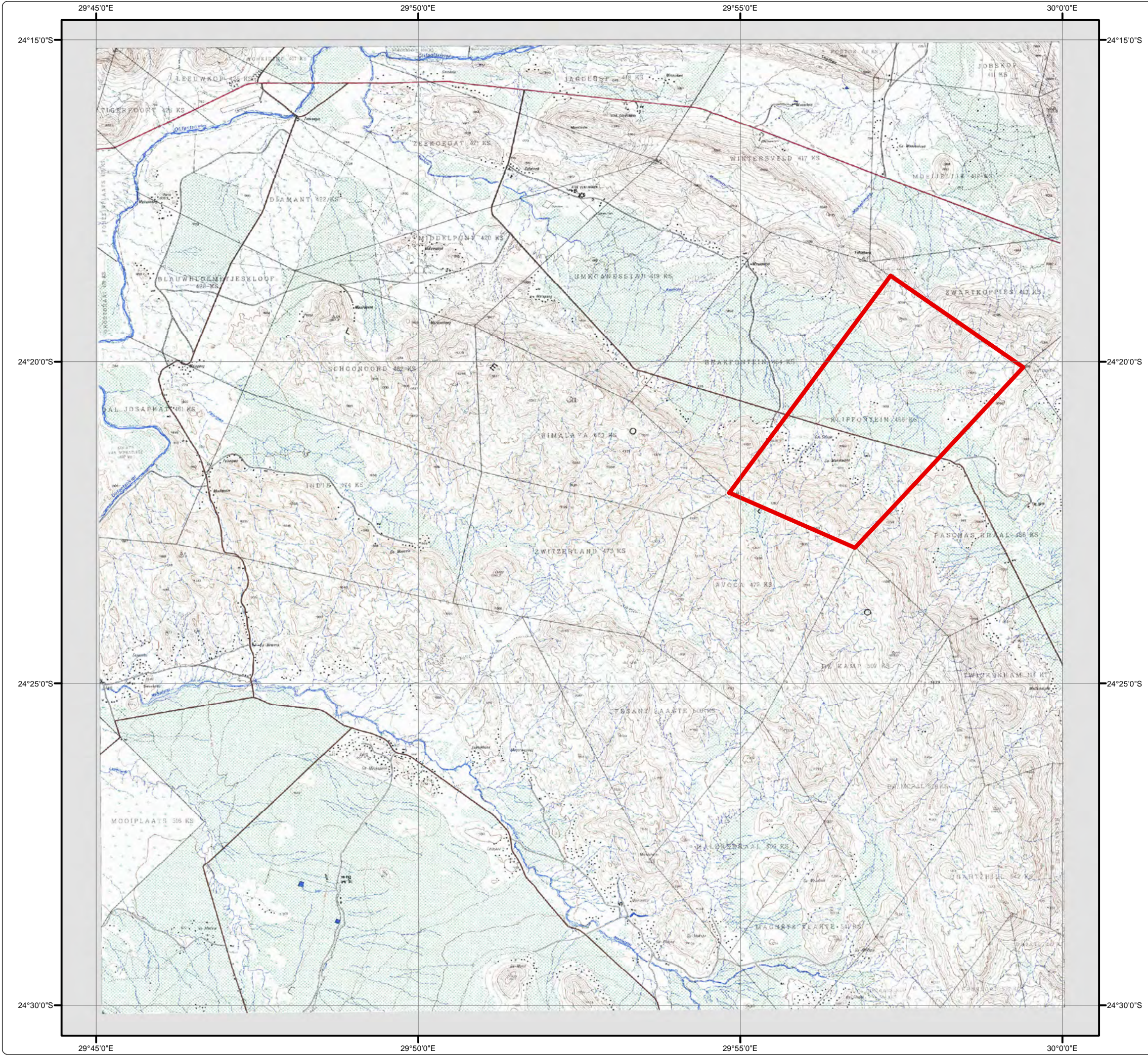
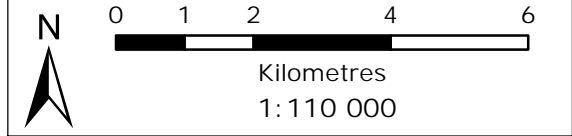
Legend

 Project Area

1: 50 000 Topographical Sheet:
2429BD Ga-Mankopane



Geographic Coordinate System Ref #: anp.ANO1557.201207.13
Datum: WGS 1984 Revision Number: 1
Date: 05/07/2012



Bokoni Platinum Mines (Pty) Ltd

Aerial Photography

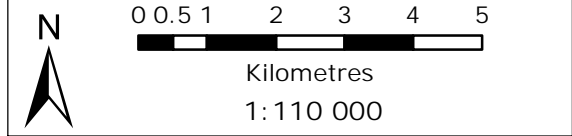
1: 10 000

Legend

-  Proposed Rock Dump
-  Project Area
-  Haul Road
-  Workshop
-  Opencast Area
-  Boxcut














Projection: Transverse Mercator Ref #: anp.ANO1557.201207.13
 Datum: Hartebeesthoek 1994 Revision Number: 1
 Central Meridian: 29°E Date: 05/07/2012



Bokoni Platinum Mines (Pty) Ltd

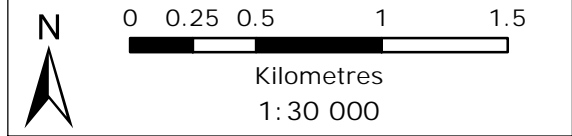
GPS Track Log

Legend

-  Proposed Rock Dump
-  Project Area
-  GPS Track Log
-  Main Road
-  Other Access Road
-  Perennial Stream
-  Non-Perennial Stream
-  Opencast Area
-  Boxcut
-  Workshop
-  Haul Road



