MARITIME ARCHAEOLOGICAL IMPACT ASSESSMENT OF PROPOSED 2AFRICA/GERA (EAST) SUBMARINE FIBRE OPTIC CABLE SYSTEM, LANDING AT DUYNEFONTEIN, WESTERN CAPE PROVINCE

Assessment conducted under Section 38 (8) of the National Heritage Resources Act (No. 25 of 1999) as part of an Environmental Impact Assessment

Prepared for

Acer (Africa) Environmental Consultants

On behalf of

Alcatel Submarine Networks

and

Mobile Telephone Network (Pty) Ltd

April 2021

Version 1.1

Prepared by

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CONTENTS OF THE SPECIALIST REPORT – CHECKLIST

Regulation GNR 326 of 4 December 2014, as amended 7 April 2017, Appendix 6	**Section of Report**
(a) details of the specialist who prepared the report; and the expertise of that specialist to compile a specialist report including a *curriculum vitae*;	Page 4 and Appendix 4
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Page 4
(c) an indication of the scope of, and the purpose for which, the report was prepared;	Section 3: Terms of Reference
(cA) an indication of the quality and age of base data used for the specialist report;	Section 5: Methodology
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7: Impact Assessment
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 5: Methodology
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 5: Methodology
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(g) an identification of any areas to be avoided, including buffers;	Section 8: Conclusion and Recommendations
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	Figures 12, 16 and 17
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Section 5,4: Limitations
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment, or activities;	Section 7: Impact Assessment
(k) any mitigation measures for inclusion in the EMPr;	Section 8: Conclusion and Recommendations

(l) any conditions for inclusion in the environmental authorisation;	Section 8: Conclusion and Recommendations
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 8: Conclusion and Recommendations
(n) a reasoned opinion— i. as to whether the proposed activity, activities or portions thereof should be authorised; iA. Regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr or Environmental Authorization, and where applicable, the closure plan;	Section 8: Conclusion and Recommendations
(o) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Comments the South African Heritage Resources Agency and from Heritage Western Cape – see Sections 2 and 3 and Appendix 1
(p) any other information requested by the competent authority	N/A
Where a government notice gazetted by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	

DETAILS OF THE SPECIALIST

This study has been undertaken by John Gribble BA Hons, MA (ASAPA) and Gail Euston-Brown BA of ACO Associates CC, archaeologists and heritage consultants.

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CONSULTANT DECLARATION OF INDEPENDENCE

I, John Gribble, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

Name of company (if applicable): ACO Associates CC

Date: 27 January 2021

EXECUTIVE SUMMARY

ACO Associates cc has been commissioned by ACER (Africa) Environmental Consultants on behalf of Mobile Telephone Network (Pty) Ltd to undertake a desktop maritime archaeological impact assessment of the route of the proposed 2AFRICA/GERA (East) submarine fibre optic cable system which makes landfall at Duynefontein on the Cape West Coast.

This maritime heritage assessment report, supported by recommendations for implementable mitigation measures will form part of an Environmental Impact Assessment for the proposed cable system.

Findings: In respect of submerged prehistoric archaeological potential, this assessment indicates that although there have, to date, been no studies of submerged prehistory in the study area, the archaeological evidence for a Later Stone Age hominin presence on the West Coast is plentiful, while the important Earlier Stone Age sites of Duinefontein 1 and 2, approximately 5 km north of the cable landfall area have produced Acheulean stone tools in association with animal bone, deposited between 200,000 and 400,000 years ago, around palaeo-pans or lakes that developed in hollows within a large dune field, where hominins were hunting or scavenging animals.

During periods of lower sea level, similar palaeo-pans and palaeo-rvier channels are likely to have been present on the exposed continental shelf of the West Coast. Together with ancient rivers courses, these water sources, which are today buried under modern seabed sediment, would have been an important focus for hominin activity on the exposed continental shelf. As described above, the handaxes found within the seabed of Table Bay in the 1980s were the same age and type as those at Duinefontein 1 and 2 and there is thus a clear potential for the occurrence of ancient, submerged archaeological material in association with such seabed features within the area to be affected by the 2AFRICA/GERA (East) cable system.

In terms of palaeontological potential within the study are, extensive cemented crusts or “hardgrounds” formed on formations exposed at the seabed and eroded and reconsolidated during glacial sea level oscillations. These have produced a wide array of multiphase phosphorite nodules and phosphatic shell casts of various ages. The bones and teeth of sharks and other fishes, the skulls of extinct whale species and the occasional remains of land-living animals that roamed the ice age exposed shelf are also phosphatized and reworked into the latest, loose sediments on the seabed.

Regarding historical shipwrecks, this assessment found that the 2AFRICA/GERA (East) cable system will be installed well to the north of the historical anchorage in Table Bay, in an area with very few shipping casualties. Only seven named wrecks are located in the vicinity of the cable route as it crosses the contiguous zone, territorial waters and inland waters to the landfall at Duynefontein. And

none of these wrecks appear to be within the 1 km buffered study area used for the this assessment. Three of these wrecks are currently older than 60 years and thus subject to protection under the National Heritage Resources Act.

Two unknown, unnamed wrecks are recorded in the area in South African Naval records, but these are outside the study area and a substantial distance from the cable route.

Nine shipping losses are recorded within the EEZ and on continental shelf in the vicinity of the proposed cable route. With one exception these wrecks are all World War U-boat casualties and although not protected by the Act, should be treated as war graves and avoided during installation of the cable system.

The cable design and engineering surveys undertaken by Fugro Germany Marine identified a number of sidescan sonar and magnetic anomalies in and on the seabed of the cable corridor. The bulk of these were geological but a handful humanly-derived debris was noted.

Recommendations: No mitigation is required or proposed in respect of submerged prehistoric archaeology or palaeontology in the Deep and Shallow Water portions of the cable route where installation will be burial by plough as it is extremely unlikely that sites or material will be affected by the installation of the cable and also impossible to mitigate any disturbance.

In the Inshore Waters and on the beach crossing, in respect of both submerged prehistoric archaeology and palaeontology, it is recommended that an alert for the occurrence of fossil bones and teeth, as well as potential submerged prehistoric archaeological material, be included in the EMPr for the project, specifically for the divers working in the shoreface and the operators excavating the trench in the beach and dune.

With regard to historical shipwrecks, the proposed 2AFRICA/GERA (East) cable system has a very low potential for impacts arising out of the installation of the seabed cable. However, in view of the potential, albeit very small, for the presence of currently unknown wrecks close to the cable route, the following recommendations are made in respect of mitigation measures to be applied during the installation of the cable system:

- If any <u>further</u> geophysical data, particularly in the Inshore Waters portion of the cable route, is generated to support the installation of the cable system it be archaeologically reviewed for the presence of historical shipwrecks or related material. If possible, the project archaeologist should be consulted before data are collected to ensure that the survey specifications and data outputs are suitable for archaeological review;

- Should the data identify wreck material at or near the location of any portion of the cable, micro-siting of the cable and/or the possible implementation of an exclusion zone around the archaeological feature should be sufficient to mitigate the risks to the site;
- Should any archaeological material be accidentally encountered during the course of cable installation, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.

Based on the information and assessment above, it is our reasoned opinion that the proposed installation of the 2AFRICA/GERA (East) cable system raises no red flags, contains no fatal flaws and is unlikely to have any impact on known or unknown maritime and underwater cultural heritage resources. It is, therefore, considered acceptable.

GLOSSARY

Archaeology: Remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures.

Early Stone Age: The archaeology of the Stone Age between 700 000 and 2 500 000 years ago**.**

Fossil: Mineralised bones of animals, shellfish, plants and marine animals. A trace fossil is the track or footprint of a fossil animal that is preserved in stone or consolidated sediment.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act 25 of 1999.

Holocene: The most recent geological time period which commenced 10 000 years ago.

Late Stone Age: The archaeology of the last 20 000 years associated with fully modern people.

Marine Isotope Stage: Alternating warm and cool periods in the Earth's palaeoclimate, deduced from oxygen isotope data derived from data from deep sea core samples.

Midden: A pile of debris, normally shellfish and bone that have accumulated as a result of human activity.

Middle Stone Age: The archaeology of the Stone Age between 20 000-300 000 years ago associated with early modern humans.

National Estate: The collective heritage assets of the Nation.

Palaeontology: Any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

Pleistocene: A geological time period (of 3 million – 10 000 years ago).

Pliocene: A geological time period (of 5 million – 3 million years ago).

SAHRA: South African Heritage Resources Agency – the compliance authority which protects national heritage.

ACRONYMS

BMH	Beach Manhole
CLS	Cable Landing Station
DEFF	Department of Environment, Forestry and Fisheries
EA	Environmental Authorisation
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ESA	Early Stone Age
HIA	Heritage Impact Assessment
HWC	Heritage Western Cape
LSA	Late Stone Age
MBES	Multibeam Bathymetry
MSA	Middle Stone Age
Mya	Million years ago
NHRA	National Heritage Resources Act
SAHRA	South African Heritage Resources Agency
SSS	Sidescan Sonar
UNCLOS	United Nations Convention on the Law of the Sea

1. INTRODUCTION

ACO Associates cc (ACO) has been commissioned by ACER (Africa) Environmental Consultants (ACER) on behalf of Mobile Telephone Network (Pty) Ltd (MTN) to undertake a desktop maritime archaeological impact assessment of the route of the proposed 2AFRICA/GERA (East) submarine fibre optic cable system which makes landfall at Duynefontein on the Cape West Coast.

Alcatel Submarine Networks (ASN) has been contracted to supply and install the proposed cable system which will be operated by MTN as the South African landing partner.

