

Proposed new citrus development on Farms Kakamas South Settlement No. 2185 & 2193 near Augrabies, Kai! Garib Municipality, Northern Cape

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January 2018

Executive summary

The proposed agricultural development comprises new citrus orchards and short buried pipelines on Farms Kakamas South Settlement No. 2185 & 2193 near Augrabies, c. 2.5 km south of the River Orange, Northern Cape. The development footprint is underlain by (1) ancient Precambrian igneous and metamorphic bedrocks that do not contain fossils as well as (2) sparsely fossiliferous or unfossiliferous superficial sediments (alluvium, aeolian sands, surface gravels) of probable Quaternary to Recent age. Diamond prospecting has occurred in the area previously, but substantial older alluvial terraces (potentially fossiliferous High Level Gravels) are not mapped in the study area. In view of the small development footprint and the generally low palaeontological sensitivity of the study region, no further specialist studies or mitigation are considered necessary for this project, as far as fossil heritage is concerned. However, should significant fossil remains (e.g. vertebrate bones and teeth) be encountered during construction, the responsible ECO should inform SAHRA at the earliest opportunity to consider possible mitigation, measures.

1. Project description

Oseiland Eiendomme (Pty) Ltd is proposing to develop new citrus orchards on Farms Kakamas South Settlement No. 2185 & 2193, situated on the south side of the R64 and c. 12 km NW of Kakamas, Kai! Garib Municipality, Northern Cape (Fig. 1). The proposed agricultural development will cover a footprint area of about 32 ha and is located about 2.5 km south of the River Orange and 2.4 km due southeast of Augrabies settlement. Water for the new citrus orchards will be supplied *via* buried pipelines alongside existing gravel farm roads leading from pump stations located on the banks of the Orange River. Existing access roads will be used, and no new access roads will need to be constructed. The property is currently zoned for Agriculture.

An EIA for this agricultural development proposal is being co-ordinated by Pieter Badenhorst Professional Services (PO Box 1058, Wellington, 7654. Cell: 0827763422. Fax: 0866721916. E-mail: pbps@iafrica.com). The present report contributes to the HIA component being compiled by Jonathan Kaplan of ACRM (5 Stuart Road, Rondebosch, 7700. Ph/Fax: 021 685 7589. Cell: 082 321 0172. E-mail: acrm@waccess.co.za). The proposed citrus project is an extension of a recently approved vineyard development on the Farm Renosterkop directly adjacent to the present property, for which a palaeontological assessment (PIA) has already, been submitted (Almond 2017).

