

**Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625  
in the Sterkstroom Area, Enoch Mgijima Local Municipality, Eastern Cape**

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- 27 September 2016 -

**Report to:**

**Sello Mokhanya** (Eastern Cape Provincial Heritage Resources Agency – EC PHRA, APM Unit)  
E-mail: smokhanya@ecphra.org.za; Tel: 043 745 0888; Postal Address: N/A

**Chris Bradfield** (Isi-Xwiba Consulting)  
E-mail: isix@lcom.co.za; Tel: 083 441 1189; Postal Address: P.O. Box 2097, Komani, 5322



**Prepared by:**

**Karen van Ryneveld** (ArchaeoMaps)  
E-mail: karen@archaeomaps.co.za; Tel: 084 871 1064; Postal Address: Postnet Suite 239, Private Bag X3, Beacon Bay, 5205

### **Specialist Declaration of Interest**

I, Karen van Ryneveld (Company – ArchaeoMaps; Qualification – MSc Archaeology), declare that:

- I am suitably qualified and accredited to act as independent specialist in this application;
- I do not have any financial or personal interest in the application, its' proponent or subsidiaries, aside from fair remuneration for specialist services rendered; and
- That work conducted have been done in an objective manner – and that any circumstances that may have compromised objectivity have been reported on transparently.



**Signature –**

**- 27 September 2016 -**

## Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijima Local Municipality, Eastern Cape

### Executive Summary

#### Project Description –

Isi-Xwiba Consulting have been appointed as independent Environmental Assessment Practitioner (EAP) by the project proponent, the Eastern Cape Department of Roads and Public Works (DRPW), to apply for Environmental Authorization (EA), including a Basic Assessment Report (BAR) and Environmental Management Plan (EMPr) to the Eastern Cape Department of Mineral Resources (DMR) for the *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijima Local Municipality (EMLM), Eastern Cape*. General development co-ordinates and property details for the gravel mines are listed as:

- BP-01 (DR02614) : S31°35'56.7"; E26°23'29.7" - Portion 7 of Farm No 47, Queenstown; and
- BP-02 (DR02625) : S31°29'49.0"; E26°49'37.8" - Remaining Extent of Farm No 159, Wodehouse.

Both study sites (BP-01 and BP-02) comprise existing gravel mines, with the total study site size in each case being 1.5-2ha in extent.

#### The Phase 1 Archaeological & Cultural Heritage Impact Assessment –

**Project Name & Locality:** *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, EMLM, Eastern Cape* [1:50,000 Map Ref – 3126CB (BP-01) & 3126BD (BP-02)].

#### Summary of Findings:

- The proposed development poses no 'fatal flaws' with reference to archaeological and cultural heritage resources; consideration of alternative study sites or 'No-Go' options is irrelevant.
- The proposed development will have little to no negative cumulative impact on the archaeological landscape.
- [In the event of any incidental archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, being identified during the course of development the process described in 'Appendix B: Heritage Protocol for Incidental Finds during the Construction Phase' should be followed.]

Heritage Compliance Summary – Registration of Two Gravel Mines (Borrow Pits) for the Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijima Local Municipality, Eastern Cape			
Map Code	Site	Co-ordinates	Recommendations
<b>BP-01 (DR01614)</b>			
BP-01	Borrow Pit 1	S31°35'56.7"; E26°23'29.7"	N/A
<b>BP-02 (DR01625)</b>			
BP-02	Borrow Pit 2	S31°29'49.0"; E26°49'37.8"	N/A (Destruction of low density MSA occurrence without developer having to apply for an EC PHRA APM Unit Permit)
	Low density MSA occurrence	N/A	

#### Recommendations –

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijima Local Municipality (EMLM), Eastern Cape* development, proceed as applied for without the developer having to comply with additional heritage compliance requirements.

**The EC PHRA-APM Unit HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.**

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Resumé: Karen van Ryneveld

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## 1 – Project Description & Terms of Reference

Isi-Xwiba Consulting have been appointed as independent Environmental Assessment Practitioner (EAP) by the project proponent, the Eastern Cape Department of Roads and Public Works (DRPW), to apply for Environmental Authorization (EA), including a Basic Assessment Report (BAR) and Environmental Management Plan (EMPr) to the Eastern Cape Department of Mineral Resources (DMR) for the *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijiba Local Municipality (EMLM), Eastern Cape*. General development co-ordinates and property details for the gravel mines are listed as:

- BP-01 (DR02614) : S31°35'56.7"; E26°23'29.7" - Portion 7 of Farm No 47, Queenstown; and
- BP-02 (DR02625) : S31°29'49.0"; E26°49'37.8" - Remaining Extent of Farm No 159, Wodehouse.

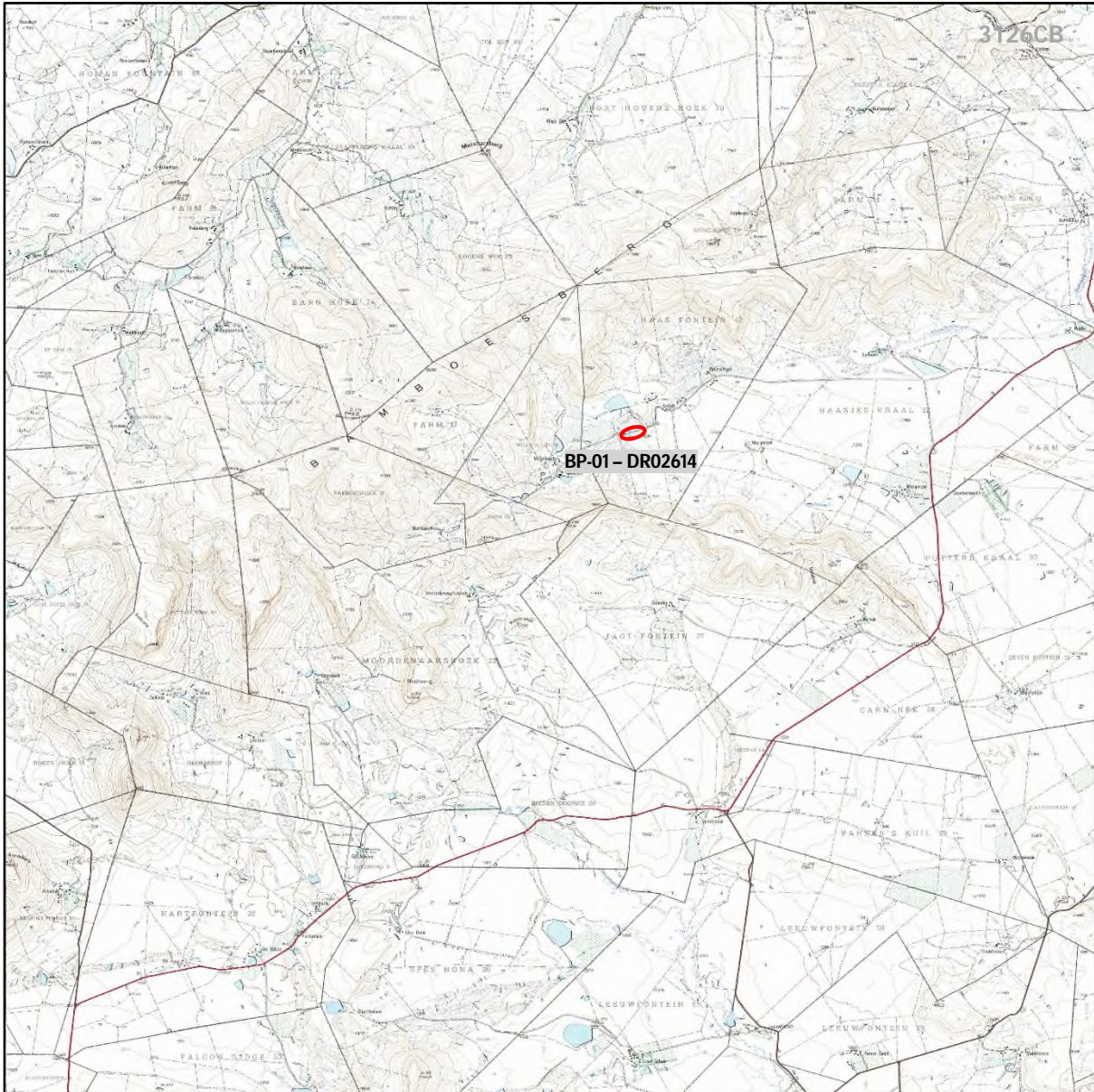
Both study sites (BP-01 and BP-02) comprise existing gravel mines, with the total study site size in each case being  $\leq 1.5$ ha in extent (Isi-Xwiba 2016a; 2016b).