ACER (is the appointed Environmental Assessment Practitioner (EAP) and is responsible for the Environmental Authorisation (EA) requirements, including identifying environmental aspects relevant to the proposed telecommunications infrastructure and construction of the cable system.

2. PROJECT DESCRIPTION

The following description of the project is summarised from information presented in the draft Scoping Report (Churchill et al 2020).

The proposed submarine cable system known as 2AFRICA/GERA (East) circumnavigates Africa, connecting Africa to Europe and parts of the Middle East (Figure 1).

The cable system will enter South Africa's Exclusive Economic Zone (EEZ) from the EEZ of Mozambique on the east coast. Thereafter the cable system follows a course south and west around the South African coast, before tracking north-east from a point approximately 100 km west of Cape Point to cross the contiguous zone and territorial waters before making landfall at Duynefontein. For the remainder of its length the cable system will be located well offshore within South Africa's EEZ and, where it skirts the southern extremity of the Agulhas Bank, beyond the outer limit of the EEZ on the continental shelf (Figure 2).

The proposed 2AFRICA/GERA (East) cable system to Duynefontein comprises the following project components:

- Marine fibre optic cable (marine environment to the MTN Beach Manhole (BMH) at Duynefontein);
- An existing BMH located behind the coastal dune cordon near Van Riebeeckstrand,m Duynefontein; and
- Terrestrial fibre optic cable (from the BMH to the Cable Landing Station (CLS) site in Duynefontein).

The installation and operation of the cable system will include the following activities:

- Pre-installation activities including cable route survey, route engineering, route clearance and a pre-lay grapnel run;
- Laying and burial of the cable in the offshore environment within South Africa's EEZ from the border with Mozambique until it reaches the shore;
- Laying of the cable across the beach up to the position of the existing BMH (requiring excavations within the intertidal zone to bury the cable before it will be anchored into the BMH) and installation of a sea earth system (System Earth);
- Installation of the onshore cable between the BMH and the CLS; and
- Construction of a BMH on the inland side of the beach (if required as relevant to the Alternative 2 landing point only).

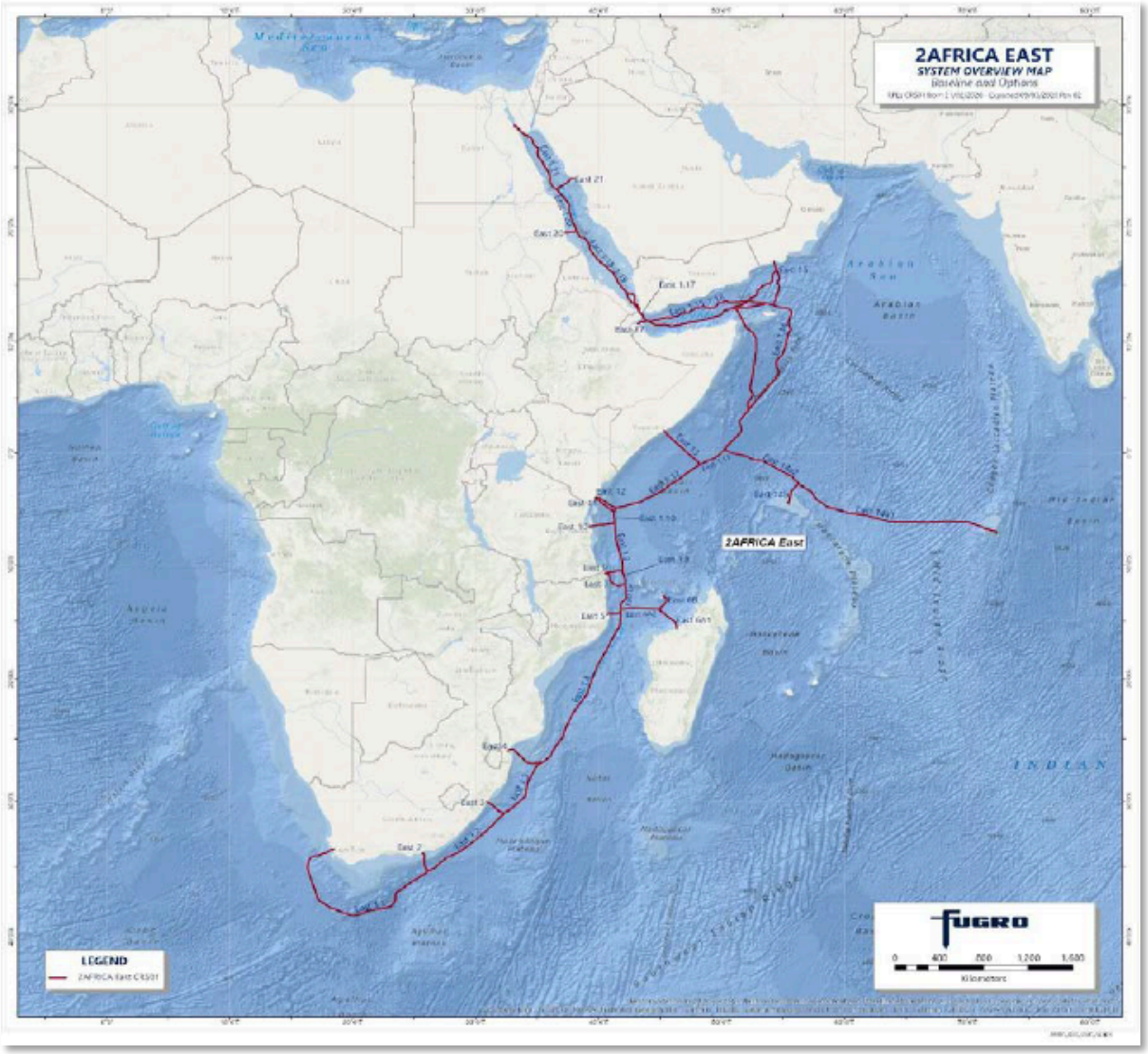

Figure 1: Proposed 2AFRICA (East) cable system overview (sourced from FUGRO, 2020, after Churchill et al 2020)

This heritage impact assessment deals principally with the marine portion of the cable system located between the outer edge of the contiguous zone (i.e. 24 nautical miles offshore) to the high water, which

is the extent of the jurisdiction of the South African Heritage Resources Agency (SAHRA) (see Sections 4.1 and 4.2 and Figure 2 below). The potential for and impacts on heritage resources within the EEZ and on the continental shelf are addressed in Section 6.5 below.

The terrestrial portion of the cable route inland of the BMH falls under the jurisdiction of Heritage Western Cape (HWC) but does not trigger the relevant section of the National Heritage Resources Act (Section 38(1)). According to HWC no heritage assessment for that portion of the route is required (see Appendix 1).

After geophysical survey of the route and clearance of possible debris (*e.g.* lost fishing gear) by grapnel dragging, the cable will be installed in a shallow trench in water depths shallower than ~-1500 m below sea level. In the deep wate, this trench is created using a subsea plough, dragged through the surficial sediments, through which the cable is threaded and buried to a target depth of 2 m. Close to the shore the cable is winched onshore to connect with the terrestrial cable route at the existing BMH infrastructure installed for the ACE/MTN Cable Landing Station. It is to be buried to ~1 m in the shoreface sediment wedge by diver-operated water jetting and buried in the beach to ~2 m depth in an excavated trench.

3. TERMS OF REFERENCE

ACO Associates was commissioned to produce a Heritage Impact Assessment (HIA) of the proposed 2AFRICA/GERA (East) cable system as part of the Environmental Impact Assessment (EIA) process for the project, as required by the National Environmental Management Act (No. 107 of 1998), as amended.

The HIA aims to identify heritage resources which may be impacted during the construction, operation and decommissioning phases of the project, assess their significance and provide recommendations for mitigation.

This document therefore includes the following:

- A desk-top level literature review to assess the potential for maritime archaeological sites, and submerged pre-colonial sites along the route of the cable system;
- A comment from a palaeontologist regarding the potential for impacts to palaeontological features arising from the installation of the cable system; and
- A review of the geophysical survey reports for the cable system for seabed anomalies that may represent heritage resources.