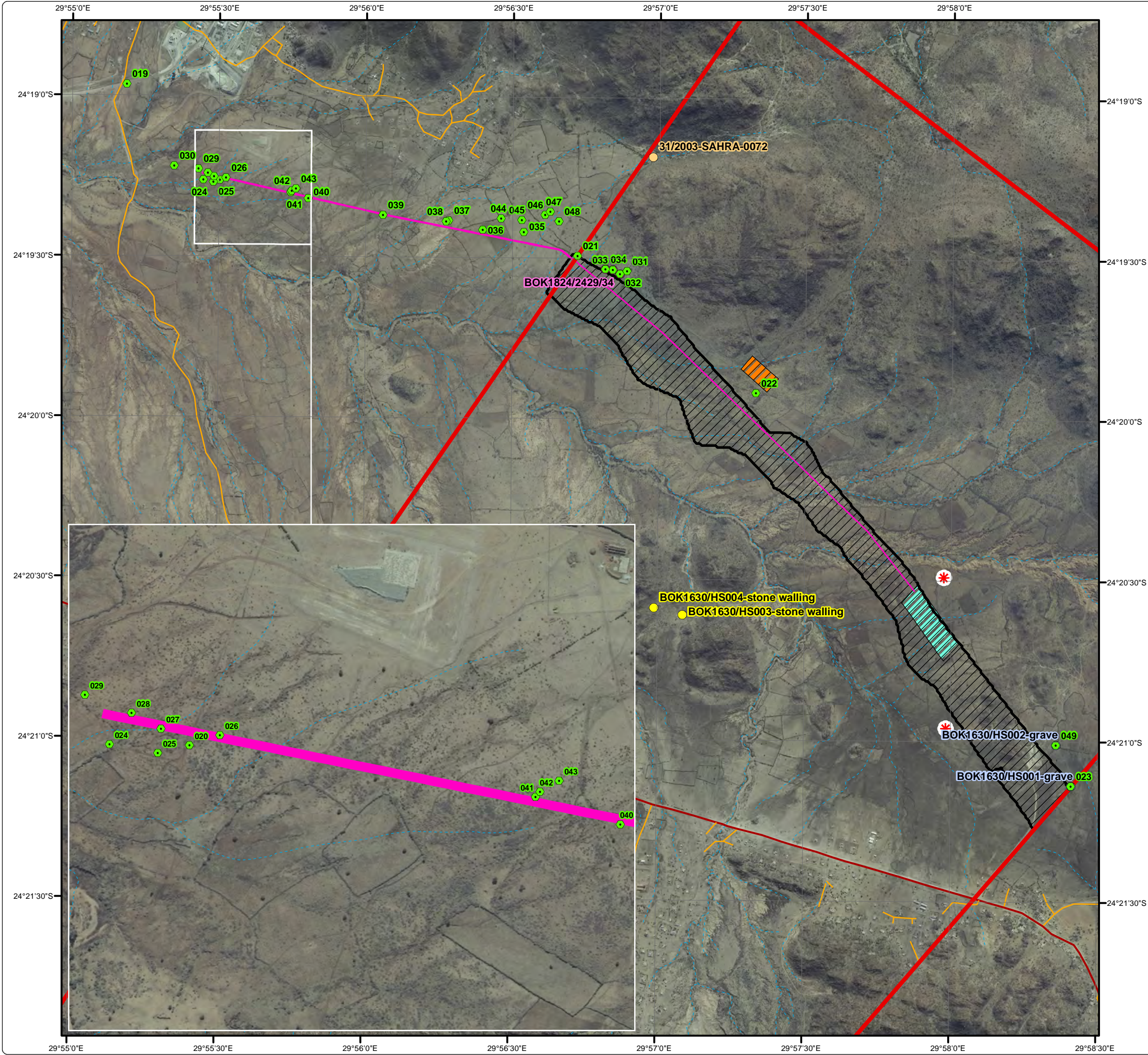
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 Datum: Hartebeesthoek 1994 Revision Number: 1
 Central Meridian: 29°E Date: 17/04/2012



Bokoni Platinum Mines (Pty) Ltd

Watching Brief & Heritage Statement Sites

- Legend**
- Watching Brief Heritage Points
 - ✱ Proposed Rock Dumps
 - Project Area
 - Main Road
 - Other Access Road
 - Perennial Stream
 - Non-Perennial Stream
 - Opencast Area
 - Boxcut
 - Workshop
 - Haul Road
- Source of Klipfontein Heritage Sites**
- Aerial Survey
 - Previous Impact Assessment (Roodt, 2003)
 - Screening Site Visit of Klipfontein 465 KS (August, 2012)
 - Watching Brief (August, 2012)