ArchaeoMaps have been appointed by Isi-Xwiba Consulting to compile the Phase 1 Archaeological & Cultural Heritage Impact Assessment (AIA) for the development, as specialist component to the application's Heritage Impact Assessment (HIA), and with findings and recommendations thereof to be included in the BAR and EMPr. Terms of Reference (ToR) for the Phase 1 AIA are summarized as:

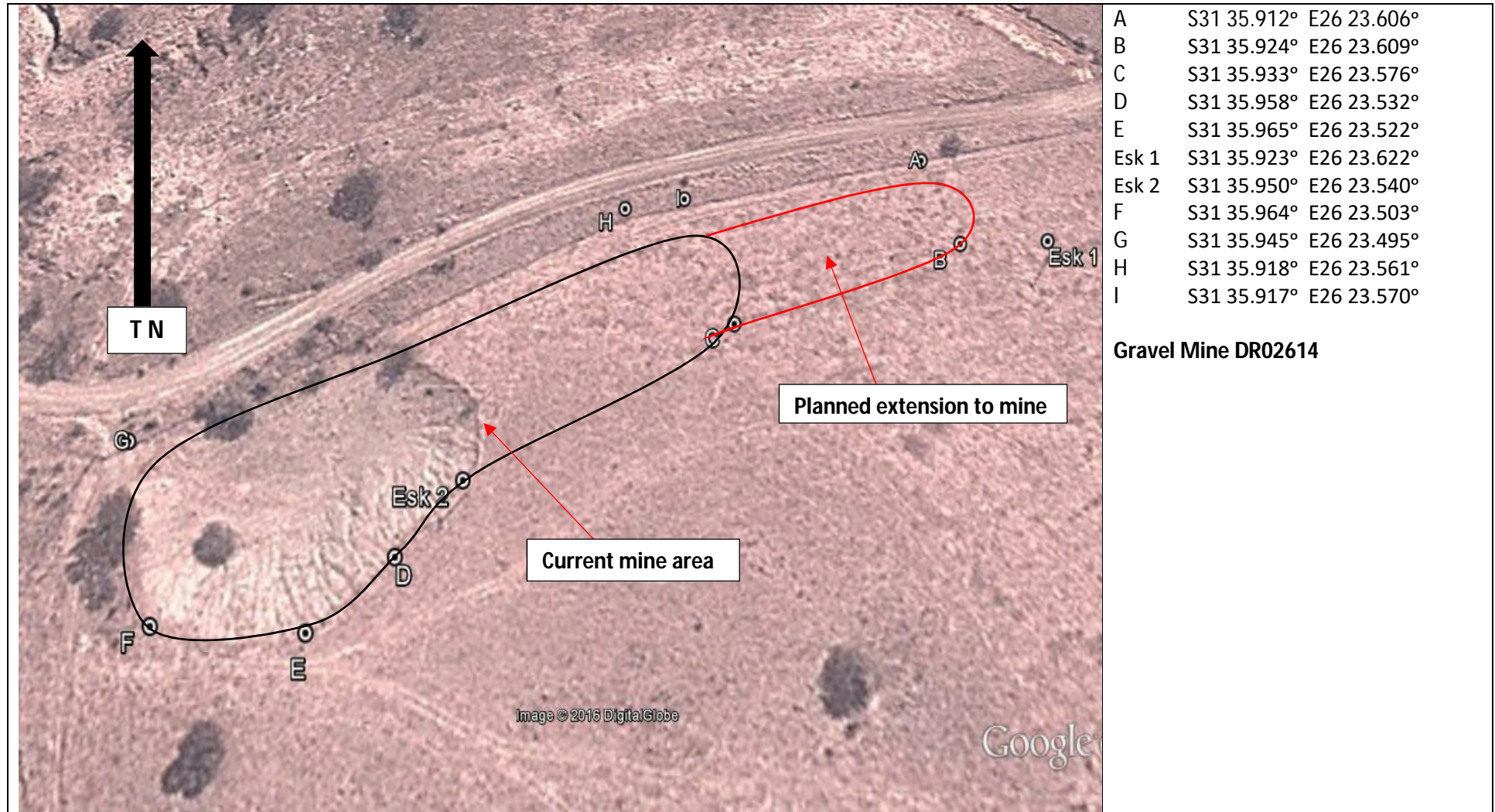
- Describe the existing area to be directly affected by the proposal in terms of its archaeological and cultural heritage characteristics as formally protected by the National Heritage Resources Act, No 25 of 1999 (NHRA 1999) and the general sensitivity of these components to change;
- Describe the likely scope, scale and significance of impacts (positive and negative) on the archaeological and cultural heritage resources of the area associated with the 1) construction and 2) operation or use phases of the proposal;
- Make recommendations on the scope of any mitigation measures that may be applied during the 1) construction and 2) operation or use phases to reduce / avoid the significance of identified related impacts. Mitigation measures could be design recommendations as well as operational controls, monitoring programmes, Phase 2 mitigation, management procedures and the like;
- Broadly describe the implication of a 'No-Go' option;
- Broadly comment on the cumulative impact (positive or negative) on archaeological or cultural heritage resources associated with the 1) construction and 2) operation or use phases of the proposal; and
- Confirm if there are any outright 'fatal flaws' to the proposal at its current location from an archaeological and cultural heritage perspective.