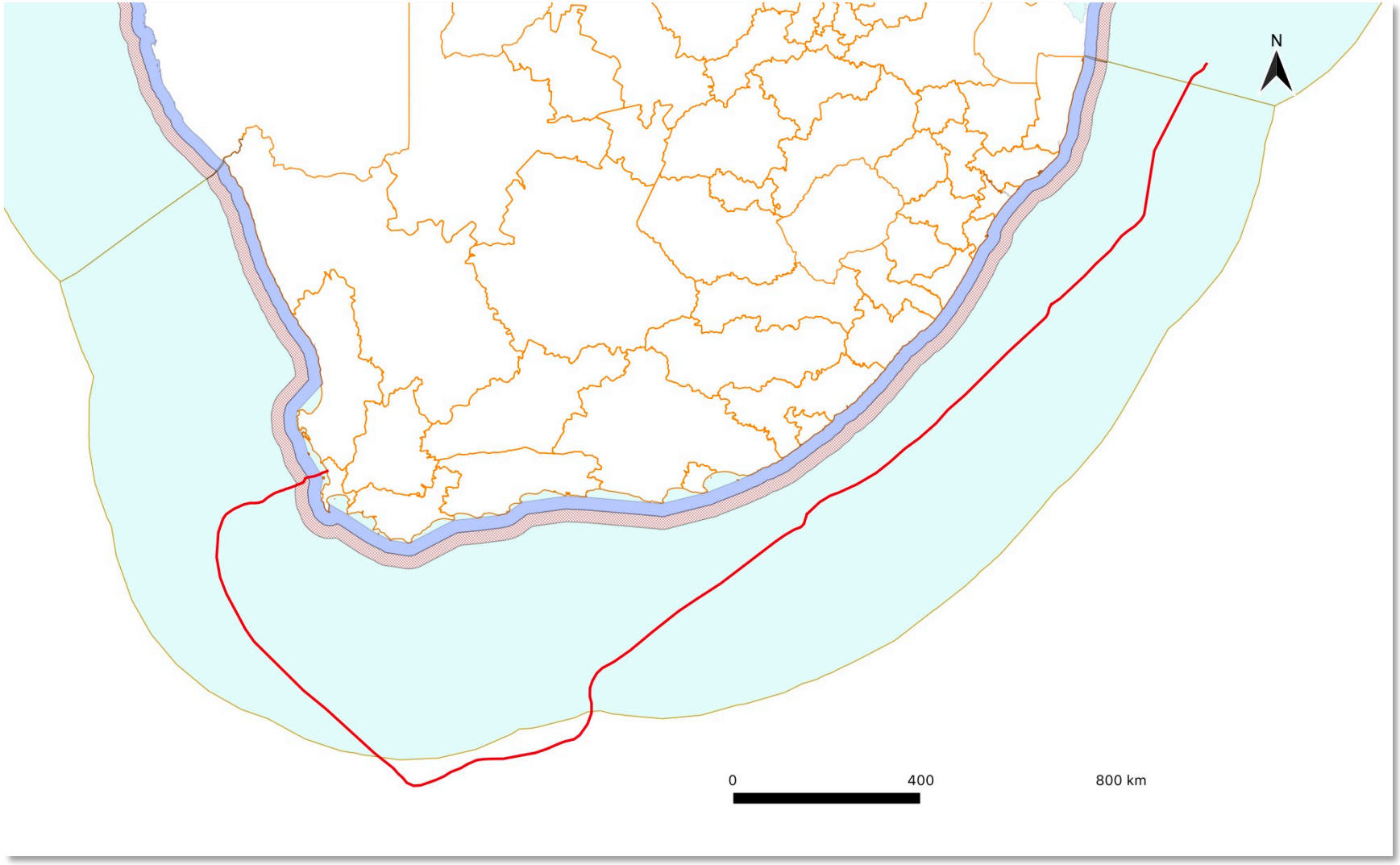

Figure 2: Proposed route of the 2AFRICA (East) cable system (red line) in South African waters (EEZ = light blue; contiguous zone = pale red; territorial waters = dark blue) (Source: Google Earth).

The results of the studies listed above are integrated in this HIA report along with an assessment of the sensitivity and significance of any heritage resources, an evaluation of the potential impacts on them of the construction, operation and decommissioning of the project, and recommendations for measures to mitigate any negative impacts of the project on them.

The HIA must be submitted for comment to the South African Heritage Resources Agency (SAHRA) the relevant statutory commenting body under the National Environmental Management Act. As stated above, correspondence with HWC has indicated that no heritage studies will be required for the terrestrial portion of the cable system, landward of the BMH.

4. RELEVANT LEGISLATION

4.1. **National Heritage Resources Act (No 25 of 1999)**

The National Heritage Resources Act (NHRA) came into force in April 2000 with the establishment of SAHRA, replacing the National Monuments Act (No. 28 of 1969 as amended) and the National Monuments Council as the national agency responsible for the management of South Africa's cultural heritage resources.

The NHRA reflects the tripartite (national/provincial/local) nature of public administration under the South African Constitution and makes provision for the devolution of cultural heritage management to the appropriate, competent level of government.

Because national government is responsible for the management of the seabed below the high-water mark, however, the management of maritime and underwater cultural heritage resources under the NHRA does not devolve to provincial or local heritage resources authorities but remains the responsibility of the national agency, SAHRA.

The NHRA gives legal definition to the range and extent of what are considered to be South Africa's heritage resources. According to Section 2(xvi) of the Act a heritage resource is "any place or object of cultural significance". This means that the object or place has aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.

In terms of the definitions provided in Section 2 of the NHRA, maritime and underwater cultural heritage can include the following sites and/or material relevant to this assessment:

- Material remains of human activity which are in a state of disuse and are in or on land [which includes land under water] and which are older than 100 years, including artefacts, human and hominid remains and artificial features and structures (Section 2(ii));

- Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, a defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation (Section 2(ii)); and
- Any movable property of cultural significance which may be protected in terms of any provisions of the NHRA, including any archaeological artefact or palaeontological specimen (Section 2(xxix)).

Of the heritage resource types protected by the NHRA, the installation and operation of the 2AFRICA/GERA (East) cable system has the potential to impact the following:

- Submerged pre-colonial archaeological sites and materials;
- Maritime and underwater cultural heritage sites and material, which are principally historical shipwrecks; and
- Palaeontological features and material, which are defined by the NHRA as the fossilised remains or fossil trace of animals or plants which lived in the geological past.

As per the definitions provided above, these cultural heritage resources are protected by the NHRA and a permit from SAHRA is required to destroy, damage, excavate, alter, deface or otherwise disturb any such site or material.

It is also important to be aware that in terms of Section 35(2) of the NHRA, all archaeological objects and palaeontological material is the property of the State and must, where recovered from a site, be lodged with an appropriate museum or other public institution.

4.2. **Maritime Zones Act (No 15 of 1994)**

South Africa's Maritime Zones Act of 1994 is the national legislative embodiment of the international maritime zones set out in the United Nations Convention on the Law of the Sea (UNCLOS).

The Act defines the extent of the territorial waters, contiguous zone, exclusive economic zone and continental shelf, which together comprise some 4.34 million square kilometres of seabed around the South African coast and sets out South Africa's rights and responsibilities in respect of these various maritime zones.

Under the terms of the maritime zones established by the Act, the application of the NHRA applies within South Africa's territorial waters (12 nautical miles seaward of the baseline) and extends to the outer limit of the maritime cultural zone (24 nautical miles seaward of the baseline). Any offshore activities that have the potential to disturb or damage cultural heritage resources located in or on the

seabed within the territorial waters and maritime cultural zone require the involvement of SAHRA, as a commenting body in respect of the National Environmental Management Act EIA process and as permitting authority where impacts to sites or material cannot be avoided and damage or destruction will occur.

The maritime portion of the proposed 2AFRICA/GERA (East) cable system crosses the continental shelf, the EEZ, the contiguous zone and the territorial waters, and comes ashore at Duynefontein landward of the territorial water baseline (Figure 3), within what Section 3 of the Maritime Zones Act defines as South Africa's internal waters. In terms of Section 3(2) of the Act, "any law in force in the Republic, including the common law, shall also apply in its internal waters".

With respect to the portion of the cable system to be installed on the continental shelf and within the EEZ, Section 9 of the Maritime Zones Act states that activities undertaken from installations operating within these areas may be subject to the requirements of any law in force in the Republic. The definition of "installation" (which includes vessels) provided in the Act, however, appears to limit this to activities related to seabed mining and mineral exploitation.

The extent of the application of the NHRA and Maritime Zones Act in respect of the 2AFRICA/GERA (East) cable system is therefore, limited to the area between the high-water mark and the outer edge of the contiguous zone. The EEZ and continental shelf are excluded from this assessment, but Section 6.5 does address the maritime archaeological potential of these areas, particularly with regard to World War II shipping casualties.

4.3. **National Environmental Management Act (No 107 of 1998)**

The National Environmental Management Act (No 107 of 1998) (NEMA) provides a framework for the integration of environmental issues into the planning, design, decision-making and implementation of plans and development proposals that are likely to have a negative effect on the environment.

Regulations governing the environmental authorisation (EA) process have been promulgated in terms of NEMA and include the EIA Regulations (GNR R326/2017) and Listing Notices (LN) 1-3 (R327, R325 and R324) that list activities requiring EA.

The proposed 2AFRICA/GERA (East) cable system triggers a number of activities in the Listing Notices and the project is thus be subject to a full Scoping and Environmental Impact Assessment process and must obtain a positive Environmental Authorisation from the national Department of Environment, Forestry and Fisheries (DEFF) (in close consultation with the Western Cape Department of Environmental Affairs and Development Planning (DEA&DP)) prior to commencement of the proposed activities.