BOK1630/HS004-stone walling
 BOK1630/HS003-stone walling

BOK1630/HS002-grave 049
 BOK1630/HS001-grave 023



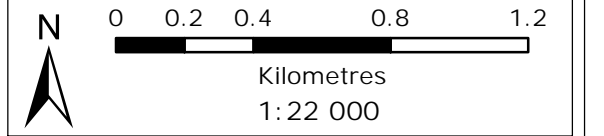
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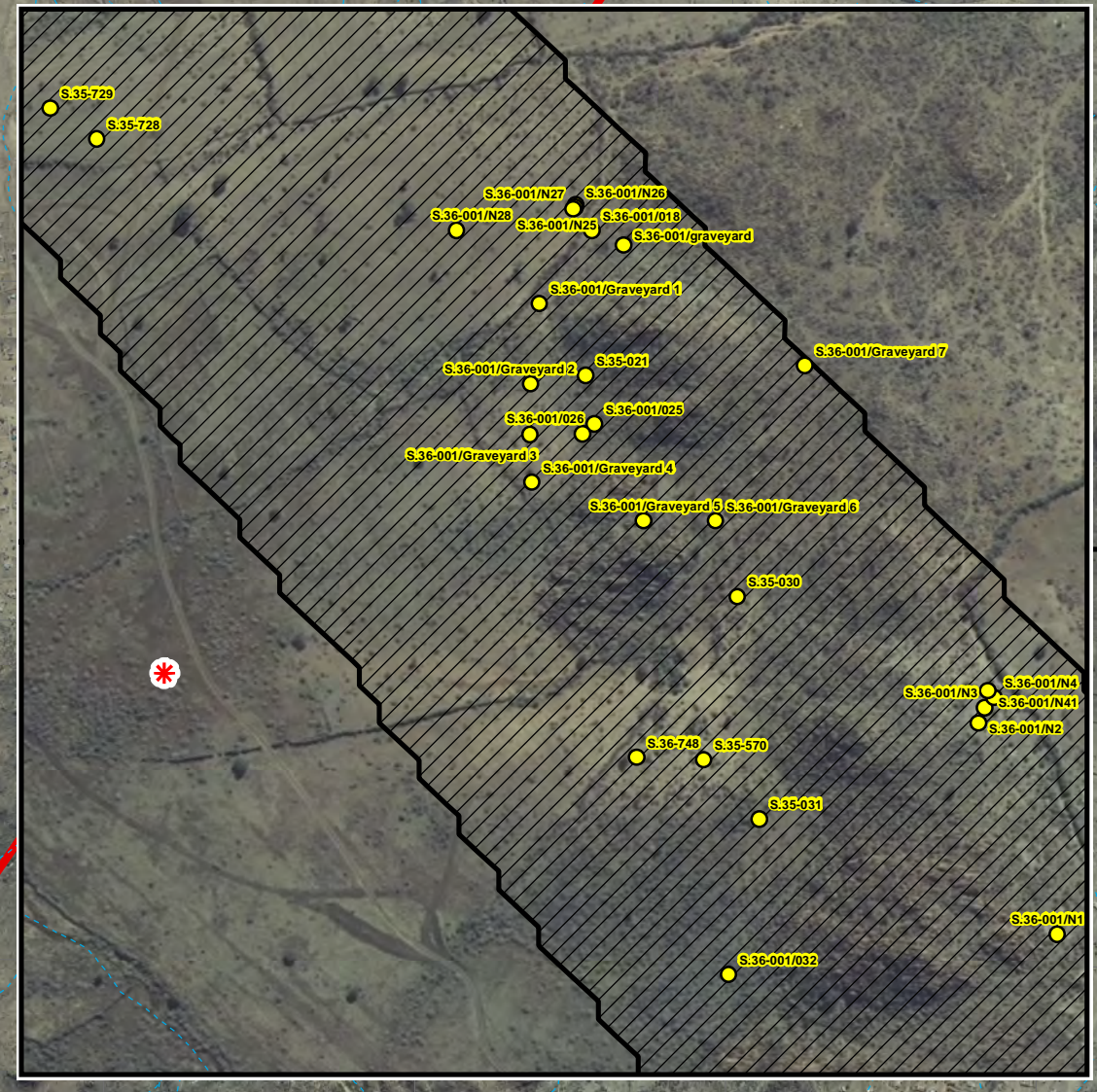
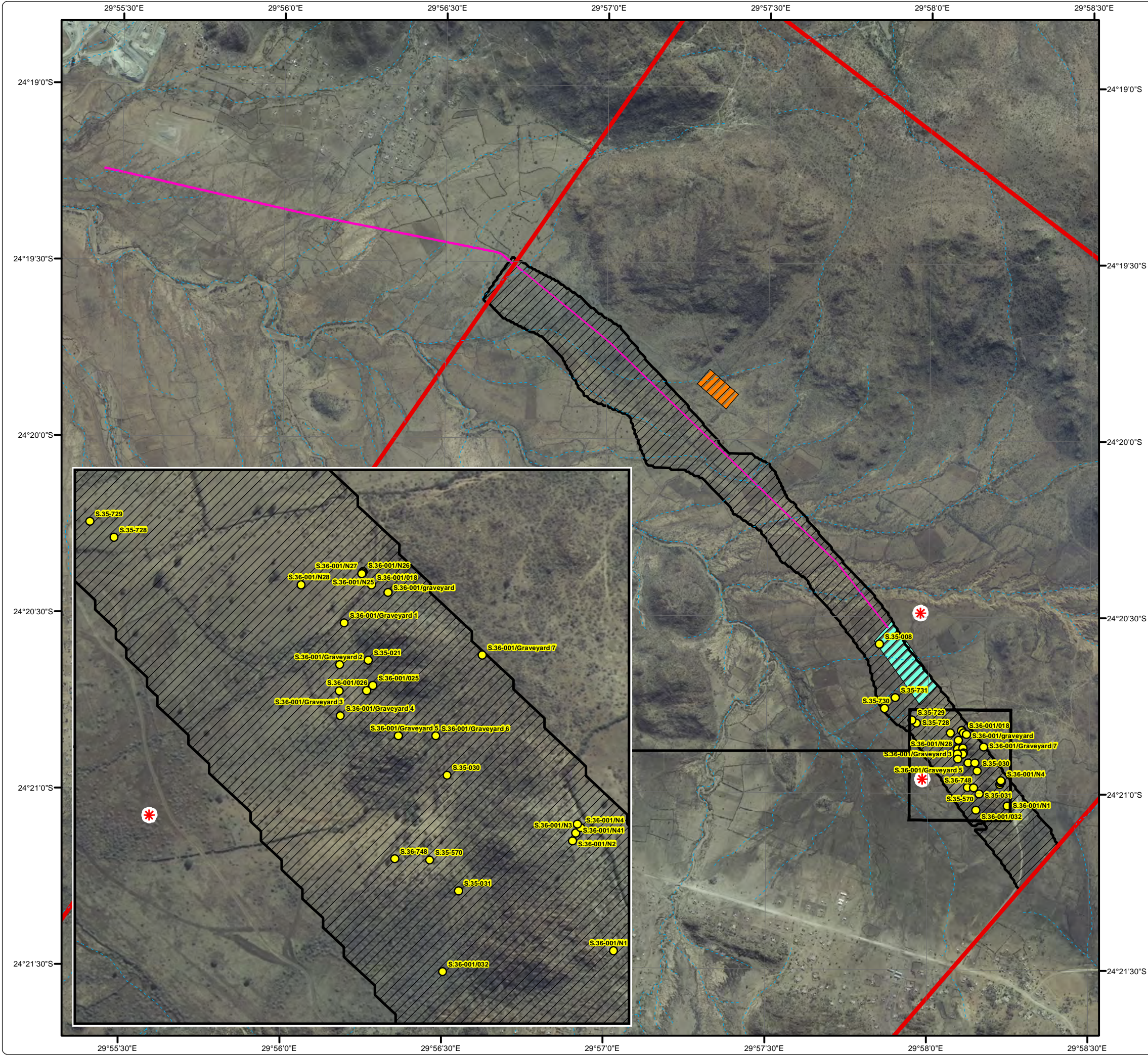