**Map 1:** General locality of BP-01 (DR02614) and BP-02 (DR02625), Sterkstroom, EMLM, EC



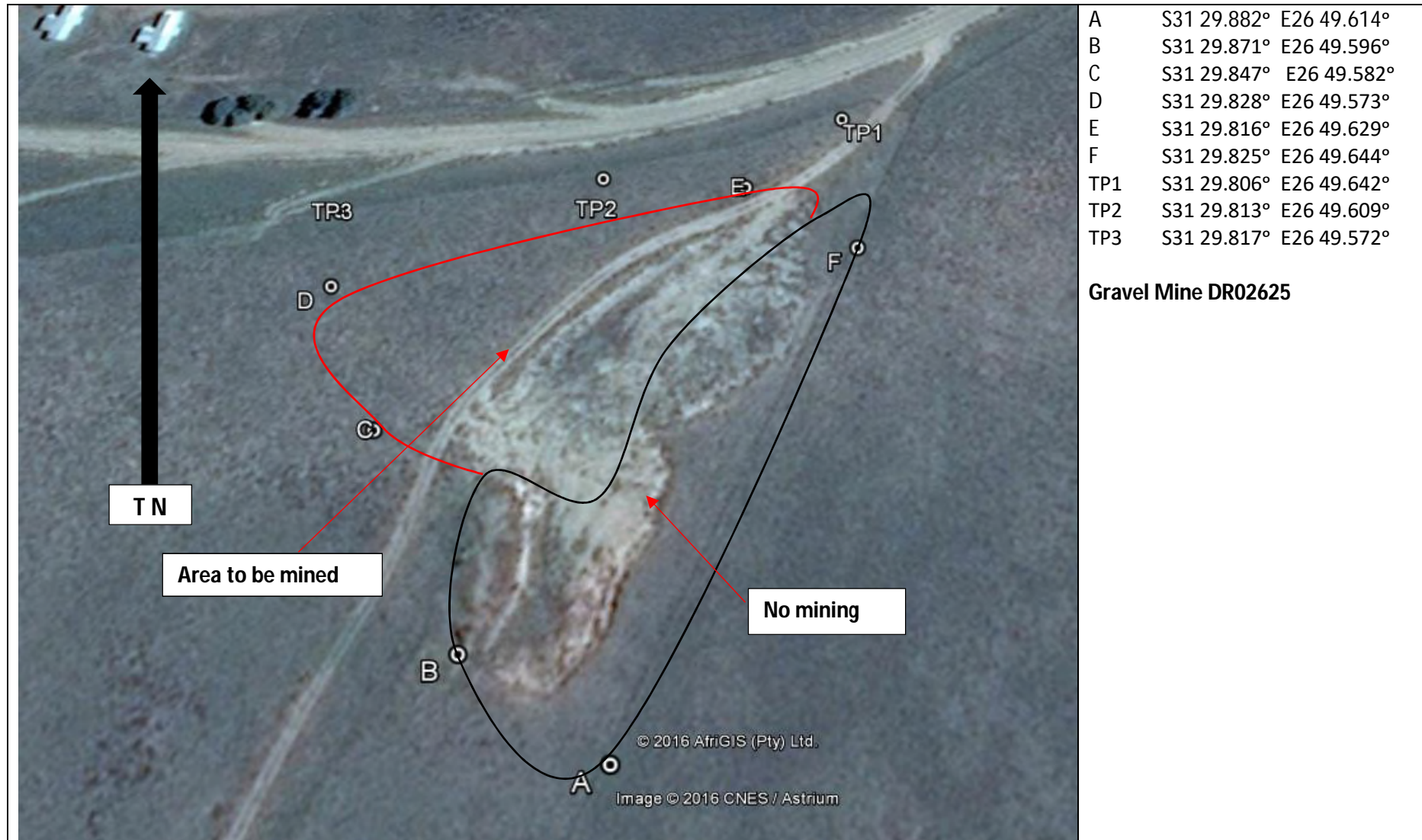
**Map 2:** General locality of BP-01, DR02614 [1:50,000 Map Ref - 3126CB]



Map 3: Layout of BP01, DR02614 (Courtesy Chris Bradfield, Isi-Xwiba)







Map 5: Layout of BP02, DR02625 (Courtesy Chris Bradfield, Isi-Xwiba)

## 2 – The Phase 1 Archaeological & Cultural Heritage Impact Assessment

### 2.1.1) Archaeological & Cultural Heritage Legislative Compliance

The Phase 1 Archaeological & Cultural Heritage Impact Assessment (AIA) for the *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area*, Enoch Mgijiba Local Municipality (EMLM), Eastern Cape, was requested to meet the Eastern Cape Provincial Heritage Resources Authority's (EC PHRA) requirements with reference to archaeological and basic cultural heritage resources in terms of the National Heritage Resources Act, No 25 of 1999 (NHRA 1999), with specific reference to Section 38(1)(c)(i) and Section 38(1)(d). This report is submitted in (partial) fulfilment of the NHRA 1999, Section 38(3) requirements, for purposes of a NHRA 1999, Section 38(4) / Section 38(8) Heritage Impact Assessment (HIA) Comment by the EC PHRA.

<p><b>NHRA 1999, Section 38</b></p> <p>1) Subject to the provisions of subsections 7), 8) and 9), any person who intends to undertake a development categorized as –</p> <p>a) The construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;</p> <p>b) The construction of a bridge or similar structure exceeding 50m in length;</p> <p>c) <b>Any development or other activity which will change the character of a site –</b></p> <p>i. <b>Exceeding 5,000m<sup>2</sup> in extent;</b> or</p> <p>ii. Involving three or more existing erven or subdivisions thereof; or</p> <p>iii. Involving three or more erven or subdivisions thereof which have been consolidated within the past five years; or</p> <p>iv. The costs which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;</p> <p>d) <b>The rezoning of a site exceeding 10,000m<sup>2</sup> in extent;</b></p> <p>e) Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,</p> <p>Must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.</p>
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**Table 1:** Extract from the NHRA 1999, Section 38

The Phase 1 AIA aimed to locate, identify and assess the significance of archaeological and cultural heritage resources, inclusive of archaeological deposits / sites (Stone Age, Iron Age and Colonial Period), rock art and shipwreck sites, built structures older than 60 years, sites of military history older than 75 years, certain categories of burial grounds and graves, graves of victims of conflict, basic living heritage and cultural landscapes and views as defined and protected by the NHRA 1999, Section 2, that may be affected by the development.

This report comprises a Phase 1 AIA, including a basic pre-feasibility study and field assessment only. The report was prepared in accordance with the 'Minimum Standards' specifications for Phase 1 AIA reports, as stipulated by SAHRA (2007).

Additional relevant legislation pertaining to the Phase 1 AIA is listed as:

- o Mineral and Petroleum Resources Development Act, No 28 of 2002 (MPRDA 2002);
- o Minerals and Petroleum Resources Development Act, No 49 of 2008 (MPRDA 2008); and
- o National Environmental Management Act, No 107 of 1998 (NEMA 1998) and associated Regulations (2014).

### 2.1.2) Methodology & Gap Analysis

The Phase 1 AIA includes a basic pre-feasibility study and field assessment:

- o The pre-feasibility assessment is based on the Appendix A schematic outline of South Africa's Pre-colonial and Colonial past, associated with introductory archaeological as well as general and scientific literature available and relevant to the study site. Databases consulted include the SAHRA 2009 Mapping Project Database (MPD), the South African Heritage Resources Information System (SAHRIS) and SAHRA database(s) on declared provincial heritage sites (PHS) pertaining to the study sites. The study excludes consultation of museum and university databases.

- The field assessment was done over a 1 day period (2016-09-17) with fieldwork conducted by the author. The assessment was done by vehicle and foot and limited to a Phase 1 surface survey. GPS co-ordinates were taken with Garmin Montana 650 (Datum: WGS84) Photographic documentation was done with a Canon EOS 1300D camera. A combination of Garmap (Base Camp) and Google Earth software was used in the display of spatial information.

The Phase 1 AIA was done according to the system and 'Minimum Standards' prescribed for the 3-tiered Phase 1-3 Heritage Impact Assessment (HIA) process (SAHRA 2007):

- Phase 1 HIA – A Phase 1 HIA is compulsory for development types as stipulated in the NHRA 1999, Section 38(1) and Section 38(8), including any other development type or study site as required by the South African Heritage Resources Agency (SAHRA) or relevant Provincial Heritage Resources Authority (PHRA). A Phase 1 HIA comprises at minimum of an archaeological (AIA) and palaeontological (PIA) study, but aims to address all heritage types protected by the NHRA 1999 and to alert developers to additional heritage specialist study requirements, if and where relevant to a development. Phase 1 HIA studies focusses on pre-feasibility and desktop studies, routinely coined with field assessments in order to locate, describe and assign heritage site significance ratings to identified resources that may be impacted by development. The aim of a Phase 1 AIA is to make site specific and general development recommendations regarding identified heritage resources for development planning and implementation purposes and may include recommendations for conservation, heritage site declaration, monitoring, Phase 2 mitigation (excavation), or destruction.
- Phase 2 HIA – Phase 2 HIAs are as a norm required where heritage resources of such significance has been identified during the Phase 1 HIA that mitigation (excavation) thereof is necessary for development purposes. Aside from large scale Phase 2 mitigation (routinely to precede development impact), lower keyed Phase 2 requirements may well include sampling, testing and monitoring during the construction or implementation phase of a development. Phase 2 HIA work is as a norm done under a compulsory heritage permit.
- Phase 3 HIA – As an extension to Phase 2 HIA work or cases where recommendations for heritage declaration formed part of a development's heritage compliance requirements, heritage resources of such scientific or heritage tourism significance, that their long term conservation and continued research would be necessary within a development framework is proposed as a Phase 3 HIA.