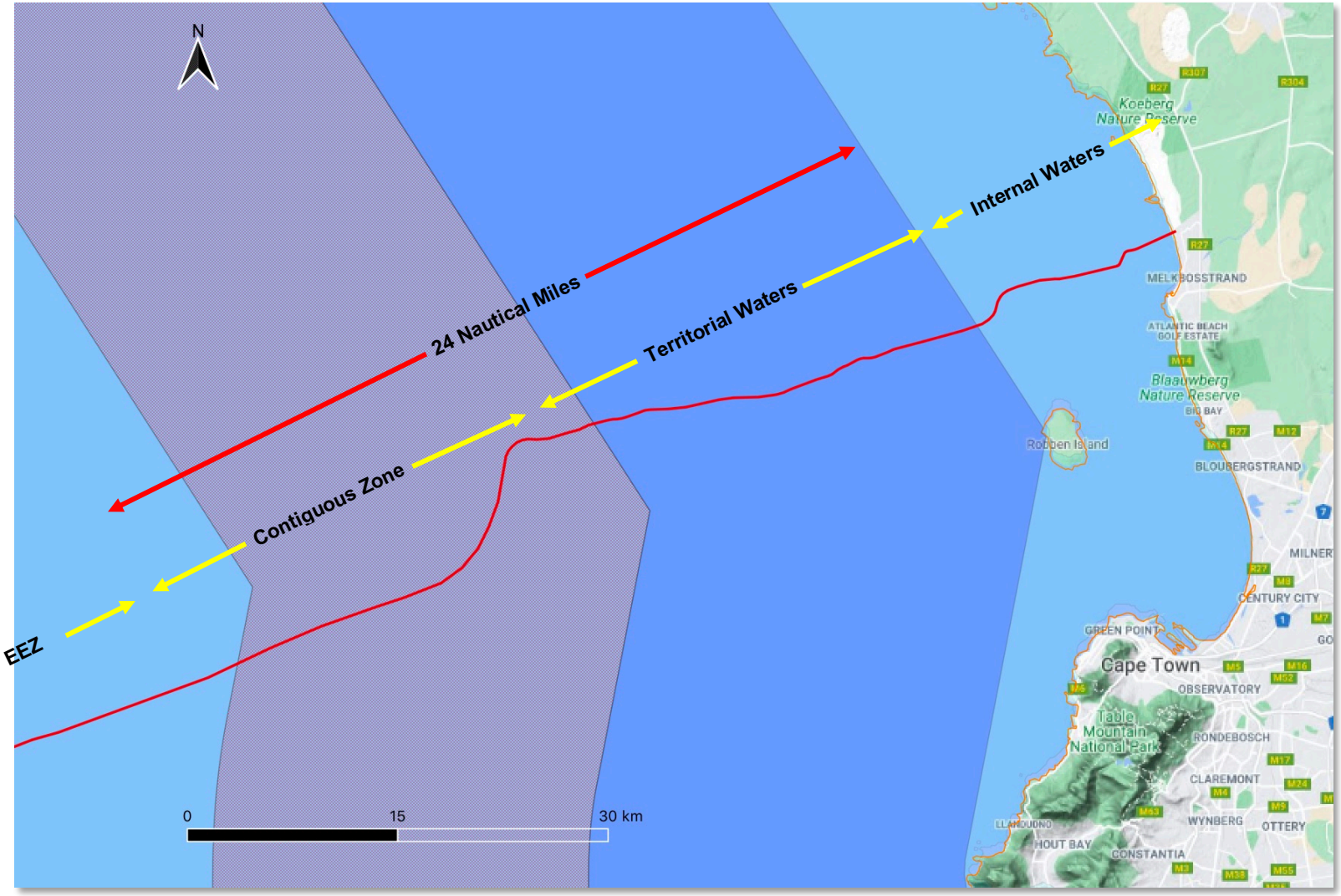

Figure 3: 2AFRICA/GERA (East) cable system and the maritime zones referred to in the text (Source: Google Earth).

As a NEMA commenting body, SAHRA was asked to comment on the Background Information Document (BID) for the proposed cable route and responded in a letter to MTN (Pty) Ltd, dated 4 December 2020, noting that the “BID has already identified that a Heritage Assessment is to be undertaken as part of the process” and supporting this. SAHRA stipulated that the heritage impact assessment must include a specialist study of maritime and underwater cultural heritage to be undertaken by a suitably qualified Maritime Archaeologist.M

5. METHODOLOGY

This desktop report provides an assessment of the maritime and underwater cultural heritage potential of the offshore portion of the 2AFRICA/GERA (East) cable system within a study area defined in Section 5.3 below.

The report includes a short description of what comprises South Africa’s maritime and underwater cultural heritage, with particular emphasis on the maritime history of the south west Cape coast in the vicinity of the cable landfall. This is followed by a discussion of potential maritime heritage resources along that portion of cable system within the contiguous zone, territorial waters and inland waters, framed within that wider context.

The report draws information from readily available documentary sources and databases, including SAHRA’s Maritime and Underwater Cultural Heritage database, a database of underwater heritage resources maintained by ACO Associates, and from relevant primary and secondary sources, and current geophysical data collected along route (see Sections 5.2 and 6.4 below) to identify as accurately as possible any known and potential heritage resources along the proposed cable route alignment.

5.1. **Palaeontological Comment**

Comment has also been obtained from the palaeontologist Dr John Pether regarding the potential for the installation of the cable system to impact on submerged palaeontological resources (see Section 6.2 below).

5.2. **Geophysical Survey**

The geophysical survey report prepared by Fugro Germany Marine (Hesemann 2020) for Segment E1.1 of the 2AFRICA/GERA (East) cable system, between the Duynefontein BMH and the offshore Port Elizabeth Branching Unit (BU) (see Figure 4), was reviewed for this HIA to ascertain whether any shipwrecks or other potential heritage resources had been identified within the sidescan sonar (SSS), multibeam bathymetry (MBES) and magnetometer data collected during the survey of the cable route.

The geophysical survey, for cable route design and engineering, was conducted between May and August 2020 along the Shallow and Deep Water sections of the 2AFRICA/GERA (East) cable system (Hesemann 2020). No Inshore Survey (i.e., in water less than 15 m depth) had been performed by the time that Hesemann (2020) was delivered.

The route survey comprised an investigation of the bathymetry, seabed features and shallow geology of the proposed route. A geotechnical sampling programme was also undertaken to establish sediment types for correlation with geophysical data (Hesemann 2020).

This archaeological review of the geophysical data relied on the survey report and the seabed feature characterisation it contained, processed seabed bathymetric maps attached to the report and other geophysical data within the contiguous zone and territorial waters.

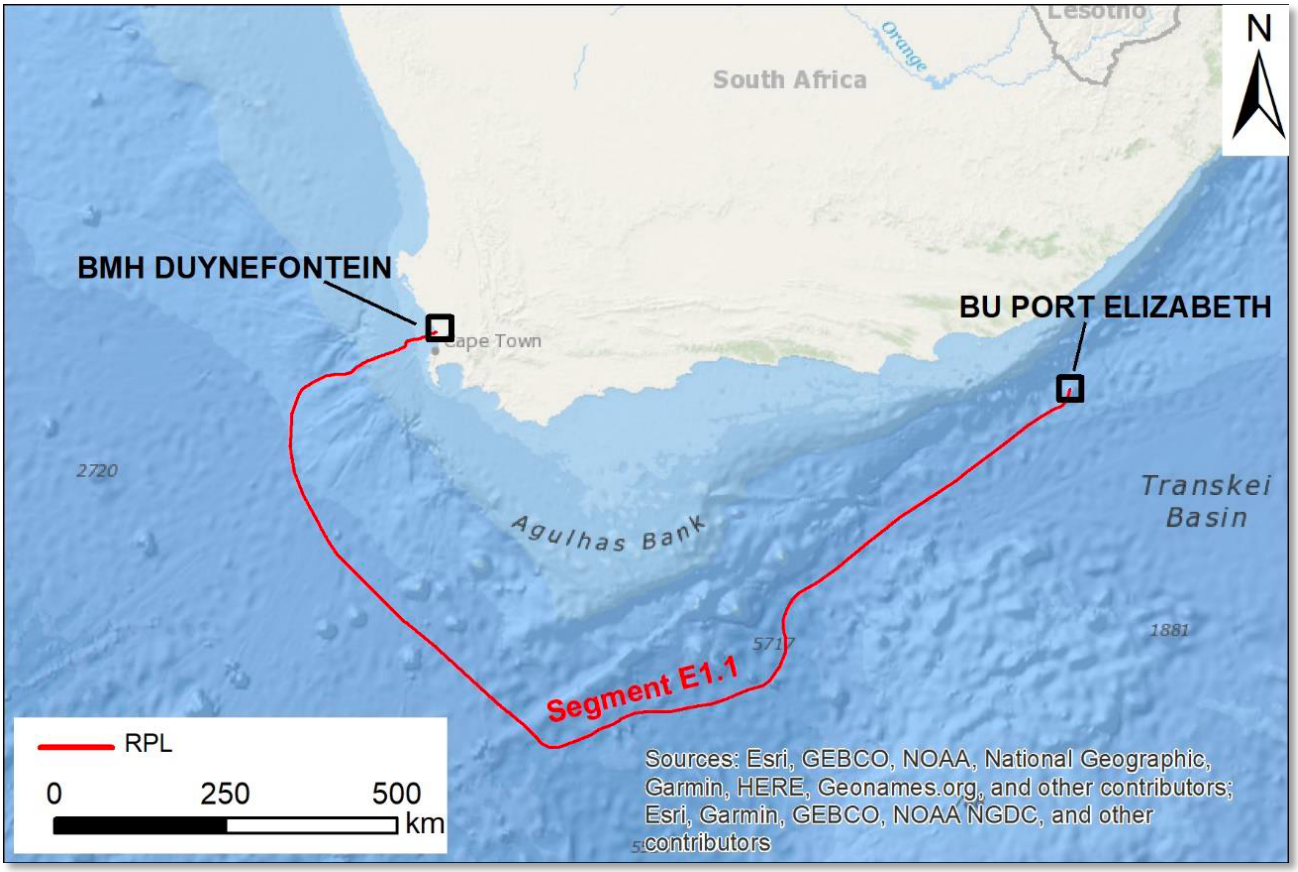

Figure 4: 2AFRICA/GERA (East) segment E1.1 - Duynefontein BMH to Port Elizabeth BU (After: Hesemann 2020).

5.3. **Maritime Study Area**

The study area for this maritime archaeological assessment has been defined as a 1 km buffer on either side of the proposed route alignment between the Mean High Water Mark at Duynefontein and the outer edge of the contiguous zone, 24 nautical miles from the baseline (Figure 5).

5.4. **Limitations**

South Africa's record of maritime and underwater cultural heritage resources is based on a mix of information derived from historical documents and other secondary sources. Where available this is supplemented by primary sources such as geophysical data and other field-based observations and site recordings. Thus, while every effort has been made to ensure the accuracy of the information presented below, the reliance on secondary data sources does mean that there are considerable gaps and inaccuracies in this record.

