

**NATURA VIVA cc**  
**Palaeontological Impact Assessments & Heritage Management,**  
**Natural History Education, Tourism, Research**

**Attn: Ms Jacqui Fincham**  
**WSP in Africa**  
**The Pavilion, 1st Floor**  
**Corner Portswood and Beach Rd**  
**Waterfront, Cape Town**  
**8001 South Africa**

**Date: 7 September 2021**

Dear Ms Fincham,

This letter is to confirm that the analysis and conclusions reached in my original palaeontological heritage report of 2014 regarding the proposed Sewage Package Plant (SPP) and associated infrastructure, now called the Waste Water Treatment Works, on the south-eastern coast of Robben Island near Cape Town still apply in full, viz

*It is concluded that the proposed Sewage Package Plant and associated infrastructure will not generate significant impacts on local palaeontological heritage resources that might compromise the Outstanding Universal Value of the Robben Island World Heritage Site.*

*Consequently, no further palaeontological heritage studies or specialist mitigation are recommended for this sewage plant project, pending the discovery or exposure of any substantial fossil remains (e.g. vertebrate bones and teeth, fossil plant-rich horizons, dense concentrations of marine shells) during the construction phase. The ECO responsible for these developments should be alerted to the possibility of important fossil remains being found either on the surface or exposed by fresh excavations during construction.*

*In the case of any substantial fossil finds during construction, these should be safeguarded - preferably in situ - and reported by the ECO as soon as possible to Heritage Western Cape, so that appropriate mitigation (i.e. recording, sampling or collection) by a palaeontological specialist can be considered and implemented. These recommendations should be incorporated into the Environmental Management Plan (EMP) for the sewage infrastructure project.*

Yours sincerely,



**Dr John E. Almond**  
**Palaeontologist**  
**Natura Viva cc**

# Proposed Sewage Package Plant on Robben Island, Cape Town, Western Cape

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## 1. SUMMARY

It is proposed to construct a Sewage Package Plant (SPP) and associated infrastructure on the south-eastern coast of Robben Island near Cape Town in order to treat sewage generated on the island. The study area for the proposed SPP is underlain by a thin (probably a few meters or less) veneer of aeolian sands of the **Witsand Formation** (Sandveld Group) of Holocene to Recent age. These unconsolidated sands directly overlie latest Precambrian (Ediacaran) submarine fan deposits of the **Tygerberg Formation** (Malmesbury Group). The metasedimentary bedrocks here have been planed-off at 3-7 m amsl by wave action during periods of high sea level in the Pleistocene Epoch. Pleistocene raised beach deposits (e.g. storm gravels) are not recorded along this comparatively protected stretch of coastline.

A wide range of invertebrate, vertebrate and plant subfossils, as well as microfossils, have been recorded from the Holocene dune sands of the Witsand Formation in the Western Cape. However, since (1) most of the taxa concerned are of wide distribution, (2) only shallow excavations ( $\leq 2.5$  m) are envisaged during the construction phase, and (3) the SPP development footprint is small (1400 m<sup>2</sup>), significant impacts on buried or subsurface fossil remains are not anticipated here. Direct impacts on bedrocks of the Tygerberg Formation within the development footprint will probably be very limited in extent. There are unconfirmed reports of simple invertebrate burrows preserved within Tygerberg sandstones on Robben Island that are potentially of great scientific interest as the first and only known macrofossils recorded from the entire Malmesbury Group. However, if valid, these observations will have been made in bedrock exposures along the shoreline, perhaps in the intertidal zone, and are unlikely to be directly affected by the proposed onshore development, or by the effluent pipeline where this runs offshore.

It is concluded that the proposed Sewage Package Plant and associated infrastructure will not generate significant impacts on local palaeontological heritage resources that might compromise the Outstanding Universal Value of the Robben Island World Heritage Site.

Consequently no further palaeontological heritage studies or specialist mitigation are recommended for this sewage plant project, *pending* the discovery or exposure of any substantial fossil remains (e.g. vertebrate bones and teeth, fossil plant-rich horizons, dense concentrations of marine shells) during the construction phase. The ECO responsible for these developments should be alerted to the possibility of important fossil remains being found either on the surface or exposed by fresh excavations during construction.