Archaeological and cultural heritage site significance assessment and associated mitigation recommendations are done according to the combined NHRA 1999, Section 7(1) and SAHRA (2007) system.

<b>SAHRA Archaeological &amp; Cultural Heritage Site Significance System</b>			
<b>Site Significance</b>	<b>Field Rating</b>	<b>Grade</b>	<b>Recommended Mitigation</b>
High Significance	National Significance	Grade I	Heritage site conservation / Heritage site development
High Significance	Provincial Significance	Grade II	Heritage site conservation / Heritage site development
High Significance	Local Significance	Grade III-A	Heritage site conservation or extensive mitigation prior to development / destruction
High Significance	Local Significance	Grade III-B	Heritage site conservation or extensive mitigation prior to development / destruction
High / Medium Significance	Generally Protected A	Grade IV-A	Heritage site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B	Grade IV-B	Heritage site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C	Grade IV-C	On-site sapling, monitoring or no heritage mitigation required prior to or during development / destruction

**Table 2:** SAHRA archaeological and cultural heritage site significance assessment ratings and associated mitigation recommendations

### 2.2.1) Pre-feasibility Summary

Based on the Appendix A schematic outline of the Pre-colonial and Colonial Periods in South Africa and background literature and database information, the probability of archaeological and cultural heritage resources situated on, or in proximity to the *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijiba Local Municipality (EMLM), Eastern Cape*, study sites can briefly be described as:

Archaeological and Basic Cultural Heritage Probability Assessment – Registration of Two Gravel Mines (Borrow Pits) for the Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijima Local Municipality, Eastern Cape			
Primary Type / Period	Sub-period	Sub-period type site	Probability
EARLY HOMININ / HOMINID	-	-	None
	Graves / human remains: High scientific significance		
STONE AGE	Earlier Stone Age (ESA)		None
	Middle Stone Age (MSA)		Low-Medium
	Later Stone Age (LSA)		Low-Medium
		Rock Art	Medium
		Shel Middens	None
	Graves / human remains: ESA & MSA - High scientific significance; LSA – High scientific & social significance		
IRON AGE	Early Iron Age (EIA)		None
	Middle Iron Age (MIA)		None
	Later Iron Age (LIA)		Medium
		Graves / human remains: EIA – High scientific significance; MIA & LIA – High scientific & social significance	
COLONIAL PERIOD	Colonial Period		Medium
		LSA – Colonial Period Contact	None
		LIA – Colonial Period Contact	Low-Medium
		Industrial Revolution	Low
		Apartheid & Struggle	Low
	Graves / human remains: Medium-high scientific & high social significance		

Table 3: Archaeological and basic cultural heritage probability assessment

### 2.2.2) The SAHRA 2009 MPD & SAHRIS

No archaeological Cultural Resources Management (CRM) reports are recorded in the SAHRA 2009 Mapping Project Database (MPD) situated within an approximate 20km radius from the *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, EMLM, Eastern Cape*, study sites. Post compilation of the SAHRA 2009 MPD three (3) SAHRIS cases have been recorded, with study sites situated within the rough 20km radius from the BP-01 (DR02614) [SAHRIS CaseID: 713] and BP-02 (DR02625) [SAHRIS CaseIDs: 264 and 5365] sites, with these referenced as:

- o Binneman, J., Booth, C. & Higgitt, N. 2010. (Albany Museum). *A Phase 1 Archaeological Impact Assessment (AIA) for the Proposed Dorper Wind Energy Facility on a Site near Molteno, Chris Hani District Municipality, Eastern Cape Province* [SAHRIS CaseID 713].
- o Van der Walt, J. 2013. (HCAC). *Archaeological Scoping Report for the Proposed Stormberg Renewable Energy Project, Sterkstroom District, Eastern Cape* [SAHRIS CaseID 5365].
- o Van Ryneveld, K. 2012. (ArchaeoMaps). *Phase 1 Archaeological Impact Assessment: Penhoek Pass – Upgrade of the N6-4 [km52-km66.2], Between Queenstown and Jamestown, Eastern Cape, South Africa* [SAHRIS CaseID 264].

### 2.2.3) SAHRA Provincial Heritage Site Database – Eastern Cape

No declared Provincial Heritage Sites (PHS) are recorded in the SAHRA – Eastern Cape database ([https://en.wikipedia.org/wiki/List\\_of\\_heritage\\_sites\\_in\\_Eastern\\_Cape](https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Eastern_Cape)) and situated within the approximate 20km radius from the *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, EMLM, Eastern Cape*, study sites. The closest declared PHSs to the BP-01 and BP-02 study sites are located in Molteno and Dordrecht respectively.



**Map 6:** Spatial distribution of geo-referenced PHSs in the SAHRA – Eastern Cape database in relation to the *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, EMLM, Eastern Cape, study sites* ([https://en.wikipedia.org/wiki/List\\_of\\_heritage\\_sites\\_in\\_Eastern\\_Cape](https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Eastern_Cape))

#### 2.2.4) General Discussion

No Earlier Stone Age (ESA) sites or occurrences have been reported on in archaeological CRM reports consulted. Middle Stone Age (MSA) sites, albeit to date recorded only as low density occurrences were reported on from the Dorper Wind Energy Facility study site (Binneman *et. al.* 2010) as well as from the Penhoek Pass area (Van Ryneveld). Later Stone Age (LSA) lithic occurrences were also present at the Dorper Wind Energy Facility study site, generally geographically associated with small outcrops, while at least six (6) known Rock Art sites were reported on to the archaeology project team, and situated on affected properties (Binneman *et. al.* 2010).

To date Iron Age site records are limited to Later Iron Age (LIA) associated grave and cemetery sites and farm workers' residences (Binneman *et. al.* 2010).

Colonial Period site reports include a number of old farmsteads reported on by Binneman *et. al.* (2010) scattered across the large Dorper Wind Energy Facility study site, and associated with farming infrastructure as well as small family cemeteries. From the Penhoek Pass study site the Valsch Fontein Colonial Period farmstead as well as a Colonial Period shelter, dating to the rough 1840s-1850s and associated with convict labour construction of the pass was recorded (Van Ryneveld 2012).

The Scoping (desktop) report by Van der Walt (2013) captures recorded early human settlement in the area: Whilst San / Bushman were living in small bands in the area, the early 1800s saw the Thembu, harassed by the Ngwane, moving across the Kei River to settle in what is now known as the greater Queenstown area. At around the same time the first 'Trekboers' crossed the Stormsberg Spruit to settle in the area north of the Stormsberg. It is at this time that the two groups met, both farmers in the harsh Stormsberg environment. Early settlers, both black and white, lived in close proximity and in fair harmony. At the time neither the militarily weak Thembu (also called the 'Tambookie' after the 'Tam'bukie Bushmen that they mixed with in the Tsomo Valley) or the 'Trekboers' were keen to make war. This friendship resulted in the Cape Government protecting the Thembu against hostile tribes in the 1815s-1840s – during the worst Difaqane (Mfekane) raids the Thembu were invited to live in the Cape Colony. However, the good relationship was not to last: White expansion associated with intensive cultivation of land meant that the Thembu would be displaced. The 1836 Stockenstrom Treaty was one of the first steps in this direction, in a new definition of boundaries between white and black land.