For example, the positions given for most of the wrecks referred to in the following sections are estimated rather than known locations and are based on descriptions of their loss or positions taken at the time of loss (often by third parties).

The potential also exists for currently unknown and/or unrecorded maritime heritage sites to be encountered on the seabed in the course of the proposed project.

The geophysical survey report reviewed as part of this HIA, for Segment E1.1 of the 2AFRICA/GERA (East) cable system (Hesemann 2020), does not cover the entire South African portion of the cable route (Figure 4) and, as has already been noted, at the time of writing this HIA, no Inshore Water survey has yet been conducted.

6. UNDERWATER CULTURAL HERITAGE

South Africa has a rich and diverse underwater cultural heritage. South Africa's rugged and dangerous coastline is strategically located on the historical trade route between Europe and the East and has witnessed more than its fair share of shipwrecks and maritime dramas since the early 16th century.

At least 2400 vessels are known to have sunk, grounded, or been wrecked, abandoned or scuttled in South African waters since the early 1500s. This doesn't include the as yet unproven potential for shipwrecks and other sites that relate to pre-European, Indian Ocean maritime exploration, trade and interactions along the South African east coast.

In addition to historical shipwrecks, the record of South Africa's long association with the sea is much broader and extends far back into prehistory. This element of our maritime and underwater cultural heritage is represented around the South African coast by thousands of pre-colonial shell middens and large numbers of tidal fish traps, which reflect prehistoric human exploitation of marine resources since at least the Middle Stone Age (MSA), more than 150,000 years ago.

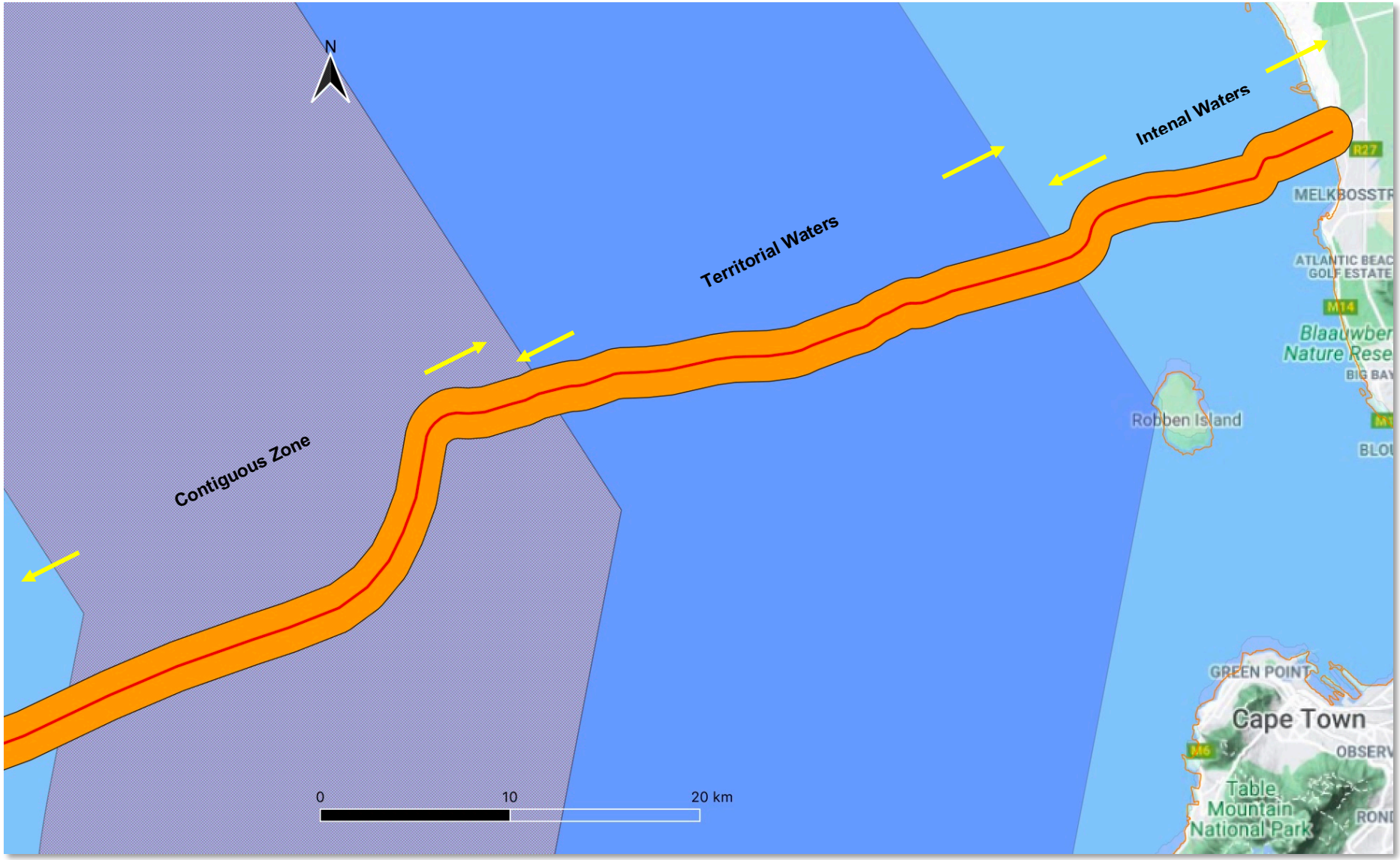

Figure 5: Maritime archaeological assessment study area for this report between the outer limit of the contiguous zone (24 NM from the baseline) to the mean high-water mark at the landfall at Duynefontein. The study area comprises a 1 km buffer (orange) on either side of the proposed cable route (red line). (Source: Google Earth)

Another, until recently, largely unacknowledged and unexplored aspect of our maritime and underwater cultural heritage are pre-colonial terrestrial archaeological sites and palaeolandscapes which are now inundated by the sea.

This assessment considers maritime and underwater cultural heritage resources along the 2AFRICA/GERA (East) cable system landward of the EEZ/contiguous zone boundary, namely submerged prehistoric resources and historical shipwrecks and also comments on the palaeontological potential of the seabed to be affected, and in broader terms on heritage resources potentially in the EEZ and on the continental shelf (see Section 6.5).

6.1. **Submerged Prehistory**

Since the start of the Quaternary, approximately 2.6 million years ago, the world has been subject to a series of cooling and warming climatic cycles in which sea level has generally been lower than it is today.

Within the last 900,000 years, global sea levels have fluctuated substantially on at least three occasions, with other lesser fluctuations in between. This has been the result of increased and decreased polar glaciation and falls in sea level were caused by the locking up in the polar ice caps of huge quantities of seawater as global temperatures cooled.

The most extreme recent sea level drop occurred between circa 20,000 and 17,000 years ago when at the height of the last glaciation (Marine Isotope Stage 2 (MIS)) global sea levels were more than 120 m lower than they are today (Waelbroeck *et al*, 2002; Rohling *et al*, 2009).

As with the MIS 2 low sea level stand, those which corresponded with MIS 4 (~70,000 years ago), MIS 6 (~190,000 years ago), MIS 8 (~301,000 years ago) and MIS 12 (~478,000 years ago) would have “added a large coastal plain to the South African land mass” (Van Andel 1989:133) where parts of the continental shelf were exposed as dry land (see Cawthra *et al*, 2016) (Figure 6).

The exposure of the South African continental shelf would have been most pronounced on the wide Agulhas Bank off the southern Cape coast, and it is estimated that a new area of land, as much as 80,000 km^2 in extent, was exposed during the successive glacial maxima (Fisher *et al*, 2010). Figure 7 andFigure 8 below give more detail of the likely extent of the continental shelf exposure off the south western Cape coast during the last glaciation (MIS 2).

The exposed continental shelf was quickly populated by terrestrial flora and fauna, and also by our human ancestors who were dependant on these resources (Compton, 2011). As a result, for periods

numbering in the tens of thousands of years on at least three occasions during the last 500,000 years our ancestors inhabited areas of what is now seabed around the South African coast.

This means that a large part of the archaeological record of the later Earlier, Middle and early Late Stone Age is located on the continental shelf and is now “inundated and for all practical purposes absent from [that] record” (Van Andel, 1989:133-134).

Until relatively recently there was little or no access to the submerged prehistoric landscapes and sites on the continental shelf, although evidence from various parts of the world of drowned, formerly terrestrial landscapes hinted at the tantalising prospect of prehistoric archaeological sites on and within the current seabed.

Perhaps the best-known example of such evidence is archaeological material and late Pleistocene faunal remains recovered in the nets of fishing trawlers in the North Sea between the United Kingdom and the Netherlands throughout the 20th century (Peeters *et al*, 2009; Peeters, 2011) and the University of Birmingham’s recent archaeological interpretation of 3D seismic data, collected in the same area by the oil and gas industry, which has revealed well-preserved prehistoric landscape features across the southern North Sea (Fitch *et al*, 2005, Gaffney *et al*, 2010).