In the case of any substantial fossil finds during construction, these should be safeguarded - preferably *in situ* - and reported by the ECO as soon as possible to Heritage Western Cape, so that appropriate mitigation (*i.e.* recording, sampling or collection) by a palaeontological specialist can be considered and implemented (Contact details: Heritage Western Cape. Protea Assurance Building, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 086-

142 142. Fax: 021-483 9842. Email: hwc@pgwc.gov.za). These recommendations should be incorporated into the Environmental Management Plan (EMP) for the sewage infrastructure project.

The specialist involved in palaeontological mitigation work would require a fossil collection permit from SAHRA (Contact details: Mrs Colette Scheermeyer, P.O. Box 4637, Cape Town 8000; Tel: 021 462 4502; Email: cscheermeyer@sahra.org.za). Fossil material must be curated in an approved repository (e.g. museum or university collection) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.

## **2. INTRODUCTION & BRIEF**

It is proposed to construct a small Sewage Package Plant (SPP) and associated infrastructure on the south-eastern coast of Robben Island near Cape Town in order to treat sewage generated on the island (Fig. 1). The treated effluent will be transported *via* an existing onshore pipeline to the existing sea outfall pipeline and discharged out to sea. The site for the sewage package plant will have an area of 1400 m<sup>2</sup>, within which the plant will have a footprint of 600 m<sup>2</sup>. The on-land plant will be partially submerged to a depth of approximately 2.5 m subsurface. Sludge produced as part of the treatment process will be dried on drying beds on the island. The sludge can be used as fertiliser or disposed of *via* the normal refuse system.

The proposed SPP development project (DEA ref number: 14/12/16/3/3/3/83) requires authorisation in terms of National Environmental Management Act (NEMA) (Act No. 107 of 1998), EIA Regulations. Robben Island is a National and World Heritage Site and therefore the competent authority in terms of Environmental Authorisation in terms NEMA will be the National Department of Environmental Affairs (DEA).

The company WSP Environmental (Pty) Ltd, Cape Town (Contact details: Ms Surina Brink , 3rd Floor, 35 Wale Street, Cape Town, 8001, South Africa. Tel: +27 21 481 8794. Fax: +27 21 481 8799. Mob: +27 82 468 0962. E-mail: Surina.brink@WSPGroup.co.za) has been appointed by the developer as the independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment for this sewage plant project.

The study area on Robben Island is underlain by potentially fossiliferous sediments of the Holocene to Recent Witsand Formation (Sandveld Group) overlying Late Precambrian metasediments of the Tygerberg Formation (Malmesbury Group). In accordance with the National Heritage Resources Act, 1999, a palaeontological heritage basic assessment as part of a comprehensive Heritage Impact Assessment for this project has been commissioned by WSP Environmental (Pty) Ltd, Cape Town.

### **1.1. Legislative context of this palaeontological study**

The various categories of heritage resources recognised as part of the National Estate in Section 3 of the National Heritage Resources Act (1999) include, among others:

- geological sites of scientific or cultural importance;
- palaeontological sites;
- palaeontological objects and material, meteorites and rare geological specimens.

According to Section 35 of the National Heritage Resources Act, dealing with archaeology, palaeontology and meteorites:

- (1) The protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority.
- (2) All archaeological objects, palaeontological material and meteorites are the property of the State.
- (3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the

responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

(4) No person may, without a permit issued by the responsible heritage resources authority—

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;

(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;

(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or

(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

(5) When the responsible heritage resources authority has reasonable cause to believe that any activity or development which will destroy, damage or alter any archaeological or palaeontological site is under way, and where no application for a permit has been submitted and no heritage resources management procedure in terms of section 38 has been followed, it may—

(a) serve on the owner or occupier of the site or on the person undertaking such development an order for the development to cease immediately for such period as is specified in the order;

(b) carry out an investigation for the purpose of obtaining information on whether or not an archaeological or palaeontological site exists and whether mitigation is necessary;

(c) if mitigation is deemed by the heritage resources authority to be necessary, assist the person on whom the order has been served under paragraph (a) to apply for a permit as required in subsection (4); and

(d) recover the costs of such investigation from the owner or occupier of the land on which it is believed an archaeological or palaeontological site is located or from the person proposing to undertake the development if no application for a permit is received within two weeks of the order being served.