Years later the discovery of diamonds and gold would forever change the economic sector of South Africa, eventually resulting in the Anglo-Boer War (1899-1902). The Battle of Stormsberg took place on 9 December 1899 in the Stormberg Valley: 3,000 British and 2,000 Boers were involved, with the Boers, led by General Olivier turning victors in the struggle against Major General Sir William Gatacre's British troops (Van der Walt 2013).

**2.2.1) BP-01 (Borrow Pit 1) – S31°35'56.7"; E26°23'29.7"**

BP-01 (DR02614) is situated on Portion 7 of Farm No 47 (Haas Fontein), Queenstown, approximately 300m from the Haas Fontein River. The study site comprises an approximate 0.7ha area. No archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, were identified on the surface of the study site, within exposed geotech sections, with average depths of approximately 1.5m bgl (below ground level), or in the immediate vicinity of the study site.

It is recommended that registration of the BP-01 (DR02614) gravel mine proceeds as applied for without the developer having to comply with additional heritage compliance requirements.



**Map 7:** BP-01 – Results of the field assessment



**Plate 1:** General view of the BP-01 study site



**Plate 3:** Anthropogenic sterile sections of geotech trenches at the BP-01 study site [1]



**Plate 2:** Current excavations and rehabilitation at the BP-01 study site



**Plate 4:** Anthropogenic sterile sections of geotech trenches at the BP-01 study site [2]



### 2.2.2) BP-02 (Borrow Pit 2) – S31°29'49.0"; E26°49'37.8"

BP-02 (DR02625) is situated on the Remaining Extent of Farm No 159 (Murrel Fountain), Wodehouse. An existing telecom line runs adjacent to the gravel mine. The study site comprises an approximate 0.8ha area. A low density of lithic artefacts was present on the surface of the study site. Artefacts seem to be typologically and technologically ascribable to the Middle Stone Age (MSA), with artefact types dominated by flake types. Artefact ratios (artefacts: m<sup>2</sup>) were however extremely low, with average  $\leq 1:50$  densities recorded and with lithics produced from a variety of raw material sources but primarily from a fine grained granite. No associated sub-surface anthropogenic members could be associated with the observed surface artefacts, including large exposed mining sections, in excess of 2m bgl (below ground level) and geotech trenches with sections in excess of 1m bgl. The low density surface artefacts may well be ascribable to hill wash from the surrounding mountainous terrain or merely represent an infrequent scattering of artefacts associated with general MSA landscape use. However, the lack of associated sub-surface context rather points towards natural post-depositional process with actual resource origin being elsewhere and not at the study site itself. Based on the low density of surface artefacts and their ex-situ context it is recommended that development at the gravel mine proceed without the developer having to apply for an EC PHRA APM Unit site destruction permit.

It is recommended that registration of the BP-02 (DR02625) gravel mine proceeds as applied for without the developer having to comply with additional heritage compliance requirements.



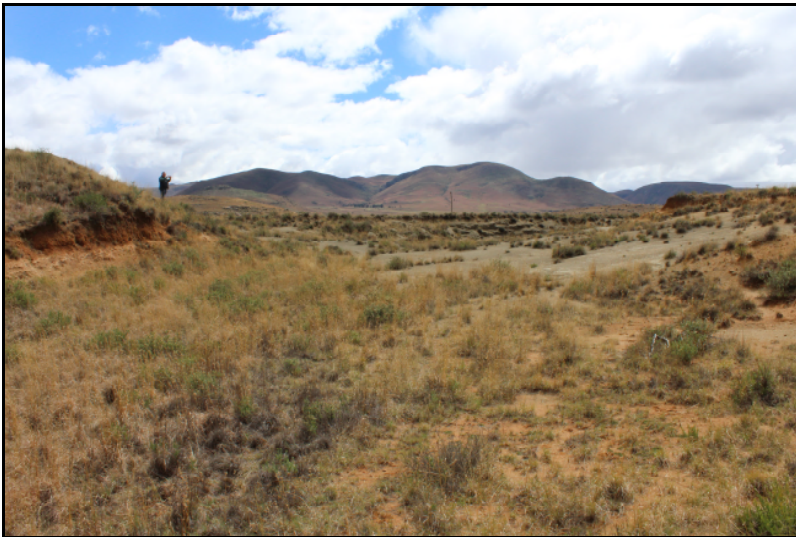
**Map 8:** BP-02 – Results of the field assessment



**Plate 5:** General view of the BP-02 study site



**Plate 7:** Anthropogenic sterile sections of geotech trenches at the BP-02 study site [2]



**Plate 6:** Current excavations at the BP-02 study site [1]



**Plate 8:** Lithic artefacts from the BP02 study site

### 3 – Environmental Impact Assessment Rating

Identified archaeological and cultural heritage resources are ascribed an Environmental Impact Assessment (EIA) rating, based on the outline presented below to provide a significance rating of development impact on resources, both during the 1) construction and 2) operation and use phases of development (in accordance with NEMA 1998, Regulations 2014):

<b>Overall Nature:</b>	1) <b>Negative</b> (negative impact on affected biophysical or human environment), or 2) <b>Positive</b> (benefit to the affected biophysical or human environment).
<b>Type:</b>	1) <b>Direct</b> (caused by the action and occur at the same time and place), 2) <b>Indirect or secondary</b> (caused by the action and are later in time or further removed in distance but reasonably foreseeable), or 3) <b>Cumulative</b> (impact which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions; can result from individually minor, but collectively significant actions taking place over a period of time).
<b>Spatial Extent:</b>	1) <b>Site</b> (immediate area of activity, incorporating a 5m zone from the edge of the affected area), 2) <b>Local</b> (area up to and/or within 10km from the 'site' as defined above), 3) <b>Regional</b> (entire community, basin or landscape), or 4) <b>National</b> (South Africa).
<b>Duration:</b>	1) <b>Short-term</b> (impact would last for the duration of activities; quickly reversible), 2) <b>Medium-term</b> (impact would affect project activity; reversible over time), 3) <b>Long-term</b> (impact would continue beyond project activity), or 4) <b>Permanent</b> (impact would continue beyond decommissioning).
<b>Severity:</b>	1) <b>Low</b> , 2) <b>Medium</b> , or 3) <b>High</b> , being +) <b>Positive</b> , or -) <b>Negative</b> (based on separately described categories examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functionality or slightly alters the environment itself).
<b>Reversibility:</b>	1) <b>Completely reversible</b> (completely reversible impact with implementation of correct mitigation measures), 2) <b>Partly reversible</b> (partly reversible impact with implementation of correct mitigation measures), or 3) <b>Irreversible</b> (impact cannot be reversed, regardless of mitigation or rehabilitation measures).
<b>Irreplaceable loss:</b>	1) <b>Resource will not be lost</b> (resource will not be lost provided mitigation measures are implemented), 2) <b>Resource will be partly lost</b> (partial loss or destruction of the resource will occur even though management and mitigation measures are implemented), or 3) <b>Resource cannot be replaced</b> (resource is irreplaceable no matter which management or mitigation measures are implemented).
<b>Probability:</b>	1) <b>Unlikely</b> (<40% probability), 2) <b>Possible</b> (40% probability), 3) <b>Probable</b> (>70% probability), or 4) <b>Definite</b> (>90% probability).
<b>Mitigation potential:</b>	1) <b>High or completely mitigatable</b> (relatively easy and cost effective to manage. Specialist expertise and equipment generally not required. Nature of impact easily understood and may be mitigated through implementation of a management plan or 'good housekeeping', including regular monitoring and reporting regimes. Significance of the impact after mitigation is likely to be low or negligible), 2) <b>Moderate or partially mitigatable</b> (management requires higher level of expertise and resources to maintain impacts with acceptable levels. Mitigation can be tied up in the design of the project. Significance of the impacts after mitigation is likely to be low to moderate. It may not be possible to mitigate the impact entirely, with residual impacts resulting), or 3) <b>Low or un-mitigatable</b> (will not be possible to mitigate the impact entirely, regardless of expertise and resources. Potential to manage the impacts may be beyond the scope of the project. Management of the impact is not likely to result in a measurable change in the level of significance).
<b>Impact significance:</b>	1) <b>Negligible</b> , 2) <b>Low</b> (largely of HIGH mitigation potential, after consideration of other criteria), 3) <b>Moderate</b> (largely of MODERATE or partial mitigation potential, after consideration of other criteria), or 4) <b>Substantial</b> (largely of LOW mitigation potential, after consideration of other criteria).