Figure 6: Possible extent of the South African continental shelf c.137,000 years ago (Source: Franklin et al, 2015)

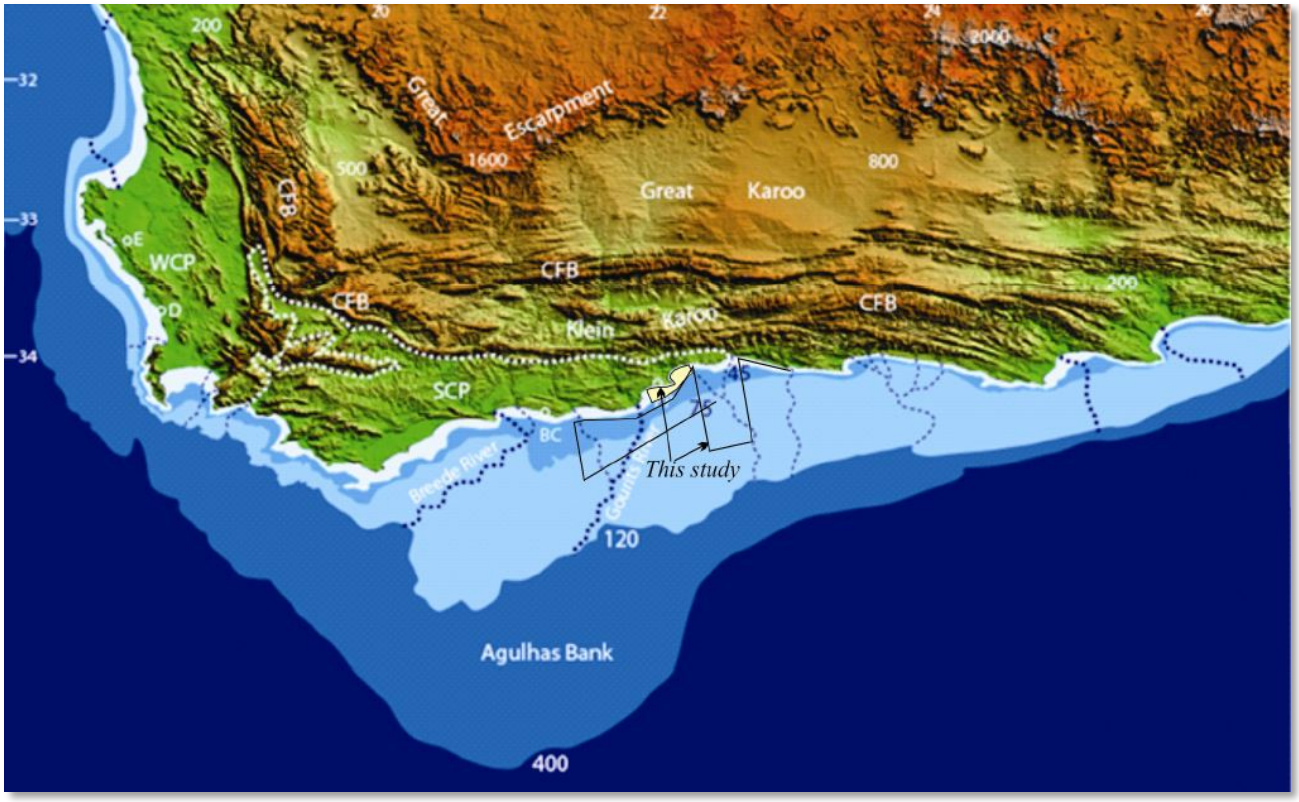

Figure 7: The south coast continental shelf showing the water depths of 45, 75, 120 and 400 m. The Equiano cable system will be installed in the area highlighted in red on the left of the image (Source: Compton, 2011 from Cawthra, 2014).

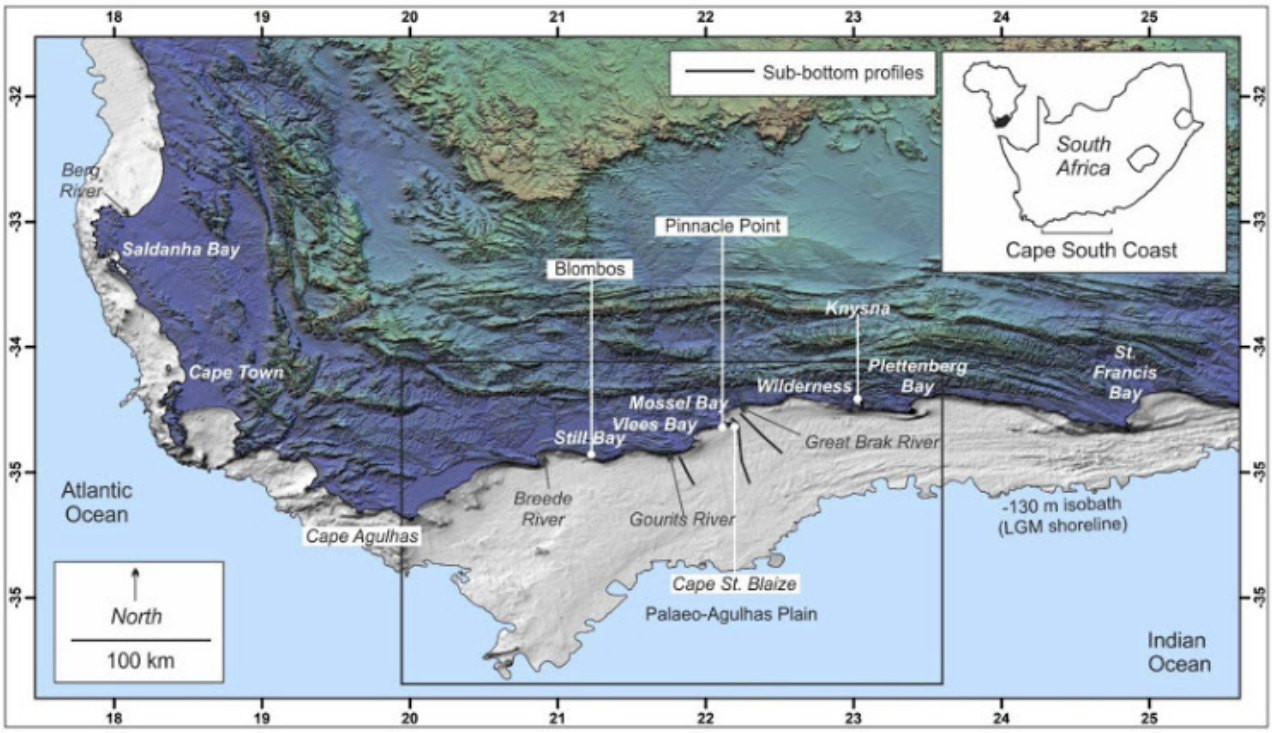

Figure 8: Extent of the exposed continental shelf along the south coast at the last glacial maximum c. 20,000 years ago (Source: https://select.timeslive.co.za/news/2020-05-21-decade-of-work-strips-90km-of-sea-for-a-glimpse-of-ice-age-sa/)

Closer to home, there is archaeological evidence for a prehistoric human presence in what is now Table Bay. In 1995 and 1996 during the excavation of two Dutch East India Company shipwrecks, the *Oosterland* and *Waddinxveen*, divers recovered three Early Stone Age, Acheulian handaxes from the seabed under the wrecks (Plate 1). The stone tools, which are between 300,000 and 1.4 million years old, were found at a depth of 7-8 m below mean sea level and were associated with Pleistocene sediments from an ancient submerged and infilled river channel. Their unrolled and unworn condition indicate that they had not been carried to their current position by the ancient river and suggests that they were found more or less where they were dropped by Early Stone Age hominins more than 300,000 years ago, when the sea level was at least 10 m lower than it is today (Werz and Flemming, 2001; Werz *et al*, 2014).

6.1.1. **Submerged Prehistoy of Melkbosstrand Area**

There have, to date, been no studies of submerged prehistory in the study area. However, archaeological evidence for a hominin presence along this portion of the West Coast, particularly during Later Stone Age, is plentiful (see Peringuey, 1911; Laidler, 1929; Rudner, 1968; Kaplan, 1998, 2000; Gray, 2000; Sealy et al, 2004; Orton, 2010; Hutten, 2014a & b).

More pertinent to this study, however, are the important Earlier Stone Age sites of Duinefontein 1 and 2, approximately 5 km north of the cable landfall area (see Deacon, 1975; Klein, 1976; Klein et al, 1999; Cruz-Uribe et al, 2003). These sites have produced Early Stone Age, Acheulean stone tools in association with animal bone, deposited between 200,000 and 400,000 years ago, around palaeo-pans or lakes that developed in hollows within a large dune field, where hominins were hunting or scavenging animals.

During periods of lower sea level, similar palaeo-pans and palaeo-rvier channels are likely to have been present on the exposed continental shelf of the West Coast. Together with ancient rivers courses, these water sources, which are today buried under modern seabed sediment, would have been an important focus for hominin activity on the exposed continental shelf. As described above, the handaxes found within the seabed of Table Bay in the 1980s were the same age and type as those at Duinefontein 1 and 2 and there is thus a clear potential for the occurrence of ancient, submerged archaeological material in association with such seabed features within the area to be affected by the 2AFRICA/GERA (East) cable system.

Plate 1: Three Acheulian handaxes recovered form seabed sediments in Table Bay (Source: http://www.aimure.org/index.php/aimure-projects)

Where alluvial sediment within palaeochannels or other such features has survived post-glacial marine transgressions there is also the potential to recover palaeoenvironmental data (pollens, foraminifera and diatoms, for example) which can contribute contextual information to our understanding of the ancient human occupation of South Africa.

There is thus the potential for the preservation, within the thin Quaternary surficial sediments in water depths of less than approximately 120 m, of pre-colonial archaeological sites and material.

6.2. **Palaeontology**

The following description of the geology of the affected formations on the continental shelf and their palaeontological potential has been provided by Dr John Pether.