Minimum standards for the palaeontological component of heritage impact assessment reports have been developed by SAHRA (2013).

### **3. APPROACH TO THE PALAEOLOGICAL HERITAGE ASSESSMENT**

The information used in this desktop study was based on the following:

1. A short project outline (BID) and maps provided by WSP Environmental (Pty) Ltd, Cape Town;
2. A review of the relevant scientific literature, including published geological maps and sheet explanations, satellite images, and geological field guides (e.g. Theron & Hill 1993);
3. The author's database on the formations concerned and their palaeontological heritage.
4. An informative unpublished report on fossils in dunes and coversands prepared for Heritage Western Cape by John Pether (2008).

In preparing a palaeontological desktop study the potentially fossiliferous rock units (groups, formations *etc*) represented within the study area are determined from geological maps and satellite images. The known fossil heritage within each rock unit is inventoried from the published scientific literature, previous palaeontological impact studies in the same region, and the author's field experience (Consultation with professional colleagues as well as examination of institutional fossil collections may play a role here, or later following field assessment during the compilation of the final report). This data is then used to assess the palaeontological sensitivity of each rock unit to development. The potential impact of the proposed development on local fossil heritage is then determined on the basis of (1) the palaeontological sensitivity of the rock units concerned and (2) the nature and scale of the development itself, most significantly the extent of fresh bedrock

excavation envisaged. When rock units of moderate to high palaeontological sensitivity are present within the development footprint, a Phase 1 field assessment study by a professional palaeontologist is usually warranted to identify any palaeontological hotspots and make specific recommendations for any mitigation required before or during the construction phase of the development.

On the basis of the desktop and Phase 1 field assessment studies, the likely impact of the proposed development on local fossil heritage and any need for specialist mitigation are then determined. Adverse palaeontological impacts normally occur during the construction rather than the operational or decommissioning phase. Phase 2 mitigation by a professional palaeontologist – normally involving the recording and sampling of fossil material and associated geological information (e.g. sedimentological data) may be required (a) in the pre-construction phase where important fossils are already exposed at or near the land surface and / or (b) during the construction phase when fresh fossiliferous bedrock has been exposed by excavations. To carry out mitigation, the palaeontologist involved will need to apply for a palaeontological collection permit from the relevant heritage management authority, *i.e.* SAHRA for the Northern Cape (Contact details: Mrs Colette Scheermeyer, P.O. Box 4637, Cape Town 8000. Tel: 021 462 4502. Email: cscheermeyer@sahra.org.za). It should be emphasized that, *providing appropriate mitigation is carried out*, the majority of developments involving bedrock excavation can make a *positive* contribution to our understanding of local palaeontological heritage.

### **3.1. Assumptions & limitations**

The accuracy and reliability of palaeontological specialist studies as components of heritage impact assessments are generally limited by the following constraints:

1. Inadequate database for fossil heritage for much of the RSA, given the large size of the country and the small number of professional palaeontologists carrying out fieldwork here. Most development study areas have never been surveyed by a palaeontologist.
2. Variable accuracy of geological maps which underpin these desktop studies. For large areas of terrain these maps are largely based on aerial photographs alone, without ground-truthing. The maps generally depict only significant (“mappable”) bedrock units as well as major areas of superficial “drift” deposits (alluvium, colluvium) but for most regions give little or no idea of the level of bedrock outcrop, depth of superficial cover (soil *etc*), degree of bedrock weathering or levels of small-scale tectonic deformation, such as cleavage. All of these factors may have a major influence on the impact significance of a given development on fossil heritage and can only be reliably assessed in the field.
3. Inadequate sheet explanations for geological maps, with little or no attention paid to palaeontological issues in many cases, including poor locality information;
4. The extensive relevant palaeontological “grey literature” - in the form of unpublished university theses, impact studies and other reports (e.g. of commercial mining companies) - that is not readily available for desktop studies;
5. Absence of a comprehensive computerized database of fossil collections in major RSA institutions which can be consulted for impact studies. A Karoo fossil vertebrate database is now accessible for impact study work.