Environmental Impact Assessment Rating: Registration of Two Gravel Mines (Borrow Pits) for the Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijima Local Municipality, Eastern Cape												
Potential Impacts	Overall nature	Type	Spatial extent	Duration	Severity	Reversibility	Irreplaceable loss	Probability	MITIGATION POTENTIAL	IMPACT SIGNIFICANCE		MITIGATION MEASURES
										Without mitigation	With mitigation	
<b>BP-01 (DR02614)</b>												
Construction phase	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Operational phase	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mitigation details: Recommendation for destruction of resource made in accordance with SAHRA (2007) heritage site significance assignation and related recommendation guidelines												
<b>BP-02 (DR02625)</b>												
Construction phase	1	1	1	1	1 (-)	3	3	4	1	1	1	1
Operational phase	1	1	1	1	1 (-)	3	3	4	1	1	1	1
Mitigation details: Recommendation for destruction of resource without the developer having to apply for an EC PHRA APM Unit site destruction permit made in accordance with the SAHRA (2007) heritage site significance assignation and related recommendation guidelines												

Table 4: Environmental Impact Assessment Rating

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the *Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijiba Local Municipality (EMLM), Eastern Cape* development, proceed as applied for without the developer having to comply with additional heritage compliance requirements.

- The proposed development poses no 'fatal flaws' with reference to archaeological and cultural heritage resources; consideration of alternative study sites or 'No-Go' options is irrelevant.
- The proposed development will have little to no negative cumulative impact on the archaeological landscape.
- [In the event of any incidental archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, being identified during the course of development the process described in 'Appendix B: Heritage Protocol for Incidental Finds during the Construction Phase' should be followed.]

Heritage Compliance Summary – Registration of Two Gravel Mines (Borrow Pits) for the Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijima Local Municipality, Eastern Cape			
Map Code	Site	Co-ordinates	Recommendations
<b>BP-01 (DR01614)</b>			
BP-01	Borrow Pit 1	S31°35'56.7"; E26°23'29.7"	N/A
<b>BP-02 (DR01625)</b>			
BP-02	Borrow Pit 2	S31°29'49.0"; E26°49'37.8"	N/A (Destruction of low density MSA occurrence without developer having to apply for an EC PHRA APM Unit Permit)
	Low density MSA occurrence	N/A	

Table 5: Heritage compliance summary

The EC PHRA-APM Unit HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.

**Notes:**

Should any registered Interested & Affected Party (I&AP) wish to be consulted in terms of Section 38(3)(e) of the NHRA 1999 (socio-cultural consultation / SAHRA SIA) it is recommended that the developer / EAP ensures that the consultation be prioritized within the timeframe of the environmental assessment process.

**Simplified Guide to the Identification of Archaeological Sites:**

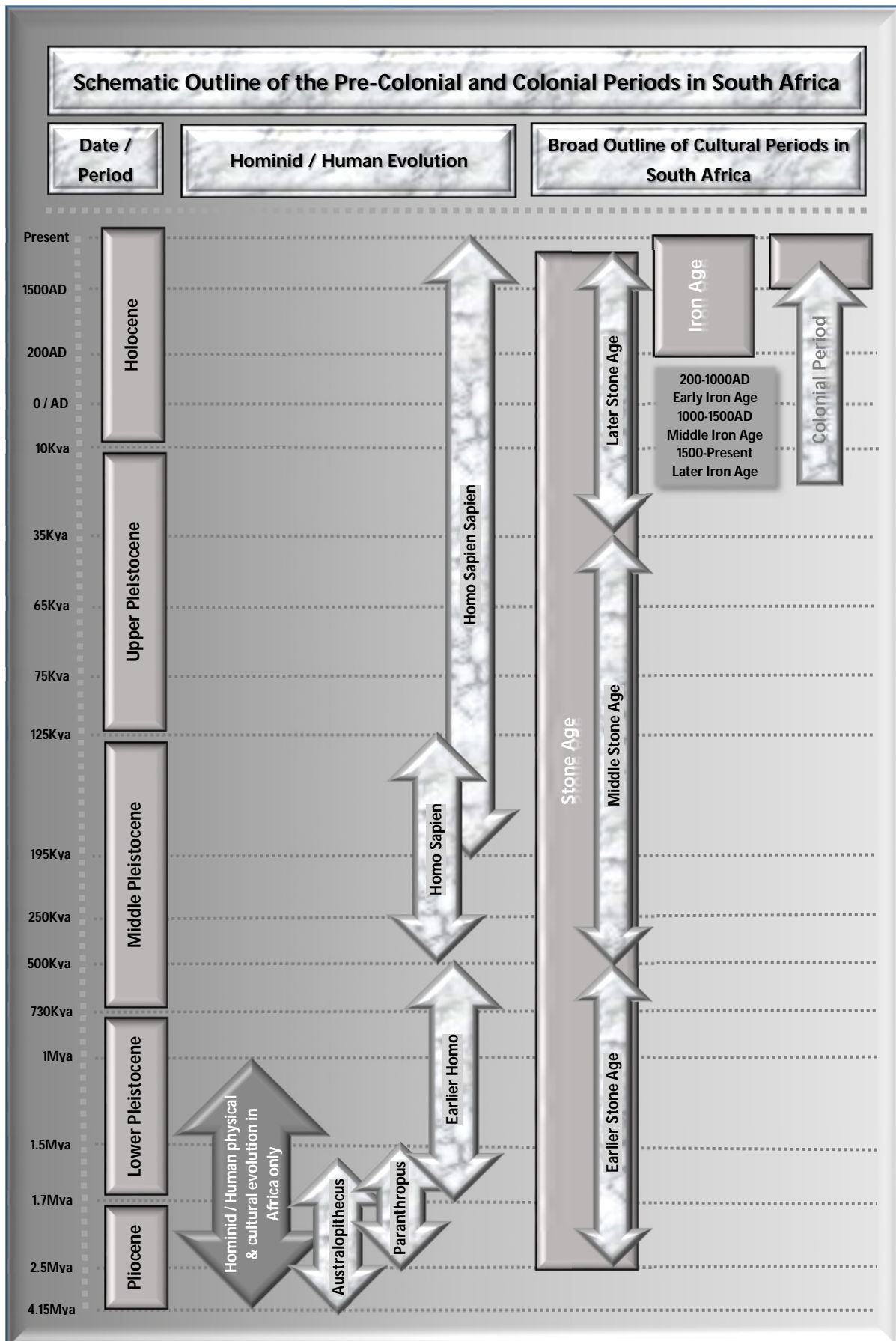
- ❖ **Stone Age** – Knapped stone display flakes and flake scars that appear unnatural and may result in similar type ‘shaped’ stones often concentrated in clusters or forming a distinct layer in the geological stratigraphy. ESA shapes may represent ‘pear’ or oval shaped stones, often in the region of 10cm or larger. Typical MSA types include blade-like or rough triangular shaped artefacts, often associated with randomly shaped lithics or flakes that display use- or edge-wear around the rim of the artefact. LSA types are similar to MSA types, but generally smaller ( $\leq 3$ cm in size), often informally shaped, and are frequently found in association with bone, pieces of charcoal, ceramic shards and food remains.
  - **Rock Art** – Includes both painted and engraved images.
  - **Shell Middens** – Include compact shell lenses that may be quite extensive in size or small ephemeral scatters of shell food remains, often associated with LSA artefact remains, but may also be of MSA and Iron Age cultural association.
- ❖ **Iron Age** – Iron Age sites are often characterized by stone features, i.e. the remains of former livestock enclosures or typical household remains; huts are identified by either mound or depression hollows. Typical artefacts include ceramic remains, farming equipment, beads and trade goods, metal artefacts (including jewellery) etc. Remains of the ‘Struggle’ – events, histories and landmarks associated therewith are often, based on cultural association, classed as part of the Iron Age heritage of South Africa.
- ❖ **Colonial Period** – Built environment remains, either urban or rural, are of a Western cultural affiliation with typical artefacts representing early Western culture, including typical household remains, trade and manufactured goods, such as old bottle, porcelain and metal artefacts. War memorial remains, including the vast array of associated graves and the history of the Industrial Revolution form important parts of South Africa’s Colonial Period heritage.

