# HERITAGE IMPACT ASSESSMENT (INCLUDING DESKTOP PIA) FOR THE UNLAWFUL ACTIVITIES ON THE REMAINDER OF ERF 196, PORTION 1 OF ERF 196, THE REMAINDER OF ERF 197 AND ERF 198, ASHBURTON, MSUNDUZI LOCAL MUNICIPALITY, KWAZULU-NATAL

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**Declaration of Consultants independence**

I, Gary Trower, am an independent consultant and have no business, financial, personal or other interest in the proposed development project in respect of which I was appointed to do a heritage impact assessment, other than fair remuneration for work performed. There are no circumstances whatsoever that compromise the objectivity of this specialist performing such work.

Gary Trower

## Introduction

The applicant, Movito (Pty) Ltd, commenced with a development without the proper authorization. The unlawful activities took place on Remainder of Erf 196, Portion 1 of Erf 196, and the Remainder of Erf 197 and Erf 198, Ashburton, Msunduzi Local and uMgungundlovu District Municipality, KwaZulu-Natal. The extent of the development will be approximately 2.91 ha and will include hotel accommodation; restaurant; salon and health studio; laundry facilities; gym and spa; a conference room; a thatched lapa area; as well as an access road and parking area. The site is located on Thornetree Road, on a property which had previously been partially developed (Figure 1& 2).

The site footprint is located within an area where the underlying geology is given a low (green) palaeo-sensitivity rating on the SAHRIS map and these deposits could contain some palaeontological material (www.sahra.org.za/sahris/map/palaeo). Being situated close to a stream could indicate that archaeological material may also be present on site. A heritage impact assessment was thus necessary to evaluate whether any fossils or any other heritage-related material could be located within the boundaries of the proposed development, and whether any mitigation measures would be necessary.

The proposed project triggers the following Listed Activities which could have some relevance to heritage as such material is often preserved adjacent to a water source (Quaternary fossils or lithics may be located within the channel or overbank deposits of a stream or river, or may be exposed by the erosive action of the water, such as fossils in bedrock):

1) GNR 327 (2014, amended 2017), Part 14 - *"The development of – (i) Dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10*

*square metres or more; (iv) dams, where the dam, including infrastructure and water surface area exceeds 10 square metres in size;*

*Where such development occurs-*

*a) Within a watercourse ; …*

*b) If no development setback has been adopted, 32 metres from a watercourse, measured from the edge of the watercourse..."*

2) GNR 327 (2014, amended 2017), Part 19 -*"The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.."*

In terms of the National Environmental Management Act 107 of 1998 and Section 38 (8) of the National Heritage Resources Act 25 of 1999 (sections 34-36), all aspects of heritage are protected. Proposed developments that are likely to impact on heritage resources (i.e. historical, archaeological, palaeontological & cosmological) require a desktop and/or field assessment to gauge the importance of such resources in order to ensure that such sites are not damaged or destroyed by developments which could negatively impact them. Identified heritage resources should be recorded through detailed documentation, mitigation measures applied if resources are threatened, or collection and/or a rescue excavation carried out if necessary.