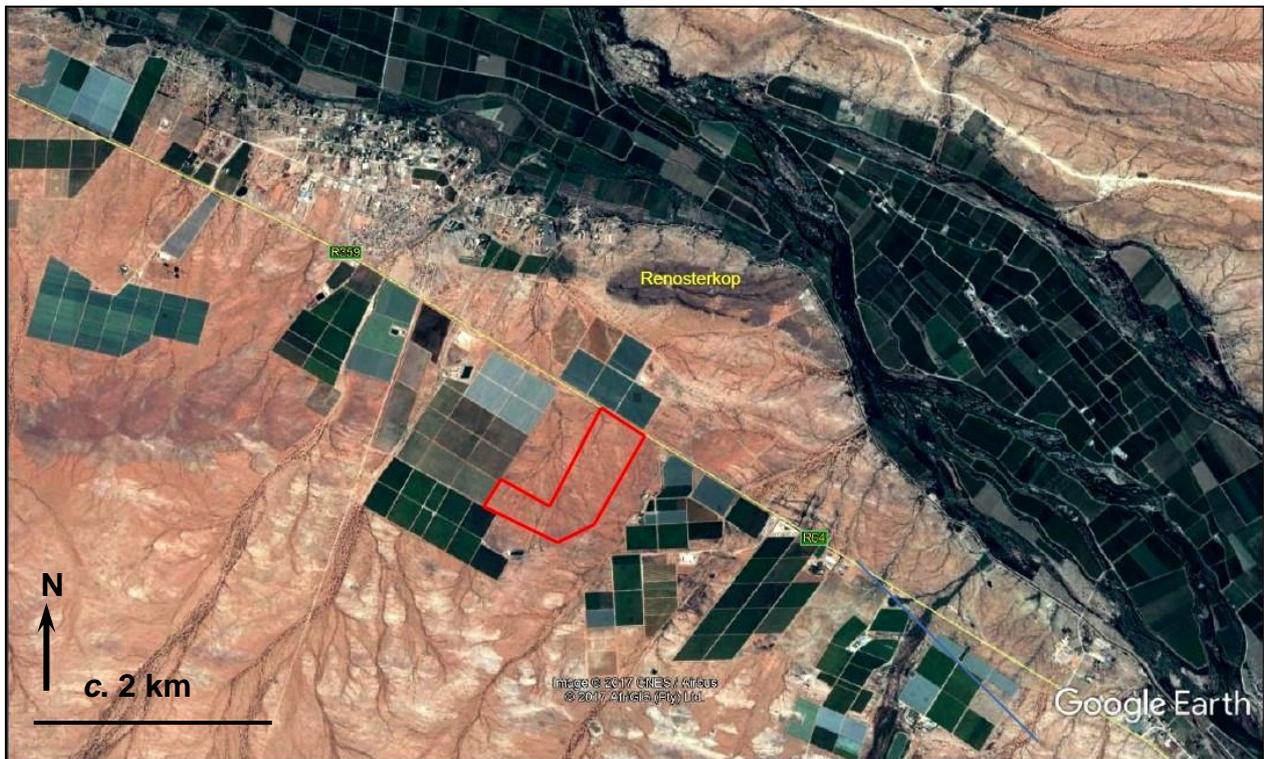


Figure 1. Google earth© satellite image showing the new citrus orchard study site (red polygon) on Farms Kakamas South Settlement No. 2185 & 2193, situated on the southern side of the Orange River just east of Augrabies settlement and c. 12 km NW of Kakamas, Northern Cape (Image abstracted from the AIA for this project by Kaplan 2017).

2. Geological context

Field photos (Kaplan 2017) and satellite images (Fig. 1) show arid, sparsely-vegetated, fairly flat-lying terrain in the study area at 660-680 m amsl that is mantled in orange-brown sandy soils and gravels and drained by numerous dendritic ephemeral stream systems. These are tributaries of the Orange River that runs about 2.5 kilometres to the north, on the far side of a small, west-east trending hill called Renosterkop.

The geological setting of the study area is shown on the 1: 250 000 geology sheet 2820 Upington (Fig. 2; Council for Geoscience, Pretoria) (Moen 2007). The underlying bedrocks are ancient Precambrian granite-gneisses assigned to the **Riemvasmaak Gneiss** of the **Namaqua-Natal Province** that are some 1.5 billion years old and entirely unfossiliferous (Cornell *et al.* 2006, Almond & Pether 2008).

The study area lies well south of the present course of the River Orange (Gariep), so ancient (Tertiary - Quaternary), consolidated alluvial gravels of the Orange River system – which are known to be highly fossiliferous elsewhere along the Orange (*e.g.* Partridge *et al.* 2006) - are unlikely to be present here; High Level Gravels are not mapped in the Renosterkop region on the 1: 250 000 geological sheet (Fig. 2). However, it is noted that the broader region has been disturbed in part by trenching for alluvial diamonds (Red DA symbols on the geological map, Fig. 2), suggesting that significant thicknesses of alluvial sediments (relict terraces) may be present here, at least locally.

Superficial sediments away from the main drainage courses largely comprise surface gravels (mainly alluvial, sheetwash and deflation deposits), scree breccias derived from local elevated exposures of bedrock), reddish-hued aeolian and locally-derived sands and perhaps near-surface calcretes, the last especially over lime-rich bedrock. The red sands may in part be assigned to the

upper part of the **Kalahari Group (Gordonia Formation)** of late Caenozoic (Neogene / Quaternary) age and the remaining alluvial sediments are probably of a similar, geological youthful age. Although fossil remains are occasionally encountered in these younger fluvial and terrestrial units – for example reworked mammalian bones and teeth, freshwater molluscs, calcretised root casts, termitaria, ostrich egg shells, land snail shells (Almond 2008, Almond & Pether 2008 and refs. therein) - they are sparsely distributed and occur over a very wide area, so the chances of serious impacts on unique fossil heritage resources here are only slight.