In the case of palaeontological desktop studies without supporting Phase 1 field assessments these limitations may variously lead to either:

(a) *underestimation* of the palaeontological significance of a given study area due to ignorance of significant recorded or unrecorded fossils preserved there, or

(b) *overestimation* of the palaeontological sensitivity of a study area, for example when originally rich fossil assemblages inferred from geological maps have in fact been destroyed by tectonism or weathering, or are buried beneath a thick mantle of unfossiliferous “drift” (soil, alluvium *etc*).

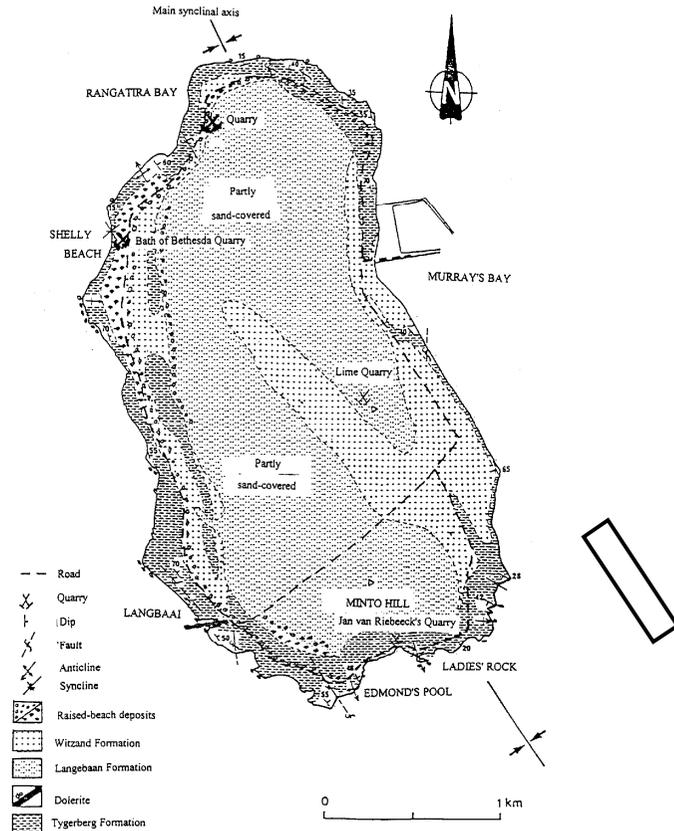
Since most areas of the RSA have not been studied palaeontologically, a palaeontological desktop study usually entails *inferring* the presence of buried fossil heritage within the study area from relevant fossil data collected from similar or the same rock units elsewhere, sometimes at localities far away. Where substantial exposures of bedrocks or potentially fossiliferous superficial sediments are present in the study area, the reliability of a palaeontological impact assessment may be significantly enhanced through field assessment by a professional palaeontologist. In the case of the Robben Island sewage plant project the major limitation for fossil heritage assessment is the lack of previous field-based palaeontological studies in the area.



**Fig. 1. Google earth© satellite image of Robben Island (A) showing detail of the study area for the proposed Sewage Package Plant on the east coast of the island (B), approximately one kilometre south of the harbour at Murray’s Bay (Detailed image kindly supplied by WSP**

Environmental (Pty) Ltd, Cape Town). The proposed SPP footprint and existing landside pipeline to the sea outlet pipeline are indicated in red.