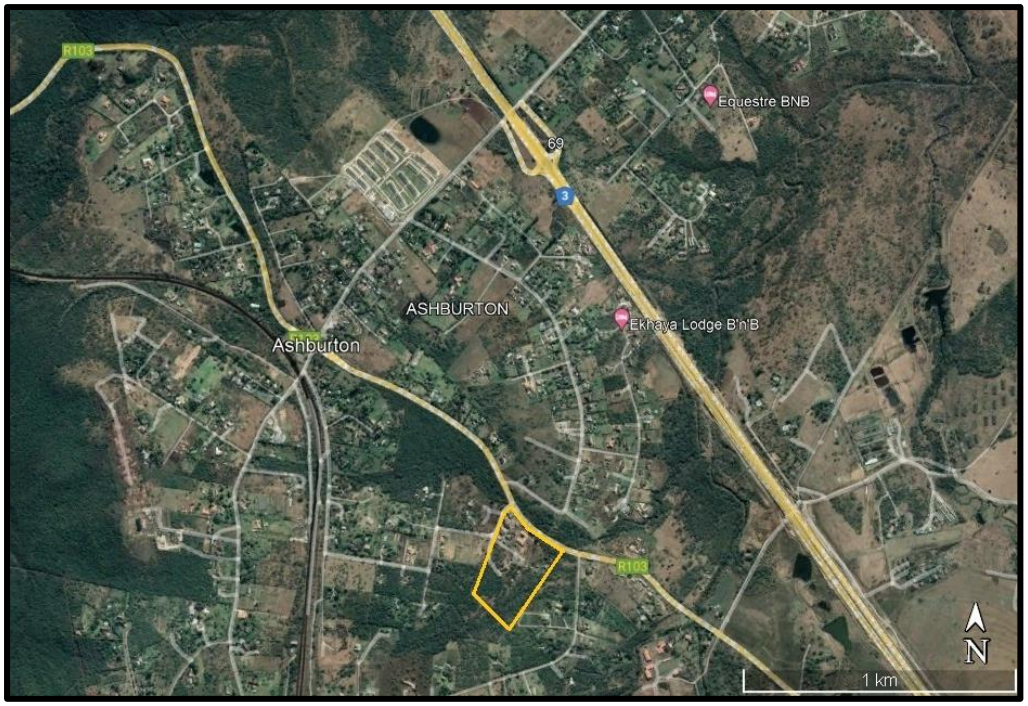


**Figure 1**: Satellite image showing a zoomed out view of the layout of the site footprint, located in Ashburton and marked in yellow outline. The site footprint has been partially developed, with patches of indigenous vegetation still present. Modified from Google Earth, Maxar Technologies 2023


**Figure 2**: Satellite image showing a close-up view of the layout of the site footprint (marked in yellow outline), located on Thornetree Road and to the south of the R103. Modified from Google Earth, Maxar Technologies 2023

# Geology

Rocks of the Karoo Basin are rich repositories for palaeontological material, necessitating measures to minimize activities which may disturb or destroy fossils preserved in underlying beds. The fossiliferous geology in the area of the proposed development consists of Late Carboniferous and early Permian deposits of the Dwyka Group. This sedimentary package accumulated as the basal deposits within a giant inland sea and comprises of diamictite, subordinate varved shale and boulder shale (Figure 3). The stratigraphic sequence making up this Subgroup resulted from trapped frozen sediments gradually dislodging from melting glaciers, as well as the material originating from a radial-type network of drainages spread across Gondwana which drained into this extensive lower-lying basin and were deposited in the tranquil depositional settings on the floor and edges of the inland sea. Such deposits could preserve coprolites, trace fossils, and plant fossils such as lycopods, *Glossopteris* and *Dadoxylon*.

These deposits form an important component and subdivision of the stratigraphy of the Karoo Supergroup, an extensive inland basin which preserves a rich array of fossil plants, insects, fish and tetrapod fauna which existed through the Carboniferous, Permian, Triassic and Jurassic of southern Gondwana (Rubidge 2005, Smith *et al*. 1993). The existence of a depositional environment in this palaeo-landscape means that fossil lifeforms which existed during the Carboniferous and early Permian may be present within this geological unit, and this is also the reason why it has a moderate palaeo-sensitivity rating of green (Figure 4).