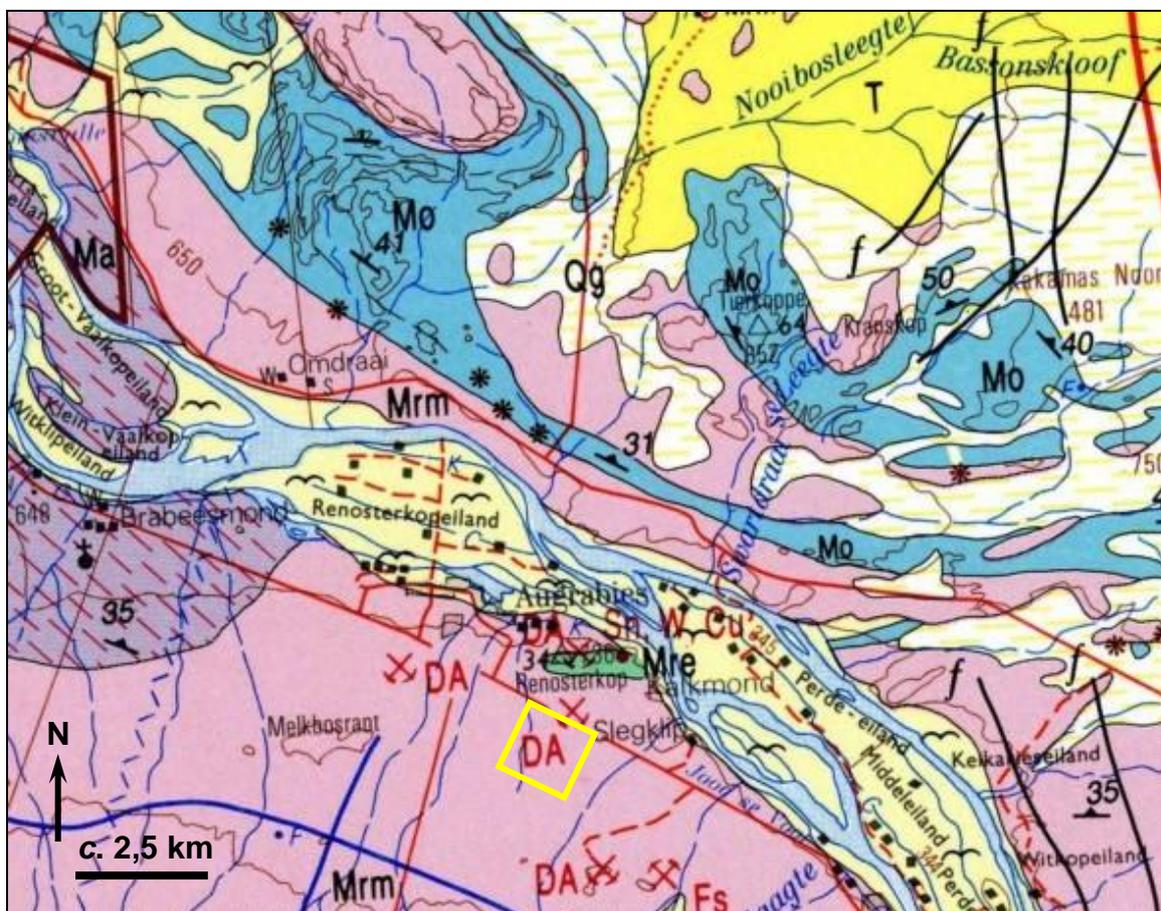


Figure 2. Extract from 1: 250 000 sheet 2820 Upington (Council for Geoscience, Pretoria) showing the geology of the Renosterkop citrus project study area (yellow rectangle) on the southern side of the Orange River and c. 12 km NW of Kakamas, Northern Cape. Bedrocks beneath the study area comprise Riemvasmaak Gneiss (Mrm, pink) forming part of the Precambrian (Proterozoic) Namaqua-Natal Metamorphic Province. Renosterkop ridge to the north is likewise built of gneissose Precambrian rocks (Mre, pale green, Renosterkop Gneiss). Thin surface sands and gravels overlying the basement bedrocks are evident from satellite images and field photographs (Kaplan 2017) but High Level Gravels are not mapped here. Note, however, evidence for previous trenching for diamonds (DA) in the region, suggesting that substantial alluvial deposits might be preserved locally.

3. Conclusions & recommendations

In view of the negligible palaeontological sensitivity of the ancient Precambrian bedrocks as well as the low sensitivity of the geologically recent superficial sediments along the Orange River in the Kakamas – Augrabies region, the proposed agricultural development – including new citrus orchards and buried pipelines - is not considered to pose a significant threat to palaeontological heritage. Although diamond prospecting has occurred in the Renosterkop region, substantial, potentially-fossiliferous older alluvial deposits are not mapped here.

Pending any significant new fossil discoveries in the area, no further specialist studies or mitigation are considered necessary for this agricultural project.

All South African fossil heritage is protected by the National Heritage Resources Act, 1999. Should substantial fossil remains - such as vertebrate bones and teeth, or petrified logs of fossil wood - be encountered at surface or exposed during construction, the ECO should safeguard these, preferably *in situ*. They should then alert the relevant provincial heritage management authority as soon as possible - *i.e.* SAHRA (Contact details: Dr Ragna Redelstorff, SAHRA, P.O. Box 4637, Cape Town 8000. Tel: 021 202 8651. Email: rredelstorff@sahra.org.za). This is to ensure that appropriate action (*i.e.* recording, sampling or collection of fossils, recording of relevant geological data) can be taken by a professional palaeontologist at the developer's expense.

These mitigation recommendations should be incorporated into the Environmental Management Programme (EMPr) for this agricultural project. Please note that:

- All South African fossil heritage is protected by law (South African Heritage Resources Act, 1999) and fossils cannot be collected, damaged or disturbed without a permit from SAHRA or the relevant Provincial Heritage Resources Agency;
- The palaeontologist concerned with potential mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (*e.g.* museum or university collection);
- All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (*e.g.* data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies developed by SAHRA (2013).

4. References

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5. Qualifications & experience of the author

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape, Limpopo, Mpumalanga, Northwest, Free State and KwaZulu-Natal under the aegis of his Cape Town-based company *Natura Viva* cc. He was a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage Assessment Practitioners – Western Cape).

Declaration of Independence

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



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