Continental Shelf: The geometry and ages of the large-scale formations which outcrop on the continental shelf, beneath a thin, patchy cover of Quaternary surficial sediments, are depicted in Figure 9. These formations are for the most part fine-grained sediments, clays, muds and silts deposited in deeper shelf depths, with intercalations of shallower shelf sediments corresponding to periods of lower sea levels.

The Paleogene and Pliocene sediments are mainly terrigenous muds, whereas the Oligocene and Miocene sediments are more calcareous due to the marine biogenic content of microfossils, bryozoan debris, corals and macrofossil shells.

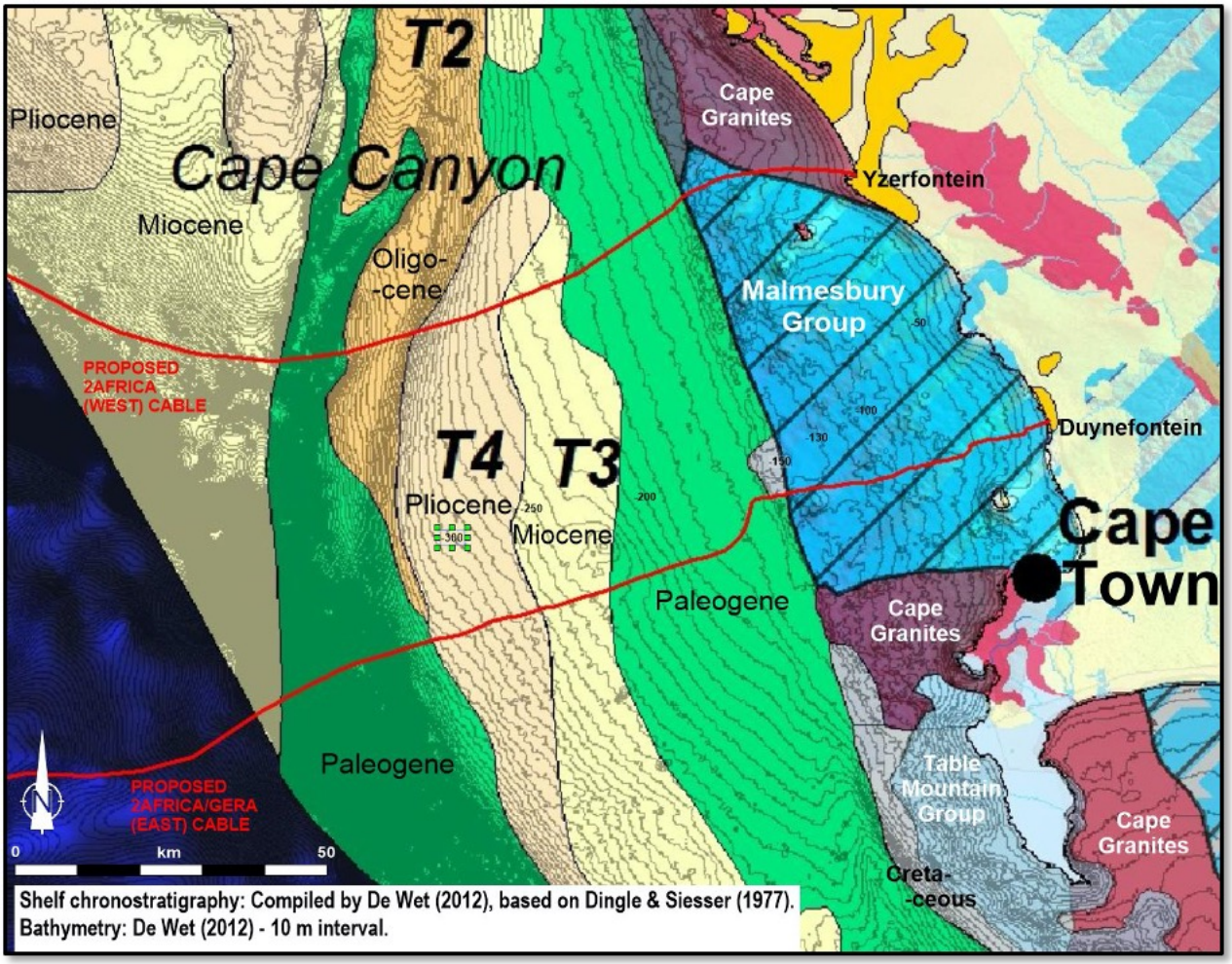

Figure 9: Chronostratigraphy of the continental shelf off Cape Town and locations of the subsea cable routes (After De Wet 2012).

During later Neogene and Quaternary times, the shelf was dominated by upwelling processes, with high organic productivity and authigenic mineralization of seabed rocks, clays and biogenic particles by phosphatization and glauconization. Extensive cemented crusts or “hardgrounds” formed on formations exposed at the seabed. Sea level oscillated repeatedly, dropping to ice-age palaeoshorelines as much as 140 m below present sea level. The hardgrounds were eroded during the ice-age/glacial shallowing episodes and re-cemented again during interglacial deepening.

This has produced a wide array of multiphase phosphorite nodules and phosphatic shell casts of various ages. The bones and teeth of sharks and other fishes, the skulls of extinct whale species and the occasional remains of land-living animals that roamed the ice age exposed shelf are also phosphatized and reworked into the latest, loose sediments on the seabed. A sample of this material turns up in bottom-trawl fishnets, scientific dredging and during diamond-mining operations.

Where the cable route proceeds across the inner shelf, it traverses bedrock of Precambrian Malmesbury shales which are not of palaeontological concern. However, prospecting for diamonds on

the western shelf reveals cemented patches and veneers of fossiliferous Pliocene and earlier Quaternary deposits locally preserved as erosional remnants in bedrock depressions. Such remnants are local sources of fossil shells which are reworked into the surficial latest Quaternary deposits.

The youngest Quaternary deposits mantling the shelf are generally quite thin and typically comprise a shelly gravel of shallow-shelf origin, overlain by Holocene shelf muddy sands. The ice age palaeoshoreline gravels are dominated by a “venus shell” clam, *Tawera philomela*. This “cold-water” species, along with others, reached the Cape coast from the mid-Atlantic islands of Tristan da Cunha and Gough, apparently thrived here and then became extinct locally during the last deglaciation (Pether 1993). During the subsequent deglaciation/warming cycle, warm-water species from the south and east coasts temporarily “invaded” the western shelf and this shows a more marked influence of Agulhas water rounding the Cape and affecting the Benguela System during the global-warming steps of the last deglaciation (Pether 1994).

Shoreface and Beach: Based on near-coastal excavations (Koeberg, Ysterplaat), boreholes and beach wash-ups (Milnerton), the formations which may be encountered beneath the modern shoreface, beach and dune sands are shown in Figure 10.

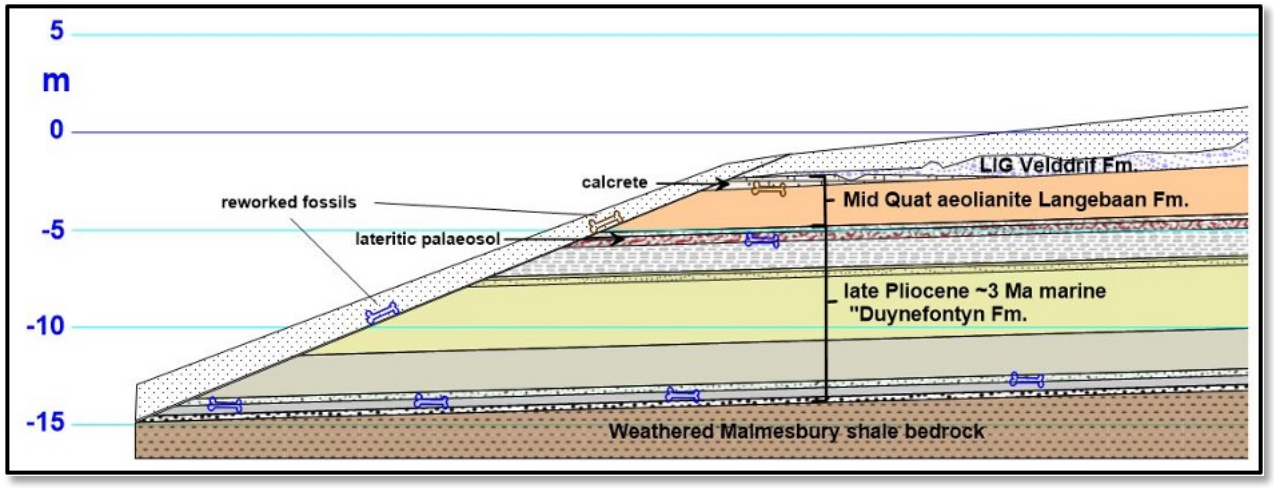

Figure 10: Schematic cross-section depicting the formations which may be encountered beneath shoreface and beach sands in embayed bedrock settings.

It may be that the shoreface and beach sands are sufficiently thick that the underlying older formations are not intersected in the relatively shallow trenches (1-2 m) required for the installation of the cable. The uppermost, Velddrif Formation shelly deposits are most likely to be encountered, and possibly the underlying calcrete of the Langebaan Formation.

The important fossils that may occur are those which have been reworked from the older formations into the modern shoreface and beach sands and include Pliocene cetaceans and seals and

Quaternary-age terrestrial bones and teeth from the Langebaan Formation. These may be uncovered in the shoreface and beach sands.

The older material is usually phosphatized and of readily visible brown to black hues. Fossil bones from the Langebaan Formation may be partly encased in calcrete cobbles and boulders.