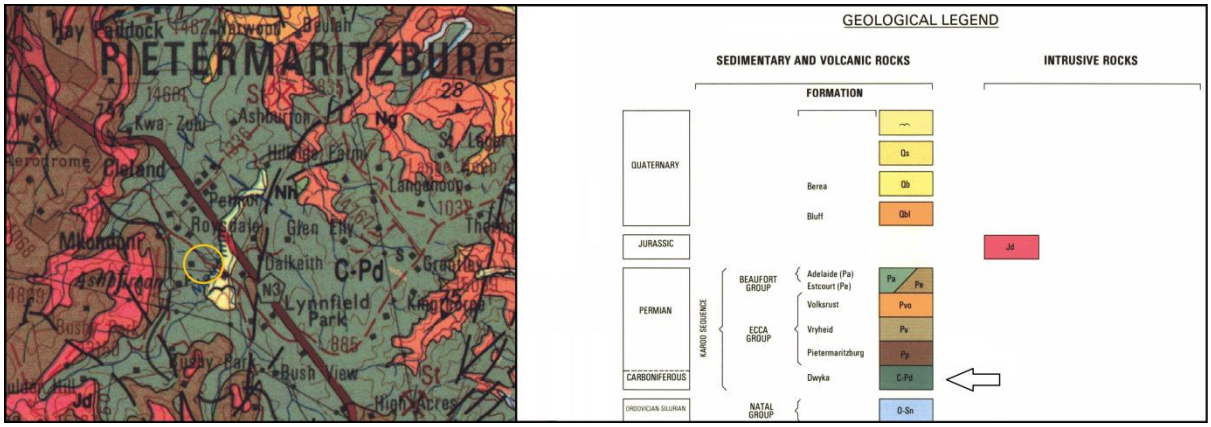


**Figure 3**: Map showing the geology of the region, with the location of the development occurring within the yellow circle and indicated on the legend with a black arrow. The blue shading (C-Pd) represents the Dwyka Group, deposits which are predominantly Carboniferous in age and are marked on the legend with a black arrow. The yellow patch to the east of the site represents Quaternary deposits. Modified from 2930 Durban, 1:250 000 Geological Series, Geological Survey, 1988

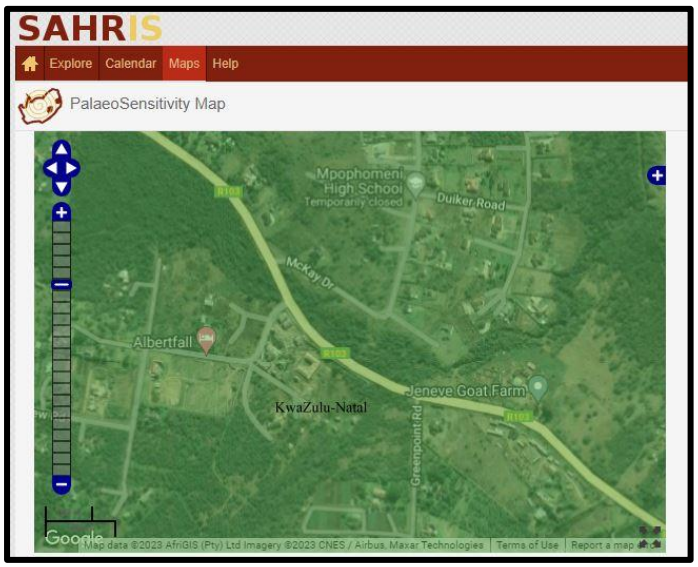


**Figure 4**: Map of how the geology in Fig.3 translates into palaeo-sensitivity. The geological unit which occurs beneath the unlawful development has a ranking of green and corresponds to the Dwyka Group, a rock type which has a low probability of significant fossil occurrences. Image modified from the SAHRIS palaeo-sensitivity map, www.sahra.org.za/sahris/map/palaeo

## Site observations

The site footprint is located in Ashburton, Pietermaritzburg to the south of the R103, at GPS coordinates 29º 40' 24.37" S, 30º 27' 19.8" E (Figure 1 & 2). Before the ground survey took place an aerial survey of the site was first carried out using Google Earth, and the relevant geology map of the area (2930 Durban) and the SAHRIS palaeo-sensitivity map were also consulted. These were all used in combination to gain an understanding of the site features, as

well as the underlying bedrock within the site footprint and how it ranked in terms of possible fossil occurrences.

Construction was on-going whilst on site, with large sections of the project almost complete (Figure 5-8). Several holes and drainage ditches were exposed where bedrock was visible, which were all examined for the presence of palaeontological material (Figure 9-12). A wall of earth was collapsing from recent rainfall, which exposed the profile of the upper soil layers. This revealed that a large portion of the upper soil profile had already been previously excavated to a depth exceeding 2 metres, so the ground had already been disturbed due to older pipeline installations (Figure 13-16). This embankment was in the process of being stabilized with cement blocks, and lots of bedrock had been excavated in the lowest part of this feature. This created a pile of shale, which was very crumbly as it was saturated with water. Several slabs of rock in this pile were manually split open in search of possible fossil material but nothing was observed (Figure 17 & 18).

Whilst on site, a JCB / back-actor was busy excavating a large trench on the eastern side of the development. The trench was inspected and comprised of bedrock overlain by clay and then capped by an upper soil layer (Figure 19 & 20). The excavated material was examined for any evidence of fossils or stone tools but nothing was recorded. Bedrock had also been removed from another drainage ditch and this was also inspected for any potential fossil material but nothing was recorded (Figure 21). Large portions of the site had been levelled out and transformed, so there weren't many pristine areas left on the site footprint. Only two stone tools were found during the ground survey, but due to the highly disturbed nature of the site they were on the surface and out of context. The one simply comprised of a flake, whereas the other consisted of a curved stone blade which showed evidence of edge utilisation (Figure 22 & 23).