**A**



**B**

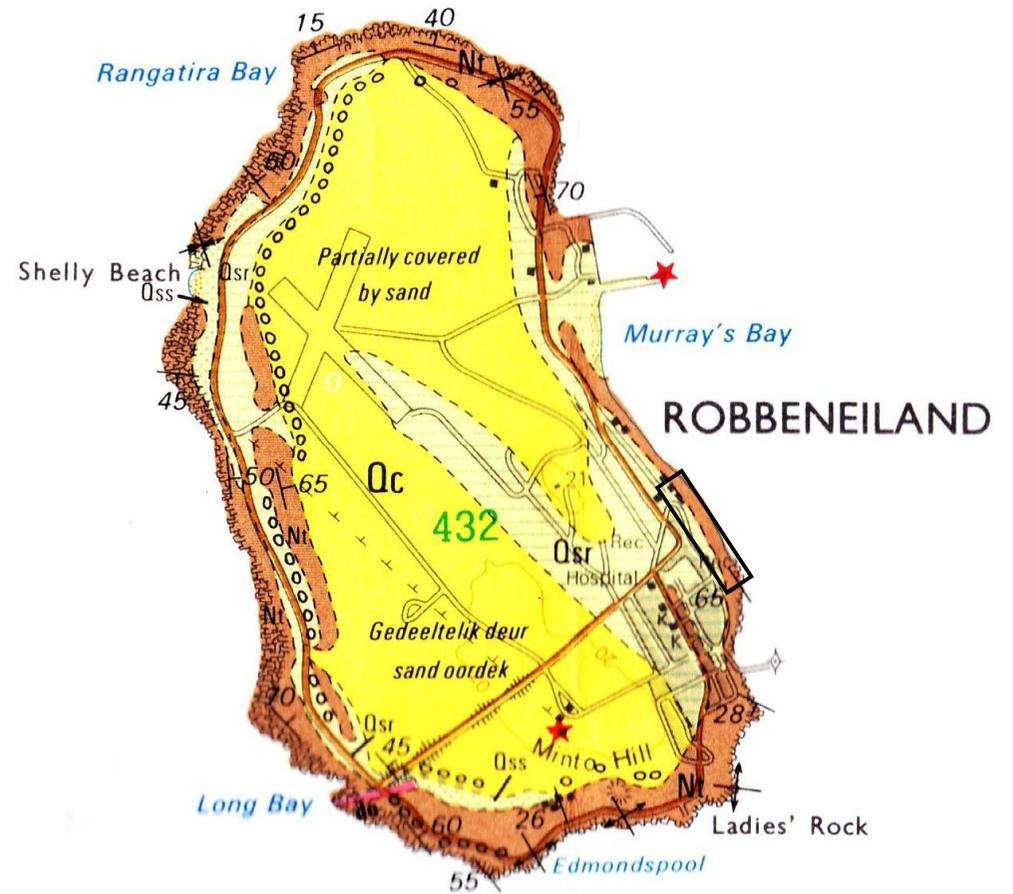


Fig. 2. Two geological maps of Robben Island with the present Sewage Package Plant study area on the east coast marked by a black rectangle: (a) From Theron & Hill (1995); (b) From 1: 50 000 geological map 3318CD (Council for Geoscience, Pretoria).

#### 4. GEOLOGICAL BACKGROUND

The study area for the proposed Sewage Package Plant is situated on the south-eastern coast of Robben Island, approximately one kilometre south of the harbour in Murray's Bay (Figs. 1 & 2). The SPP footprint and landside sector of the pipeline to the sea outlet pipeline are located on a gently seaward-sloping, vegetated coastal bench or platform at 3 – 7 m amsl situated between the modern rocky coast and the coastal road (Fig. 1B).

The geology of Robben Island has been reviewed in 1: 50 000 and 1: 250 000 sheet explanations for the Cape Town area (Theron 1984 and Theron *et al.* 1992 respectively), in a recent study focusing on structural geology by Rowe *et al.* (2010), as well as in informative but unpublished excursion guides produced for the Western Cape Branch of the Geological Society of South Africa (e.g. Theron & Hill 1995).