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AD	: Anno Domini (the year 0)
AIA	: Archaeological Impact Assessment
AMAFA	: Amafa aKwaZulu-Natali (Natal PHRA)
ASAPA	: Association of Southern African Professional Archaeologists
BAR	: Basic Assessment Report
BC	: Before the Birth of Christ (the year 0)
BCE	: Before the Common Era (the year 0)
BID	: Background Information Document
BP	: Before the Present (the year 0)
cm	: Centimetre
CMP	: Conservation Management Plan
CRM	: Cultural Resources Management
DAC	: Department of Arts and Culture
DEAT	: Department of Environmental Affairs and Tourism
DME	: Department of Minerals and Energy
EAP	: Environmental Assessment Practitioner
ECO	: Environmental Control Officer
ELO	: Environmental Liaison Officer
EC PHRA	: Eastern Cape Provincial Heritage Resources Authority
EIA <sub>1</sub>	: Environmental Impact Assessment
EIA <sub>2</sub>	: Early Iron Age
EMPr	: Environmental Management Plan / Programme Report
ESA	: Earlier Stone Age
ha	: Hectare
HIA	: Heritage Impact Assessment
HWC	: heritage Western Cape
ICOMOS	: International Council on Monuments and Sites
IEM	: Integrated Environmental Management
km	: kilometre
Kya	: Thousands of years ago
LIA	: Later Iron Age
LSA	: Later Stone Age
m	: metre
m <sup>2</sup>	: Square meter
MIA	: Middle Iron Age
Mm	: millimetre
MPRDA 2002	: Mineral and Petroleum Resources Development Act, No 28 of 2002
MSA	: Middle Stone Age
Mya	: Millions of years ago
NEMA 1998	: National Environmental Management Act, No 107 of 1998
NHRA 1999	: National Heritage Resources Act, No 25 of 1999
PIA	: Palaeontological Impact Assessment
PHRA	: Provincial Heritage Resources Authority
PSSA	: Palaeontological Society of South Africa
PPP	: Public Participation Process
SAHRA	: South African Heritage Resources Agency
SAHRIS	: South African Heritage Resources Information System
SIA	: Social Impact Assessment

1. Binneman, J., Booth, C. & Higgit, N. 2010. (Albany Museum). *A Phase 1 Archaeological Impact Assessment (AIA) for the Proposed Dorper Wind Energy Facility on a Site near Molteno, Chris Hani District Municipality, Eastern Cape Province.*
2. [https://en.wikipedia.org/wiki/List\\_of\\_heritage\\_sites\\_in\\_Eastern\\_Cape](https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Eastern_Cape) [Accessed: 26 September 2016].
3. Isi-Xwiba. 2016a. *Gravel Mine DR02614. Basic Assessment Report in terms of NEMA. Background Information Document (BID).*
4. Isi-Xwiba. 2016b. *Gravel Mine DR02625. Basic Assessment Report in terms of NEMA. Background Information Document (BID).*
5. SAHRA. 2007. *Minimum Standards for the Archaeological and Palaeontological Components of Impact Assessments.*
6. South African Government. (No 107 of) 1998. *National Environmental Management Act.*
7. South African Government. (No 25 of) 1999. *National Heritage Resources Act.*
8. South African Government. (No 28 of) 2002. *Mineral and Petroleum Resources Development Act.*
9. South African Government. (No 49 of) 2008. *Mineral and Petroleum Resources Development Act.*
10. Van der Walt, J. 2013. (HCAC). *Archaeological Scoping Report for the Proposed Stormberg Renewable Energy Project, Sterkstroom District, Eastern Cape.*
11. Van Ryneveld, K. 2012. (ArchaeoMaps). *Phase 1 Archaeological Impact Assessment: Penhoek Pass – Upgrade of the N6-4 [km52-km66.2], Between Queenstown and Jamestown, Eastern Cape, South Africa.*








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## Heritage Impact Assessment (HIA) – Registration of Two Gravel Mines (Borrow Pits) for Upgrading of the DR02614 and DR02625 in the Sterkstroom Area, Enoch Mgijima Local Municipality, Eastern Cape

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### Heritage Protocol for Incidental Finds during the Construction Phase

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Should any palaeontological, archaeological or cultural heritage resources, including human remains / graves, as defined and protected by the NHRA 1999, be identified during the construction phase of development (including as a norm during vegetation clearing, surface scraping, trenching and excavation phases), it is recommended that the process described below be followed.

#### ➤ On-site Reporting Process:

1. The identifier should immediately notify his / her supervisor of the find.
2. The identifier's supervisor should immediately (and within 24 hours after reporting by the identifier) report the incident to the on-site SHE / SHEQ officer.
3. The on-site SHE / SHEQ officer should immediately (and within 24 hours after reporting by the relevant supervisor) report the incident to the appointed ECO / ELO officer. [Should the find relate to human remains the SHE / SHEQ officer should immediately notify the nearest SAPS station informing them of the find].
4. The ECO / ELO officer should ensure that the find is within 72 hours after the SHE / SHEQ officers report reported on SAHRIS and that a relevant heritage specialist is contacted to make arrangements for a heritage site inspection. [Should the find relate to human remains the ECO / ELO officer should ensure that the archaeological site inspection coincides with a SAPS site inspection, to verify if the find is of forensic, authentic (informal / older than 60 years), or archaeological (older than 100 years) origin].
5. The appointed heritage specialist should compile a 'heritage site inspection' report based on the site specific findings. The site inspection report should make recommendations for the destruction, conservation or mitigation of the find and prescribe a recommended way forward for development. The 'heritage site inspection' report should be submitted to the ECO / ELO, who should ensure submission thereof on SAHRIS.
6. SAHRA / the relevant PHRA will state legal requirements for development to proceed in the SAHRA / PHRA Comment on the 'heritage site inspection' report.
7. The developer should proceed with implementation of the SAHRA / PHRA Comment requirements. SAHRA / PHRA Comment requirements may well stipulate permit specifications for development to proceed.
  - Should permit specifications stipulate further Phase 2 archaeological investigation (including grave mitigation) a suitably accredited heritage specialist should be appointed to conduct the work according to the applicable SAHRA / PHRA process. The heritage specialist should apply for the permit. Upon issue of the SAHRA / PHRA permit the Phase 2 heritage mitigation program may commence.
  - Should permit specifications stipulate destruction of the find under a SAHRA / PHRA permit the developer should immediately proceed with the permit application. Upon the issue of the SAHRA / PHRA permit the developer may legally proceed with destruction of the palaeontological, archaeological or cultural heritage resource.
  - Upon completion of the Phase 2 heritage mitigation program the heritage specialist will submit a Phase 2 report to the ECO / ELO, who should in turn ensure submission thereof on SAHRIS. Report recommendations may include that the remainder of a heritage site be destroyed under a SAHRA / PHRA permit.
  - Should the find relate to human remains of forensic origin the matter will be directly addressed by the SAPS: A SAHRA / PHRA permit will not be applicable.