In spite of several exposures of shale being examined at various points across the site for the presence of fossils, no palaeontological material was observed during the ground survey. In addition, no graves, historical buildings or archaeological sites were recorded on the property.

**Figure 5 - 8**: Construction was on-going on site, with large portions of the project in an advanced stage of completion. Top left (Fig.5) shows the entrance gate leading off of Thornetree Road. Various buildings were almost finished, leading off from a parking lot area (top right & bottom left, Fig.6 & 7). Looking east, showing the northern boundary wall with a large pile of shale in the foreground (Fig.8)

**Figure 9 - 12**: Various holes and ditches had been excavated on site, all of which were examined for the presence of any possible heritage-related material which may have been unearthed. However, no artefacts or palaeontological material was observed

**Figure 13 - 16**: Whilst on site it was noted that an embankment was collapsing due to recent rainfall, which was being stabilised with cement blocks (top left & right, Fig. 13 & 14). This revealed that underground pipelines had already been installed and that the upper soil surface had been excavated to a depth of over 2 metres, indicating that the ground has previously been disturbed (bottom left & right, Fig. 15 & 16). A trench was dug below this embankment, which unearthed a considerable amount of Dwyka shale

**Figure 17 & 18**: A considered amount of shale had been excavated from the trench below the collapsing embankment. This material was examined for fossils and several blocks of shale were split open in search of any evidence of palaeontological material, but nothing was observed

**Figure 19 & 20**: During the ground survey a JCB was busy excavating a long trench on the eastern portion of the site footprint. This was inspected and it was found to contain shale bedrock, overlain by clay and capped by the upper soil surface. No heritage-related material was observed in the trench or within any of the excavated rock and sediment

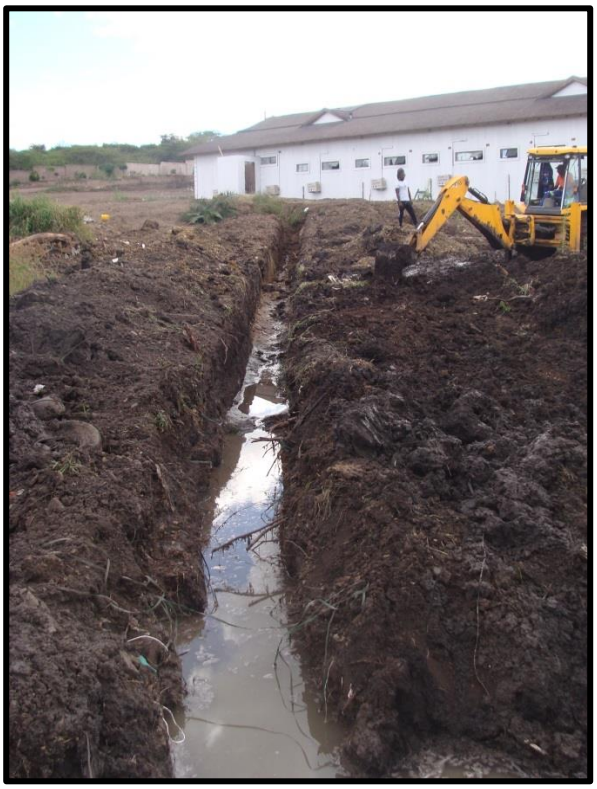

**Figure 21**: A fairly large amount of shale had also been excavated from another trench on the eastern side of the site footprint, and this material was examined for any evidence of palaeontological material but nothing was observed

**Figure 22 & 23**: During the ground survey only two stone tools were recorded, both of which were on the surface and out of context. On the left is a stone flake (Fig.22) and on the right is a blade which showed some evidence of use wear (Fig.23)

To better evaluate the site, the table below summarizes the heritage impact significance:

**Assessing Impact Significance**

| Criteria | without mitigation | with mitigation |
|---|---|---|
| Extent/spatial scale of impact | local | local |
| Duration of impact | permanent | permanent |
| Intensity/severity of impact | medium | medium |
| Probability of impact | improbable | improbable |
| Consequence | medium | medium |
| Confidence in the assessment | medium | medium |
| Significance | low | low |
| Reversibility | irreversible | |
| Loss of resource | low | |
| Mitigation potential | none | |

**Identified heritage resources (NHRA status)**

| Formal protections | |
|---|---|
| National Heritage site (Section 27) | none |
| Provincial Heritage site (Section 27) | none |
| Provisional Protection (Section 29) | none |
| Place listed in heritage register (Section 30) | none |
| | |
| **General protections** | |
| Palaeontological site or material (Section 35) | none |

## Contingency plan for possible heritage-related discoveries:

## Chance Find Protocol

Heritage-related discoveries are ranked by their nature and context; their uniqueness and completeness; their rarity and significance; as well as the contribution they can make to science. However any artefact or occurrence can turn out to be important, therefore all discoveries need to be assessed and ranked in order to determine their relevance and whether further action is required.