Bokoni Platinum Mines (Pty) Ltd

Mine Plan & Heritage Sites

Legend

- Heritage Sites
- ✱ Proposed Rock Dump
- Project Area
- Perennial Stream
- Non-Perennial Stream
- Opencast Area
- Boxcut
- Workshop
- Haul Road





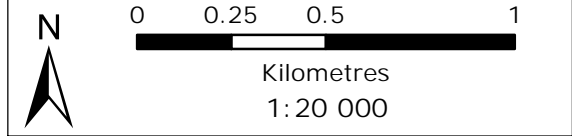
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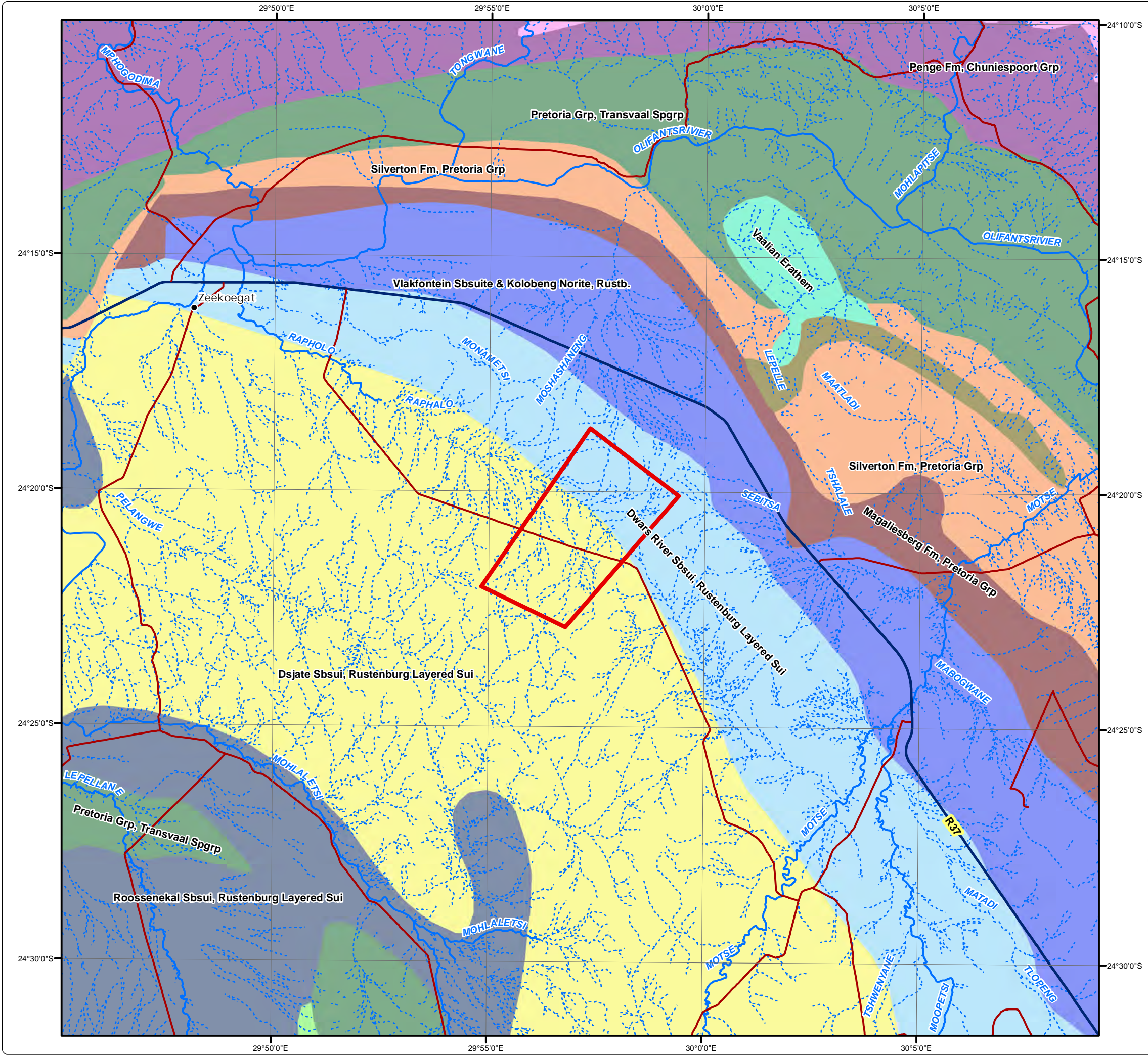
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 Datum: Hartebeesthoek 1994 Revision Number: 2
 Central Meridian: 29°E Date: 14/06/2013