**NOTE:** Note that SAHRA / PHRA permit and process requirements relating to the mitigation of human remains requires suitable advertising of the find, a consultation, mitigation and re-interment / deposition process.

➤ **Duties of the Supervisor:**

1. The supervisor should immediately upon reporting by the identifier ensure that all work in the vicinity of the find is ceased.
2. The supervisor should ensure that the location of the find is immediately secured (and within 12 hours of reporting by the identifier), by means of a temporary conservation fence (construction netting) allowing for a 5-10m heritage conservation buffer zone around the find. The temporary conserved area should be sign-posted as a 'No Entry – Heritage Site' zone.
3. Where development has impacted on the resource, no attempt should be made to remove artefacts / objects / remains further from their context, and artefacts / objects / remains that have been removed should be collected and placed within the conservation area or kept for safekeeping with the SHE / SHEQ officer. It is imperative that where development has impacted on palaeontological, archaeological and cultural heritage resources the context of the find be preserved as good as possible for interpretive and sample testing purposes.
4. The supervisor should record the name, company and capacity of the identifier and compile a brief report describing the events surrounding the find. The report should be submitted to the SHE / SHEQ officer at the time of the incident report.

➤ **Duties of the SHE / SHEQ Officer:**

1. The SHE / SHEQ officer should ensure that the location of the find is recorded with a GPS. A photographic record of the find (including implementation of temporary conservation measures) should be compiled. Where relevant a scale bar or object that can indicate scale should be inserted in photographs for interpretive purposes.
2. The SHE / SHEQ officer should ensure that the supervisors report, GPS co-ordinate and photographic record of the find be submitted to the ECO / ELO officer. [Should the find relate to human remains the SHE / SHEQ officer should ensure that the mentioned reporting be made available to the SAPS at the time of the incident report].
3. Any retrieved artefacts / objects / remains should, in consultation with the ECO / ELO officer, be deposited in a safe place (preferably on-site) for safekeeping.

➤ **Duties of the ECO / ELO officer:**

1. The ECO / ELO officer should ensure that the incident is reported on SAHRIS. (The ECO / ELO officer should ensure that he / she is registered on the relevant SAHRIS case with SAHRIS authorship to the case at the time of appointment to enable heritage reporting).
2. The ECO / ELO officer should ensure that the incident report is forwarded to the heritage specialist for interpretive purposes at his / her soonest opportunity and prior to the heritage site inspection.
3. The ECO / ELO officer should facilitate appointment of the heritage specialist by the developer / construction consultant for the heritage site inspection.
4. The ECO / ELO officer should facilitate access by the heritage specialist to any retrieved artefacts / objects / remains that have been kept in safekeeping.
5. The ECO / ELO officer should facilitate coordination of the heritage site inspection and the SAPS site inspection in the event of a human remains incident report.
6. The ECO / ELO officer should facilitate heritage reporting and heritage compliance requirements by SAHRA / the relevant PHRA, between the developer / construction consultant, the heritage specialist, the SHE / SHEQ officer (where relevant) and the SAPS (where relevant).

➤ **Duties of the Developer / Construction Consultant:**

The developer / construction consultant should ensure that an adequate heritage contingency budget is accommodated within the project budget to facilitate and streamline the heritage compliance process in the event of identification of incidental palaeontological, archaeological and cultural heritage resources during the course of development, including as a norm during vegetation clearing, surface scraping, trenching and excavation phases, when resources not visible at the time of the surface assessment may well be exposed.

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**Resumé**  
**Karen van Ryneveld**  
**2016**

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**Name:** Karen van Ryneveld

**Contact Details:**

- 1) Mobile – 084 871 1064
- 2) E-mail – karen@archaeomaps.co.za
- 3) Website – www.archaeomaps.co.za
- 4) Postal address – Postnet Suite 239, Private Bag X3, Beacon Bay, 5205

**Company:** ArchaeoMaps cc

**Occupation:** Archaeologist

**Qualification:** MSc Archaeology (WITS University – 2003)

**Accreditation:**

- 1) Association of Southern African Professional Archaeologists (ASAPA) accredited Cultural Resources Management CRM practitioner [member nr – 163]
  - o 2010 – ASAPA CRM Section: Principle Investigator – Stone Age
  - o 2005 – ASAPA CRM Section: Field Director – Iron Age & Colonial Period
- 2) SAHRA, AMAFA, EC PHRA and HWC listed ASAPA accredited CRM archaeologist

**Tertiary Education**

2015 – Present	<b>University of Fort Hare (UFH), East London</b> (MPhil Environmental Studies)
2010	<b>University of South Africa (UNISA), Pretoria</b> (Project Management 501)
2006 – 2007	<b>Nelson Mandela Metropolitan University (NMMU), Port Elizabeth</b> (Undergraduate Certificate in Geographical Information Systems – GIS)
2001 – 2003	<b>University of the Witwatersrand (WITS), Johannesburg</b> (MSc Archaeology)
1999 – 2000	<b>University of Pretoria (UP), Pretoria</b> (BA Hons. Archaeology)
1991 – 1993	<b>University of Pretoria (UP), Pretoria</b> (BA Archaeology & History of Art)

**Courses**

2016/01	SPA (Safety Passport Alliance) – Petrol Retail [SA Safety Management Training Services – SMST]
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**Employment – Professional Archaeology**

2007/04 – Present	ArchaeoMaps [Self-employed] (Archaeologist – CRM)
2006/06 – 2007/03	National Museum, Bloemfontein (Archaeologist – CRM, Dept. of Archaeology)
2005/04 – 2006/05	McGregor Museum, Kimberley (Archaeologist – CRM / Research, Dept. of Archaeology)
2004/04 – 2005/01	Amafa aKwaZulu-Natali (HoD: Archaeology, Palaeontology & Meteorites Unit – APM Unit)
2002/09 – 2004/03	McGregor Museum, Kimberley (Archaeologist – CRM / Research, Dept. of Archaeology)

**Employment – Freelance: Ground Penetrating Radar**

2015/10 – Present	Terra Scan assistant (BCM area, EC) – GPR & underground utilities focussing on petrol retail (oil & gas) industry
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**Archaeology – Summary**

Karen has been involved in CRM archaeology since 2003 and has been the author (including selected co-authored reports) of approximately 450 Phase 1 AIA studies. Phase 1 AIA work is centred in South Africa, focussing on the Northern and Eastern Cape provinces and the Free State. She has also conducted Phase 1 work in Botswana (2006 / 2007). In 2007 she started ArchaeoMaps, an independent archaeological and heritage consultancy. In 2010 she was awarded ASAPA CRM Principle Investigator (PI) status based on large scale Phase 2 Stone Age mitigation work (De Beers Consolidated Mines – Rooipoort, Northern Cape, 2008 / 2009) and has also been involved in a number of other Phase 2 projects including Stone Age, Shell Middens, Grave / Cemetery projects and Iron Age sites.

In addition to CRM archaeology she has been involved in research, including the international collaborations at Maloney's Kloof and Grootkloof, Ghaap Plateau, Northern Cape (2005 / 2006). Archaeological compliance experience includes her position as Head of the Archaeology, palaeontology and Meteorites (APM) Unit at AMAFA aKwaZulu-Natali (2004).

**Company Profile**

Company Name	: ArchaeoMaps cc
Registration Number	: 2005/180719/23
VAT Number	: Not VAT Registered
Accountant	: AZIMA Financial Services
Members / Shareholders	: Karen van Ryneveld (100%)
BBBEE Status	: Exempted Micro Enterprise (EME)