Based on the work of Almond *et al*. (2009) and Groenewald *et al*. (2014) and summarised on the SAHRIS website (www.sahra.org.za/sahris/map/palaeo), if a development occurs within a red zone a desktop study is required, as well as a phase 1 Palaeontological Impact Assessment (PIA) comprising a field survey and recording of fossils. A phase 2 PIA is also required, which entails the rescue of fossil material during construction activities, as well as the compulsory application for a collection and destruction permit. If the development occurs in an orange zone, a desktop survey as well as a phase 1 PIA comprising of a field survey and collection of fossils is compulsory. A prior application for a collection permit is therefore recommended and a phase 2 PIA may be necessary during the construction phase of the project. If the development occurs in a green zone, a desktop survey as well as phase 1 PIA comprising a field survey is recommended. Lastly developments which occur in a blue or grey zone may require a desktop survey, based on the known heritage sites in the area as well as the nature of surrounding geological units.

The normal procedure for recovering archaeological/palaeontological material would be to identify areas which show investigative potential through a concentration of fossils or artefacts, and whose recovery and preparation could address certain scientific questions. The process would then entail obtaining permission from the landowner/s and applying to

SAHRA (South African Heritage Resources Agency) or another provincial heritage agency for a collection permit to excavate or remove blocks of bedrock for preparation in the lab. This is a slow and time-consuming process which requires the skills of a field archaeologist/palaeontologist to spot worthy material within geological/stratigraphic exposures, and skilled fossil excavators and/or preparators who can successfully recover fossils from sediment or slabs of bedrock.

But in the case of developments fossils or artefacts may be exposed which were not being targeted as a part of a formal scientific investigation, which then requires intervention to ensure that such heritage resources are documented and evaluated, and possibly recovered. In this way, construction activities can provide an opportunity for scientists in that sediments or bedrock and other heritage related material will be exposed which otherwise would have gone unnoticed as it was hidden from view and would have been costly to excavate.

As a general rule, direct field observations are the best method to gauge the degree to which heritage-related material may be present on site, whether eroding out or visible on the surface. As many developments require a degree of digging down into the soil and/or underlying stratigraphy, fossils will be hidden from view due to their buried nature and will only be exposed by the action of a back-actor or once they have started eroding out from the stratigraphy they are preserved in. Heritage consultants such as archaeologists and palaeontologists are required to evaluate the sites of proposed development in the hope of recording and/or recovering important objects and artefacts before they are damaged or destroyed, but during the entire timeline of a project such a consultant is generally only on site for a few hours. Having a palaeontologist or archaeologist on site to examine every scoop of a back actor/JCB would be very costly and impractical, so additional site visits may be required for certain large-scale projects, or developments in highly sensitive areas.

If fossils are unearthed during the rest of the project timeline when no palaeontologist is on site, they may be difficult for the on-site layman to identify as many geological formations superficially resemble palaeontological material. Pseudo-fossils and certain mineral deposits often form into a variety of shapes which may closely resemble plant and animal fossils, making it more difficult for laypersons to positively identify chance finds in the field. With certain projects it is therefore recommended that training be provided to on-site staff on fossil identification in order to increase the chances of observing palaeontological material that may be present within the boundaries of the site footprint. Even though it is not the responsibility of site workers to keep an eye out for heritage objects and/or they may not have received the appropriate training on what to look out for, they are on the ground witnessing and observing. This is a helpful tool when there is a flow of information from on-site staff to management and protocol dictates that you convey when something unusual or out of the ordinary is observed during work operations.

The probability of on-site foremen or construction workers operating heavy earth moving equipment and working to a strict time schedule spotting heritage objects amongst tons of bedrock or sediment is not always likely but nonetheless possible. In South Africa and around the world many important archaeological and palaeontological discoveries have been made during construction projects, and companies and individuals can play their part by following the law and making the effort to report heritage resources which have been unearthed during digging operations. In so doing, developers can enhance their public image and potentially contribute to a rare fossil or object reaching a museum or tertiary institution where it can studied and eventually displayed to the public as heritage belongs to the entire nation and should be preserved as best as possible.