Bokoni Platinum Mines (Pty) Ltd Regional Geology

Legend

- Settlement
 - ▭ Project Area
 - Arterial Route
 - Main Road
 - Perennial Stream
 - Non-Perennial Stream
- ### Regional Geology
- Dsjate Sbsui, Rustenburg Layered Sui
 - Dwars River Sbsui, Rustenburg Layered Sui
 - Lebowa Granite Sui, Bushveld Cplx
 - Machadodorp Memb, Silverton Fm
 - Magaliesberg Fm, Pretoria Grp
 - Malmali Sbrp, Chuniespoort Grp
 - Penge Fm, Chuniespoort Grp
 - Pretoria Grp, Transvaal Spgrp
 - Roosenekal Sbsui, Rustenburg Layered Sui
 - Silverton Fm, Pretoria Grp
 - Vaalian Erathem
 - Vlaktefontein Sbsuite & Kolobeng Norite, Rustb.





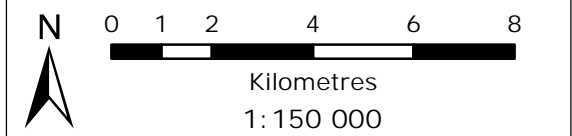
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 Datum: Hartebeesthoek 1994 Revision Number: 2
 Central Meridian: 29°E Date: 14/09/2012



Appendix E: Identified archaeological sites and graves

1 IDENTIFIED HERITAGE RESOURCES

1.1 BOK1630/2429BD/S.35-008 (Iron Age/Historic open scatter)

A concentration of seven undiagnostic ceramic fragments (Figure 1-1 and Figure 1-5), two lower grinding stones (Figure 1-2 and Figure 1-3), and at least one upper grinding stone fragment identified next to an old agricultural field (Figure 1-4). The coordinates are S 24°20'34.70" and E 29°57'50.90".



Figure 1-1: Three undiagnostic potsherd ceramic fragments identified at Site S.35-008.



Figure 1-2: A lower grinding stone identified at Site S.35-008.

BOK1630



Figure 1-3: A lower grinding stone identified at Site S.35 008.



Figure 1-4: At least one upper grinding stone fragment identified at Site S.35-008.



Figure 1-5: Four undiagnostic potsherd ceramic fragments identified at Site S.35 008.

1.2 BOK1630/2429BD/S.35-570 (Isolated Stone Age/Iron Age occurrence)

Three diagnostic ceramic fragments with burnish and two MSA artefacts were noted near the base of a small koppie (Figure 1-6 and Figure 1-7). The coordinates are S 24°20'59.06" and E 29°58'08.61".

BOK1630



Figure 1-6: Five artefacts were identified at Site S.35-570.



Figure 1-7: Three ceramic fragments with burnish were identified at Site S.35-570.

1.3 BOK1630/2429BD/S.35-728 (Isolated Iron Age/Historic occurrence)

Two undiagnostic ceramic fragments were noted next to an old agricultural field (Figure 1-8 and Figure 1-9). The coordinates are S 24°20'48.11" and E 29°57'57.92".



Figure 1-8: General view of Site S.35-728 in landscape. The solid red line indicates the agricultural field boundary.

BOK1630



Figure 1-9: Two undiagnostic ceramic fragments were identified at Site S.35-728.

1.4 BOK1630/2429BD/S.35-729 (Isolated Iron Age/Historic occurrence)

Two undiagnostic potsherd ceramic fragments were noted next to an old agricultural field (Figure 1-10 and Figure 1-11). The coordinates are S 24°20'47.57" and E 29°57'57.10".



Figure 1-10: General view of Site S.35-729 in landscape. The solid red line indicates the agricultural field boundary.



Figure 1-11: Two undiagnostic ceramic fragments were identified at Site S.35-729.

1.5 BOK1630/2429BD/S.35-730 (Iron Age/Historic open scatter)

A concentration of four undiagnostic ceramic fragments and three diagnostic ceramic fragments with burnish were noted near an erosion gully (Figure 1-12). The coordinates are S 24°20'45.61" and E 29°57'51.94".



Figure 1-12: Seven ceramic fragments were identified at Site S.35-730.

1.6 BOK1630/2429BD/S.35-731 (Isolated Iron Age/Historic occurrence)

A single, isolated occurrence of an undiagnostic ceramic fragment was noted near an erosion gully. The site is about 70 km south west of S.35-730 (Figure 1-13). The coordinates are S 24°20'43.80" and E 29°57'53.91".



Figure 1-13: A single, undiagnostic ceramic fragment at Site S.35-731.

1.7 BOK1630/2429BD/S.35-021 (Iron Age/Historic feature)

Site S.35-021 is an Iron Age/Historic stone walled site that is situated on a small koppie directly adjacent to the burial ground S.36-001 (Figure 1-14). The site is located in the opencast mine area. The stone walling may be associated with the burial ground. The coordinates are S 24°20'52.28" and E 29°58'06.53".



Figure 1-14: Stone walling identified at Site S.35-021 in landscape.

1.8 BOK1630/2429BD/S.35-030 (Isolated Iron Age/Historic occurrence)

An isolated occurrence of one ceramic fragment with graphite and two ceramic fragments with burnish were identified and recorded on a koppie in the opencast mine area (Figure 1-15). The coordinates are S 24°20'56.18" and E 29°58'09.20".



Figure 1-15: Three ceramic fragments identified at Site S.35-030.

1.9 BOK1630/2429BD/S.35-031 (Iron Age/Historic feature)

A single grain bin foundation was identified and recorded next to an old agricultural field (Figure 1-16). The coordinates are S 24°21'00.10" and E 29°58'09.59".

BOK1630



Figure 1-16: A single grain bin foundation next to an old agricultural field.