As shown in both geological maps of Robben Island reproduced here in Figure 2, the study area is underlain at depth by low-grade metasediments of the **Malmesbury Group**. These bedrocks are assigned to the **Tygerberg Formation** and are inferred to be latest Precambrian (Ediacaran) age, constrained by the youngest detrital zircons of 560 Ma and the intrusion of the Cape Granites at 552-540 Ma (Gaucher *et al.* 2009). They build the substructure of the entire island and are well exposed along the coast. Steeply SW-dipping, north-south striking beds of the Tygerberg Formation are clearly visible in the intertidal and shallow subtidal zone adjacent to the SPP development footprint on satellite images (Fig. 1B). Tygerberg Formation rocks on Robben Island are described in some detail by Rowe *et al.* (2010) whose detailed mapping (*ibid.*, their Figure 2) indicates that in the SPP study area this unit is represented by sandstone facies. The medium- to coarse-grained sandstones are described as tan to light grey in hue, thin- to medium-bedded, and well-jointed. Sphaeroidal weathering along joint surfaces is a characteristic feature. Sedimentary structures include parallel lamination, trough cross-bedding and local horizons of convolute bedding. The beds are cross-cut by pressure-solution cleavage planes that are more widely spaced than in finer-grained, pelitic facies of the Tygerberg Formation and do not obscure the original bedding. Inferred depositional processes include fluidisation, grain flow and high-density turbidity currents with high rates of deposition within a submarine fan setting, possibly in proximity to a subduction zone / deep-sea trench (Von Veh 1982, Rozendaal *et al.* 1999, Rowe *et al.* 2010).

The Tygerberg bedrocks in the interior of Robben Island are mantled by Late Caenozoic coastal sediments of the **Sandveld Group** (Fig. 3). The coastal bench in the study area has been cut into Tygerberg rocks by prolonged wave action, most recently during the last interglacial sea-level highs of the Late Pleistocene Epoch (c. 125 000 BP) when sea levels reached an average of 6-7 m higher than at present. Successive Mid to Late Pleistocene episodes of marine planation will have eroded away traces of Plio-Pleistocene aeolianites (wind-blown sands) and any older superficial deposits of the Sandveld Group from Malmesbury bedrocks close to the coast. These older aeolianites, referred to the **Langebaan Formation** (Qc / dark yellow in Fig. 2B), are still preserved, however, over much of the interior of the island, but only outside the study area. Along the eastern coast of Robben Island, including most of the present study area, younger (Holocene to Recent) carbonate-rich aeolian sands of the **Witsand Formation** (Qsr / pale yellow in Fig. 2B) directly overlie the Malmesbury bedrocks, as well as Langebaan aeolianites further away from the coast. The Witsand Formation aeolianites in the Cape Town region are described by Theron (1984) and Theron *et al.* (1992) and for Robben Island in particular by Theron and Hill (1995). The pale, shelly, unconsolidated sands are mainly structured by the prevailing south-easterly winds during the dry summer months, with dune plumes prograding towards the interior in a north-westerly direction (See map Fig. 2B). The thickness of the aeolian sands in the study area is uncertain, but unlikely to exceed a few meters. Gravelly raised beach terrace deposits of Pleistocene age are mapped at various points along the margins of Robben Island but not on the east coast, probably because this shore was more protected from storm wave activity (Theron & Hill 1995).