If by chance fossils or any other heritage-related material were to be discovered which was not anticipated in this report, construction would need to cease immediately and a protocol

should be followed whereby the relevant provincial or national heritage custodians in the relevant province would need to be informed. Developers would also need to acquire the services of a suitably qualified palaeontologist or archaeologist to rank the significance of the discoveries. If anything relevant is observed, mitigation measures may be necessary and an application for a collection permit may be required. A second site visit (Phase 2) may be necessary so that scientists can be given the opportunity to record and/or recover fossil material if it is ranked as significant and likely to make a positive contribution to the field of science.

## Assumptions and limitations

A key assumption for this report is that the kml/kmz file sent to the heritage specialist accurately conveys the layout and nature of the development, which is not always the case as plans are often revised; because the site layout has not been accurately drawn in Google Earth; or lastly because the developers have understated and downplayed the degree, severity, nature or extent of the development so as to make it seem less impactful to the environment. A further assumption is that the geological maps used in this assessment are accurate and up to date, which may not be the case as there is a continuous refinement and revision of the geological model through new scientific research, some of which may still need to become incorporated into available maps. Another assumption is that developers will respect the guidelines set out in the laws of South Africa with regards to good environmental management practices and policies, and will immediately cease all construction if any fossiliferous material is discovered. It is therefore assumed that the developers will practice integrity and embrace an unwavering mind-set with regards to respecting and protecting all aspects of heritage, including due consideration for the fact that such objects cannot simply be sacrificed to meet project deadlines.

A limitation with large scale maps (1:250 000) is that smaller outcrops of fossiliferous bedrock may not be indicated within the represented geological model. In addition, several potentially fossiliferous outcrops may have been weathered and eroded over millennia, buried under younger deposits such as alluvial and colluvial sediments, or capped by topsoil. Palaeontologically-sensitive bedrock may have also been metamorphosed through its contact with intrusive lavas, damaging or destroying fossil specimens along the contact zone.

The professional opinion given in this HIA report is based on the results of a site visit, which was used to gauge the fossiliferous potential of the bedrock likely to be exposed during the proposed development, and the impact significance. This process involved careful scrutiny of the best available maps and data sets as well as a ground survey, and all attempts were made to take a holistic, informed decision. Yet in spite of this, it is possible that fossils may be present somewhere in or around the area of the development but were not visible due to their buried nature. Moreover, certain predictions about the likelihood of encountering fossils was based on all available evidence and may prove to be less or more likely than anticipated.

## Conclusion and recommendations

Large portions of the site have already been excavated during construction activities, so as a result there were many ditches where bedrock had been unearthed and the upper soil profile had been exposed. These disturbed areas were searched for any evidence of heritage-related material, but nothing significant was observed. Only two stone tools were recorded which were out of context and lying on the surface, one of which was a flake and the other a blade. Palaeontological material which has previously been discovered in Dwyka bedrock predominantly comprises of plant fossils, so this rock type has a low probability of containing significant fossil material. No archaeological sites, fossils, graves or historical buildings were

observed on site. The remaining construction work for the project can therefore proceed as planned.

However, if any palaeontological or any other heritage-related material were to be unearthed during future construction activities, developers and/or landowners are reminded that according to the National Heritage Resources Act 1999 (Act No. 25) and KwaZulu-Natal Heritage Act 2008 (Act No. 4), work should immediately cease and the **Chance Find Protocol** outlined above should be followed to ensure that developments comply with the law, and to ensure that a rare object/fossil stands a good chance of being recorded and/or relocated before being damaged or destroyed by construction activities present on-site.

## References

1) Almond, J.E., De Klerk, B. & Gess, R., 2009. *Palaeontological Heritage of the Eastern Cape*. Internal report, SAHRA

2) Environmental Impact Regulations of 2014, amended 2017

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5) Rubidge, B.S. 2005. Re-uniting lost continents - fossil reptiles from the ancient Karoo and their wanderlust. *South African Journal of Geology* 108 (1): 135-172

6) Smith, R.M.H., Eriksson, P.G. and Botha, W.J. 1993. A review of the stratigraphy and sedimentary environments of the Karoo-aged basins of Southern Africa. *Journal of African Sciences 16*: 143-169