2 IDENTIFIED GRAVES

Site ID	Site Type	South	East
S.36-001/N25	Grave	24°20'49.28"	29°58'06.35"
S.36-001/N26	Grave	24°20'49.32"	29°58'06.35"
S.36-001/N27	Grave	24°20'49.35"	29°58'06.31"
S.36-001/N28	Two graves	24°20'49.72"	29°58'04.26"
S.36-001/018	Grave	24°20'49.71"	29°58'06.68"
S.36-001/graveyard	Grave	24°20'49.99"	29°58' 07.19"
S.36-001Graveyard 1	Grave	24°20'51.02"	29°58'05.71"
S.36-001Graveyard 2	Grave	24°20'52.43"	29°58'05.57"
S.36-001Graveyard 3	Grave	24°20'53.32"	29°58'05.55"
S.36-001Graveyard 4	Grave	24°20'54.17"	29°58'05.58"
S.36-001Graveyard 5	Grave	24°20'54.76"	29°58'07.58"
S.36-001Graveyard 6	Grave	24°20'54.87"	29°58'08.72"
S.36-001Graveyard 7	Grave	24°20'52.11"	29°58'10.39"
S.36-001/N4	Grave	24°20'57.84"	29°58'13.62"
S.36-001/N3	Grave	24°20'58.14"	29°58'13.56"
S.36-001/N2	Grave	24°20'58.42"	29°58'13.45"
S.36-001/N1	Grave	24°21'02.13"	29°58'14.84"
S.36-032	Grave	24°21'02.90"	29°58'09.10"
S.36-748	Two graves	24°20'59.00"	29°58'07.40"

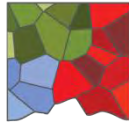
Appendix F: Chance Find Procedures, Fossil Find Procedures and Fossil Monitoring



**CHANCE FIND PROCEDURES (CFPS)
FOR BOKONI PLATINUM (PTY) LTD,
SEKHUKHUNE, LIMPOPO PROVINCE**

BOKONI PLATINUM (PTY) LTD

18 JUNE 2013




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Report Title: Chance Find Procedures (CFPs) for Bokoni Platinum (Pty) Ltd, Sekhukhune, Limpopo Province

Project Number: BOK1630 CFPs Document

Name	Responsibility	Signature	Date
Justin du Piesanie: HRM Specialist	CFPs Compiler		2013-06-18

This report is provided solely for the purposes set out in it and may not, in whole or in part, be used for any other purpose without Digby Wells Environmental prior written consent.



ACRONYMS

BGG	Burial Grounds and Graves
CFPs	Chance Find Procedures
CL	Community Liaison
Digby Wells	Digby Wells Environmental
EC	Environmental Control
HIA	Heritage Impact Assessment
HRM	HRM Resources Management
HS	Health and Safety
ICOMOS	International Council on Monuments and Sites
LIHRA	Limpopo Heritage Resources Authority
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
SAHRA	South African Heritage Resources Authority
SAPS	South African Police Service
UNESCO	United Nations Educational, Scientific and Cultural Organisation

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3	CHANCE FIND PROCEDURES	1
3.1	INITIAL IDENTIFICATION AND/OR EXPOSURE	1
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3.3	CHANCE FIND PROCEDURE: BGG.....	2
4	CONCLUSION	3

1 INTRODUCTION

The purpose of this document is to provide Bokoni Platinum, (Pty) Ltd (Bokoni) and their contractors with the appropriate response guidelines (extracted and adapted from the National Heritage Resources Act (Act No. 25 of 1999) Regulations Reg No. 6820, GN: 548, taking into consideration international best practice based on World Bank, Equator Principles and the International Finance Corporation Performance Standards, 1972 UNESCO Convention on the Protection of World Cultural and Natural Heritage (World Heritage Convention), ICOMOS Guideline on Heritage Impact Assessment and the Australian ICOMOS Burra Charter (1999)) that should be implemented in the event of chance discovery of heritage resources. These guidelines or chance find procedures (CFPs) can be incorporated into Bokoni policies that may have relevance during construction and operational phases.

The CFPs presented by Digby Wells Environmental (Digby Wells) aim to avoid and/or reduce project risks that may result due to chance finds, whilst considering international best practice.

2 DEFINITIONS

For simplicity, the term 'heritage resource' includes structures, archaeology, palaeontology, meteors, and public monuments as defined in the South African National Heritage Resources Act (Act No. 25 of 1999) (NHRA) Sections 34, 35, and 37. Procedures specific to burial grounds and graves (BGG) as defined under NHRA Section 36 will be discussed separately as these require the implementation of separate criteria for CFPs.

3 CHANCE FIND PROCEDURES

The following procedural guidelines must be considered in the event that previously unknown heritage resources or burial grounds and graves (BGG) are exposed or found during the life of the project.

3.1 Initial Identification and/or Exposure

Heritage resources or BGG may be identified during construction or accidentally exposed. The initial procedure when such sites are found aim to avoid any further damage. The following steps and reporting structure must be observed in both instances:

1. The person or group (identifier) who identified or exposed the burial ground must cease all activity in the immediate vicinity of the site;
2. The identifier must immediately inform his/her supervisor of the discovery;
3. The supervisor must ensure that the site is secured and control access; and

4. The supervisor must then inform the relevant Bokoni personnel responsible for at least the following portfolios: Community Liaison (CL), Environmental Control (EC) and Health and Safety (HS).

3.2 Chance Find Procedure: Heritage Resources

In the event that previously unidentified heritage resources are identified and/or exposed during construction or operation of the Project, the following steps must be implemented subsequent to those outlined under Section 3.1 above:

1. The Digby Wells project manager and/or Heritage Resources Management (HRM) Unit must be notified of the discovery;
2. Digby Wells will assign a qualified specialist to consider the heritage resource, either via communicating with the EC Officer via telephone or email, or based on a site visit;
3. Appropriate measures will then be presented to Bokoni;
4. Should the specialist conclude that the find is a heritage resource protected in terms of the NHRA (1999) Sections 34, 35, 37 and NHRA (1999) Regulations (Regulation 38, 39, 40), Digby Wells will notify the South African Heritage Resources Agency (SAHRA) and/or the Limpopo Provincial Heritage Resources Agency (LIHRA) on behalf of Bokoni; and
5. Based on the comments received from SAHRA and/or LIHRA, Digby Wells will provide Bokoni with a Terms of References Report and relevant associated costs if necessary.