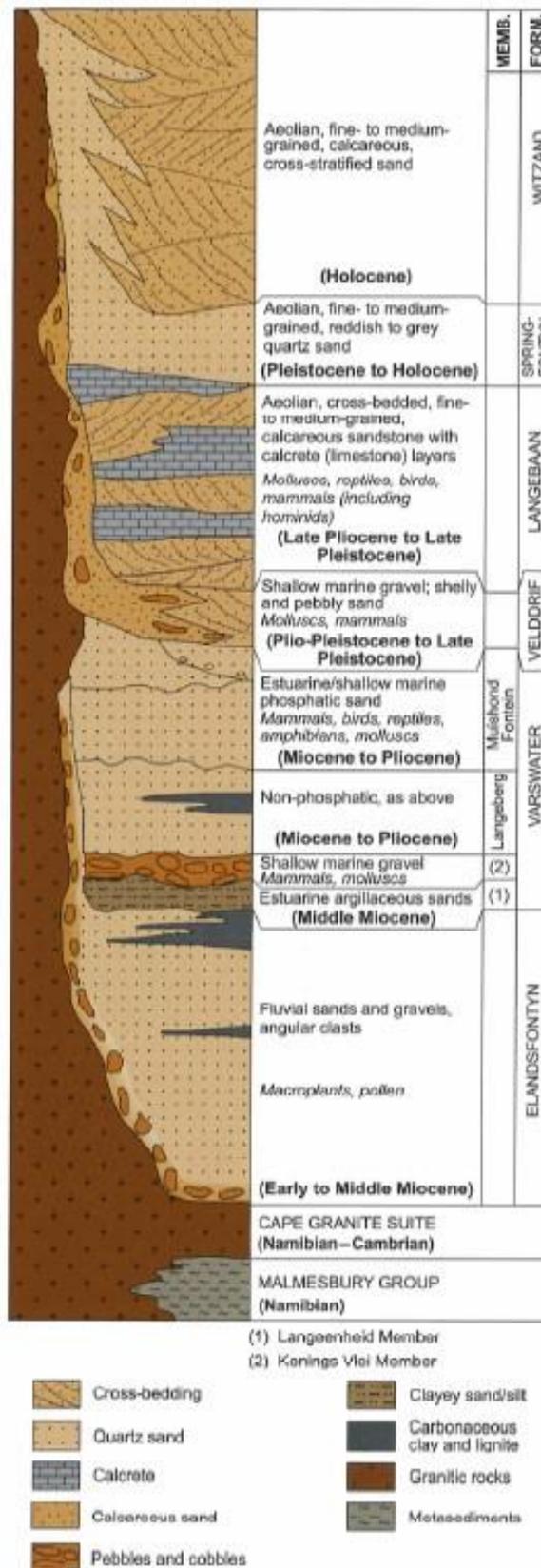


Fig. 3. Generalised stratigraphic column for the Late Caenozoic Strandveld Group of the West Coast (From Roberts *et al.* 2006). The solid vertical red bars indicate the Plio-Pleistocene Langebaan Formation aeolianites and younger, Holocene to Recent Witsand aeolianites that mantle the Tygerberg Formation bedrocks on Robben Island.

## 5. PALAEOLOGICAL HERITAGE

Recent research shows that the **Malmesbury Group** metasediments are actually of Late Proterozoic (Ediacaran) age originally. Given their low metamorphic grade (low greenschist facies and below), they are therefore potentially fossiliferous where levels of tectonic deformation are low (Belcher & Kisters 2003, Gresse *et al.* 2006). Groups of fossils that may have originally been preserved within siliciclastic or minor carbonate sediments here include trace fossils, stromatolites, organic-walled microfossils (*e.g.* acritarchs) as well as the enigmatic vendobiontans. However, extensive deformation, including intense folding, faulting, quartz veining and cleavage development, as well as regional metamorphism during the Late Proterozoic to Cambrian Saldanian Orogeny (mountain-building event) have probably obliterated most organic remains, with the possible exception of some trace fossils and microfossils. Micropalaeontological analysis of these difficult rocks is now in progress (G. Germs, pers. comm. 2008). The more pelitic (clay-rich) Malmesbury rocks have additionally suffered extensive chemical weathering under humid tropical conditions during Cretaceous and Tertiary times so that away from the coast fresh bedrock is almost universally covered with a deep mantle of multi-hued, kaolinitic and ochreous saprolite (*in situ* weathered rock) and surface gravels (sometimes silcretized) (*e.g.* Almond 2010).

So far there are no confirmed records of Precambrian fossils from the Malmesbury Group, including the **Tygerberg Formation**. However, there is a tantalizing report of bioturbation by sand-filled invertebrate burrows within sandstone facies of the Tygerberg Formation on Robben Island (Nakashole 2004). This report was not confirmed by Rowe *et al.* (2005, p. 61) and certainly needs following up. Tygerberg Formation bedrocks beneath Sandveld Group cover at Duinefontein, on the mainland coast some 15 km NE of Robben Island, feature Pliocene fossil borings of the ichnogenus *Gastrochaenolites* that were generated by marine bivalves when these rocks were last exposed on the sea bed (Pether 2007, Hart 2010).