3.3 Chance Find Procedure: BGG

In the event that previously unidentified BGG are identified and/or exposed during construction or operation of the Project, the following steps must be implemented subsequent to those outlined under Section 3.1 above:

1. The Digby Wells project manager and/or the HRM Unit must immediately be notified of the discovery in order to take the required further steps:
 - i. The local South African Police Service (SAPS) will be notified on behalf of Bokoni;
 - ii. Digby Wells will deploy a suitably qualified specialist to inspect the exposed burial and determine in consultation with the SAPS:
 - The temporal context of the remains, i.e.:
 - a. forensic,

-
- b. authentic burial grave (informal or older than 60 years, NHRA (1999) Section 36); or
 - c. archaeological (older than 100 years, NHRA (1999) Section 38); and
 - If any additional graves may exist in the vicinity.
 2. Should the specialist conclude that the find is a heritage resource protected in terms of the NHRA (1999) Section 36 and NHRA (1999) Regulations (Regulation 38, 39, 40), Digby Wells will notify SAHRA and/or LIHRA on behalf of Bokoni;
 3. SAHRA/PHRA may require that an identification of interested parties, consultation and /or grave relocation take place;
 4. Consultation must take place in terms of NHRA (1999) Regulations 39, 40, 42; and
 5. Grave relocation must take place in terms of NHRA (1999) Regulations 34.

4 CONCLUSION

The CFP's presented in this document serve as international best practice policy for the accidental discovery of heritage resources and BGG. Based on the definitions provided within this document and the proposed lines of communication, Bokoni will be able to mitigate the accidental discovery of heritage resources and BGG throughout the various phases of the project. Where necessary, Digby Wells is available to assist with the recommendation of mitigations for the accidental discovery of heritage resources and BGG.



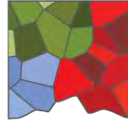
**FOSSIL FIND PROCEDURES (FFPS)
FOR THE PROPOSED BOKONI
KLIPFONTEIN OPENCAST MINE
PROJECT, KLIPFONTEIN 465 KS,**

BOKONI PLATINUM (PTY) LTD

19 JUNE 2013

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*Non-Executive




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Report Title: Fossil Find Procedures (FFPs) for the Proposed Bokoni
Klipfontein Opencast Mine Project, Klipfontein 465 KS,
Sekhukhune, Limpopo Province

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ACRONYMS

ECO	Environmental Control Officer
FFP	Fossil Find Procedure
MA	Monitoring for Fossils

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1 INTRODUCTION

In the context under consideration, it is improbable that fossil finds will require declarations of permanent “no go” zones. At most, a temporary pause in activity at a limited locale may be required. The strategy is to rescue the material as quickly as possible.

The procedures suggested below are in general terms, to be adapted as befits a context. They are described in terms of finds of fossil bones that usually occur sparsely. However, they may also serve as a guideline for other fossil material that may occur.

Bone finds can be classified as two types: isolated bone finds and bone cluster finds.

2 ISOLATED BONE FINDS

In the process of digging excavations, isolated bones may be spotted in the hole sides or bottom, or as they appear on the spoil heap. By this is meant bones that occur singly, in different parts of the excavation. If the number of distinct bones exceeds six pieces, the finds must be treated as a bone cluster (below).

2.1 Response by personnel in the event of isolated bone finds

The following responses should be undertaken by personnel in the event of isolated bone finds:

- **Action 1:** An isolated bone exposed in an excavation or spoil heap must be retrieved before it is covered by further spoil from the excavation and set aside;
- **Action 2:** The site foreman and Environmental Control Officer (ECO) must be informed;
- **Action 3:** The responsible field person (site foreman or ECO) must take custody of the fossil. The following information is to be recorded:
 - Position (excavation position);
 - Depth of find in hole;
 - Digital image of hole showing vertical section (side); and
 - Digital image of fossil.
- **Action 4:** The fossil should be placed in a bag (e.g. a Ziploc bag), along with any detached fragments. A label must be included with the date of the find, position information, and depth; and
- **Action 5:** The ECO is to inform the developer who then contacts the archaeologist and/or palaeontologist contracted to be on standby. The ECO is to describe the occurrence and provide images via email.

2.2 Response by Palaeontologist in the event of isolated bone finds

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established.

3 BONE CLUSTER FINDS

A bone cluster is a major find of bones (e.g. several bones in close proximity or bones resembling parts of a skeleton). These bones will likely be seen in broken sections of the sides of the hole and as bones appearing in the bottom of the hole and on the spoil heap.

3.1 Response by personnel in the event of a bone cluster find

The following responses should be undertaken by personnel in the event of bone cluster finds:

- **Action 1:** Immediately stop excavation in the vicinity of the potential material. Mark or flag the position as well as the spoil heap that may contain fossils;
- **Action 2:** Inform the site foreman and the ECO; and
- **Action 3:** The ECO is to inform the developer who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The ECO is then to describe the occurrence and provide images via email.

3.2 Response by Palaeontologist in the event of a bone cluster find

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established. It is likely that a Field Assessment by the palaeontologist will be carried out.

It will probably be feasible to avoid the find and continue to the excavation farther along, or proceed to the next excavation, so that the work schedule is minimally disrupted. The response time/scheduling of the Field Assessment is to be decided in consultation with the developer/owner and the environmental consultant.