The Holocene to Recent dune sands of the **Witsand Formation** contain a wide range of subfossil remains of both palaeontological and archaeological interest. The fossils have been usefully reviewed in an unpublished report by Pether (2008; see also Rogers 1980, 1982, Roberts *et al.* 2006). They include land snails (*e.g.* *Trigonephrus globulus*), terrestrial vertebrate bones (*e.g.* tortoises, moles, rodents, ostrich and occasionally large mammals), ostrich egg shells, freshwater vertebrates (frogs, snails, fish), plant remains (reeds, coalified roots, charcoal), comminuted invertebrate skeletal remains (*e.g.* molluscs, echinoid spicules) and various groups of microfossils (pollens, diatoms, ostracods, foraminiferans) as well as archaeological materials (*e.g.* Later Stone Age artefacts, shell middens).

## 6. CONCLUSIONS & RECOMMENDATIONS

The study area for the proposed SPP along the south-eastern coast of Robben Island is underlain by a thin (probably a few meters or less) veneer of aeolian sands of the **Witsand Formation** (Sandveld Group) of Holocene to Recent age. These unconsolidated sands directly overlie latest Precambrian (Ediacaran) submarine fan deposits of the **Tygerberg Formation** (Malmesbury Group). The bedrocks here have been planed-off at 3-7 m amsl by wave action during periods of high sea level in the Pleistocene Epoch. Pleistocene raised beach deposits (*e.g.* storm gravels) are not recorded along this comparatively protected stretch of coastline.

A wide range of invertebrate, vertebrate and plant subfossils, as well as microfossils, have been recorded from the Holocene dune sands of the Witsand Formation in the Western Cape. However, since (1) most of the taxa concerned are of wide distribution, (2) only shallow excavations ( $\leq 2.5$  m) are envisaged during the construction phase, and (3) the SPP development footprint is small (1400 m<sup>2</sup>), significant impacts on buried or subsurface fossil remains are not anticipated here. Direct impacts on underlying bedrocks of the Tygerberg Formation within the development footprint will probably be very limited in extent. There are unconfirmed reports of simple invertebrate burrows preserved within Tygerberg Formation sandstones on Robben Island that are potentially of great

scientific interest as the first and only known macrofossils recorded from the entire Malmesbury Group. However, if valid, these observations will have been made in bedrock exposures along the shoreline, perhaps in the intertidal zone, and are unlikely to be directly affected by the proposed onshore development, or by the effluent pipeline where this runs offshore.

It is concluded that the proposed Sewage Package Plant and associated infrastructure will not entail significant impacts on local palaeontological heritage resources that might compromise the Outstanding Universal Value of the Robben Island World Heritage Site.

Consequently no further palaeontological heritage studies or specialist mitigation are recommended for this sewage plant project, *pending* the discovery or exposure of any substantial fossil remains (e.g. vertebrate bones and teeth, fossil plant-rich horizons, dense concentrations of marine shells ) during the construction phase. The ECO responsible for these developments should be alerted to the possibility of important fossil remains being found either on the surface or exposed by fresh excavations during construction.

In the case of any substantial fossil finds during construction, these should be safeguarded - preferably *in situ* - and reported by the ECO as soon as possible to Heritage Western Cape, so that appropriate mitigation (*i.e.* recording, sampling or collection) by a palaeontological specialist can be considered and implemented (Contact details: Heritage Western Cape. Protea Assurance Building, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 086-142 142. Fax: 021-483 9842. Email: hwc@pgwc.gov.za). These recommendations should be incorporated into the Environmental Management Plan (EMP) for the sewage infrastructure project.

The specialist involved in palaeontological mitigation work would require a fossil collection permit from SAHRA (Contact details: Mrs Colette Scheermeyer, P.O. Box 4637, Cape Town 8000; Tel: 021 462 4502; Email: cscheermeyer@sahra.org.za). Fossil material must be curated in an approved repository (e.g. museum or university collection) and all fieldwork and reports should meet the minimum standards for palaeontological impact studies developed by SAHRA.

## **7. ACKNOWLEDGEMENTS**

Ms Surina Brink of WSP Environmental (Pty) Ltd, Cape Town, is thanked for commissioning this desktop study and for providing the necessary background information.

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## 9. 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 under the aegis of his Cape Town-based company *Natura Viva* cc. He is 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 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 development 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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