The Field Assessment could have the following outcomes:

- If a human burial, the appropriate authority is to be contacted. The find must be evaluated by a human burial specialist to decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in an archaeological context, an archaeologist must be contacted to evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.
- If the fossils are in a palaeontological context, the palaeontologist must evaluate the site and decide if Rescue Excavation is feasible, or if it is a Major Find.

4 RESCUE EXCAVATION

Rescue Excavation refers to the removal of the material from the “design” excavation. This would apply if the amount or significance of the exposed material appears to be relatively circumscribed and it is feasible to remove it without compromising contextual data. The time span for Rescue Excavation should be reasonable rapid to avoid any undue delays, e.g. one to three days and definitely less than one week.

In principle, the strategy during the mitigation is to “rescue” the fossil material as quickly as possible. The strategy to be adopted depends on the nature of the occurrence, particularly the density of the fossils. The methods of collection would depend on the preservation or fragility of the fossil and whether in loose or in lithified sediment. These could include:

- On-site selection and sieving in the case of robust material in sand; and
- Fragile material in loose sediment would be encased in blocks using Plaster-of-Paris or reinforced mortar.

If the fossil occurrence is dense and is assessed to be a “Major Find”, a carefully controlled excavation is required.

5 MAJOR FINDS

A Major Find is the occurrence of material that, by virtue of quantity, importance and time constraints, cannot be feasibly rescued without compromise of detailed material recovery and contextual observations.

5.1 Management Options for Major Finds

In consultation with the developer/owner and the environmental consultant, the following options should be considered when deciding on how to proceed in the event of a Major Find.

Option 1: Avoidance

Avoidance of the Major Find through project redesign or relocation. This ensures minimal impact to the site and is the preferred option from a heritage resource management perspective. When feasible, it can also be the least expensive option from a construction perspective.

The find site will require site protection measures, such as erecting fencing or barricades. Alternatively, the exposed finds can be stabilised and the site refilled or capped. The latter is preferred if excavation of the find will be delayed substantially or indefinitely. Appropriate protection measures should be identified on a site-specific basis and in wider consultation with the heritage and scientific communities.

This option is preferred as it will allow the later excavation of the finds with due scientific care and diligence.

Option 2: Emergency Excavation

Emergency excavation refers to the “no option” situation where avoidance is not feasible due to design, financial and time constraints. It can delay construction and emergency excavation itself will take place under tight time constraints, with the potential for irrevocable compromise of scientific quality. It could involve the removal of a large, disturbed sample by an excavator and conveying this by truck from the immediate site to a suitable place for “stockpiling”. This material could then be processed later.

Consequently, the emergency excavation is not the preferred option for a Major Find.

6 EXPOSURE OF FOSSIL SHELL BEDS

6.1 Response by personnel in the event of intersection of fossil shell beds

The following responses should be undertaken by personnel in the event of intersection with fossil shell beds:

- **Action 1:** The site foreman and ECO must be informed;
- **Action 2:** The responsible field person (site foreman or ECO) must record the following information:
 - Position (excavation position);
 - Depth of find in hole;
 - Digital image of the hole showing the vertical section (side); and
 - Digital images of the fossiliferous material.
- **Action 3:** A generous quantity of the excavated material containing the fossils should be stockpiled near the site, for later examination and sampling;
- **Action 4:** The ECO is to inform the developer who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The ECO is to describe the occurrence and provide images via email.

6.2 Response by the palaeontologist in the event of fossil shell bed finds

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established. This will most likely be a site visit to document and sample the exposure in detail, before it is covered up.

7 EXPOSURE OF FOSSIL WOOD AND PEATS

7.1 Response by personnel in the event of exposure of fossil wood and peats

The following responses should be undertaken by personnel in the event of exposure of fossil wood and peats:

- **Action 1:** The site foreman and ECO must be informed;
- **Action 2:** The responsible field person (site foreman or ECO) must record the following information:
 - Position (excavation position);
 - Depth of find in hole;
 - Digital image of the hole showing the vertical section (side); and
 - Digital images of the fossiliferous material.
- **Action 3:** A generous quantity of the excavated material containing the fossils should be stockpiled near the site, for later examination and sampling;
- **Action 4:** The ECO is to inform the developer who must then contact the archaeologist and/or palaeontologist contracted to be on standby. The ECO is to describe the occurrence and provide images via email.

7.2 Response by the palaeontologist in the event of exposure of fossil wood and peats

The palaeontologist will assess the information and liaise with the developer and the ECO and a suitable response will be established. This will most likely be a site visit to document and sample the exposure in detail, before it is covered up.

8 MONITORING FOR FOSSILS

A regular monitoring presence over the period during which excavations are made, by either an archaeologist or palaeontologist, is generally not practical.

The field supervisor or foreman and workers involved in digging excavations must be encouraged and informed of the need to watch for potential fossil and buried archaeological material. Workers seeing potential objects are to report to the field supervisor who, in turn, will report to the ECO. The ECO will inform the archaeologist and/or palaeontologist contracted to be on standby in the case of fossil finds.

To this end, responsible persons must be designated. This will include hierarchically:

- The field supervisor or foreman who is going to be most often in the field;
- The ECO for the project;

- The Project Manager

Should the monitoring of excavations be stipulated in the Archaeological Impact Assessment and/or the Heritage Impact Assessment, the contracted Monitoring Archaeologist (MA) can also monitor for the presence of fossils and make a field assessment of any material brought to attention. The MA is usually sufficiently informed to identify fossil material and this avoids additional monitoring by a palaeontologist. In shallow coastal excavations, the fossils encountered are usually in an archaeological context.

The MA then becomes the responsible field person and fulfils the role of liaison with the palaeontologist and coordinates with the developer and the ECO. If fossils are exposed in non-archaeological contexts, the palaeontologist should be summoned to document and sample/collect them.