6.3. **Maritime History of the South African Coast**

In 1498 the Portuguese explorer Vasco da Gama finally pioneered the sea route around Africa from Europe to the East. Since then, the southern tip of the African continent has played a vital role in global economic and maritime affairs, and until the opening of the Suez Canal in 1869, represented the most viable route between Europe and the markets of the East (Axelson, 1973; Burman, 1976; Turner, 1988; Gribble, 2002; Gribble and Sharfman, 2013).

The South African coast is rugged and the long fetch and deep offshore waters mean that the force and size of seas around the coast are considerable; a situation exacerbated by prevailing seasonal winds.

The geographical position of the South African coast on the historical route to the East and the physical conditions mariners could expect to encounter in these waters have, in the last five centuries, been responsible for the large number of maritime casualties which today form the bulk of South Africa's maritime and underwater cultural heritage (Gribble, 2002).

At least 2400 vessels are known to have sunk, grounded, or been wrecked, abandoned or scuttled in South African waters since the early 1500s. More than 1900 of these wrecks are older than 60 years of age and are thus protected by the NHRA as archaeological resources.

The existing list of wrecks is by no means complete and does not include the as yet unproven potential for shipwrecks and other sites that relate to pre-European, Indian Ocean maritime exploration, trade and interactions along the South African east coast.

It is anticipated that further research in local and foreign archives, together with physical surveys to locate the remains of historical shipwrecks will produce a final tally of more than 3000.

The earliest known South African wrecks are Portuguese, dating to the sixteenth century when that country held sway over the route to the East. Due to the later, more prolonged ascendancy of the Dutch and British in European trade with the East and control at the Cape, the majority of wrecks along the South African coast belong to these two nations. However, at least 36 other nationalities are represented amongst the wrecks that litter the South African coast.

Da Gama's maritime incursion into the Indian Ocean laid the foundation for more than 500 years of subsequent European maritime activity in the waters around the South African coast (Figure 11). The Portuguese and other European nations who followed their lead around the Cape and into the Indian Ocean, however, joined a maritime trade network that was thousands of years old and in which east and south east Africa was an important partner.

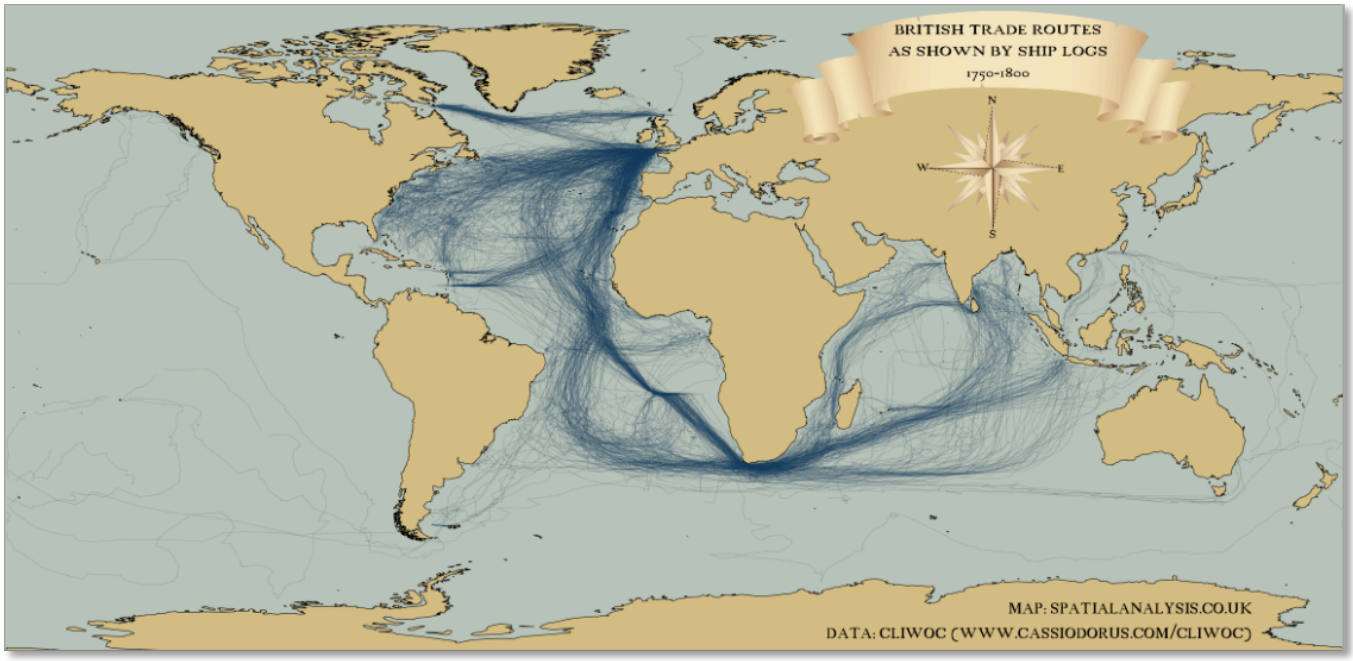

Figure 11: Example of the strategic position of the South African coast in global trade. British trade routes as shown by ship logs – 1750 to 1800 (Source: http://www.theguardian.com/news/datablog/2012/apr/13/shipping-routes-history-map).

This trade spanned the Indian Ocean and linked the Far East, South East Asia, India, the Indian Ocean islands and Africa. Archaeological evidence from Africa points to an ancient trade in African products – gold, skins, ivory and slaves – in exchange for beads, cloth, porcelain, iron and copper. The physical evidence for this trade includes Persian and Chinese ceramics excavated sites on African Iron Age like Khami, Mapungubwe and Great Zimbabwe (see Garlake, 1968, Huffman, 1972, Chirikure, 2014), glass trade beads found in huge numbers on archaeological sites across eastern and southern Africa (Wood, 2012).

There is shipwreck evidence on the East African coast for this pre-European Indian Ocean trade (see for example Pollard et al 2016) and clear archaeological and documentary evidence that this trade network extended at least as far south as Maputo in Mozambique. This suggests that there is the potential for shipwrecks and other sites that relate to pre-European, Indian Ocean maritime exploration, trade and interactions to exist along the South African east coast and offshore waters.

The historical shipwrecks that form part of South Africa's underwater cultural heritage are thus a unique and highly cosmopolitan repository of information about global maritime trade during the last five

centuries and potentially much further back into the past. These sites contain a wealth of cultural material associated with that trade and clues to the political, economic, social and cultural changes that accompanied this trade and which contributed to the creation of the modern world.

6.3.1. **Maritime History of the Duynefontein Area**

The 2AFRICA/GERA (East) cable system, in its crossing of the contiguous zone and territorial waters off the West Coast, will be routed well to the north of the historical anchorage in Table Bay which has the largest concentration of historical wrecks in South African waters (more than 400). The concentration of shipping casualties in Table Bay is the result of a combination of factors, including a lee shore to the Western Cape's winter storms and the long history of the bay as busy shipping hub, which do not apply to the coast north of Table Bay. Very few shipping casualties therefore occurred between Bloubergstrand and Dassen Island, south of Yzerfontein, and no wrecks are recorded at Duynefontein or within its immediate vicinity.

There are no known or recorded shipwrecks within the study area for the 2AFRICA/GERA (East) cable system in the contiguous zone, territorial waters or internal waters.

The nearest recorded wreck to the study area is *L'Lucie*, a French sailing vessel wrecked in Losperds Bay in October 1808, approximately 3 km south of the cable system landfall at Duynefontein (Figure 12). Beyond these basic details, nothing else is known about this wreck.

Eight other wrecks recorded in the wider vicinity of the cable system route are shown on Figure 12. They are, in order of age:

- ***Lancastria*** (1880): a local wooden sailing barque wrecked in a south-easterly gale on Matroos Point, 8 km north of the cable landfall in late 1880.

- ***Cabo de Eizagurre*** (1917): a Spanish steamship of 4376 tons (Plate 2) which sank approximately 5,5 km north of the cable route on 26 May 1917, apparently after hitting a mine possibly laid by the German commerce raider, *Wolf*. The vessel sank within minutes with the loss of 133 lives.

- ***Oklahoman*** (1942): an American steel steam freighter which foundered north of Robben Island after running aground on Dassen Island in fog on 7 July 1942.

- ***Gamtoos*** (1976): Built in 1936 as a 750 ton coaster with a shallow draught (Plate 3), the *Gamtoos* was requisitioned and converted in 1942 by the then South African Defence Force

into a salvage vessel. HMSAS *Gamtoos* (pennant number W122) then to joined the Marine Salvage Force in the Mediterranean where she worked on wartime maritime salvage.

Released at the end of World War II, *Gamtoos* returned to South Africa, where she was chartered first as a storeship during 'Operation Snacktown' to transport mixed cargoes to Marion and Prince Edward islands following their annexation by South Africa. Her final role was as a guano transport from the West Coast islands to the mainland for the Department of Agriculture and Forestry before being scuttled in 1976.

She was towed into Table Bay by SAS President Kruger to be scuttled by depth-charges but the tow-line parted, causing the failure of the first attempt at the scuttling her. A second attempt - rocket attacks and bombing by Buccaneer aircraft of 24 Squadron, South African Air Force - also failed to send the defiant *Gamtoos* to the bottom of the bay. Finally, Shackletons of 35 Squadron were called in to depth-charge the ship and on 10 June 1976, she slipped beneath the waves (Weinerlein 2006, http://www.clydeships.co.uk/view.php?ref=17236).

This wreck is currently less than 60 years of age and thus does not fall within the ambit of the NHRA.

Plate 2: *Cabo de Eizaguirre* (Source: https://upload.wikimedia.org/wikipedia/commons/b/b1/Carlos_de_Eizaguirre.jpg)

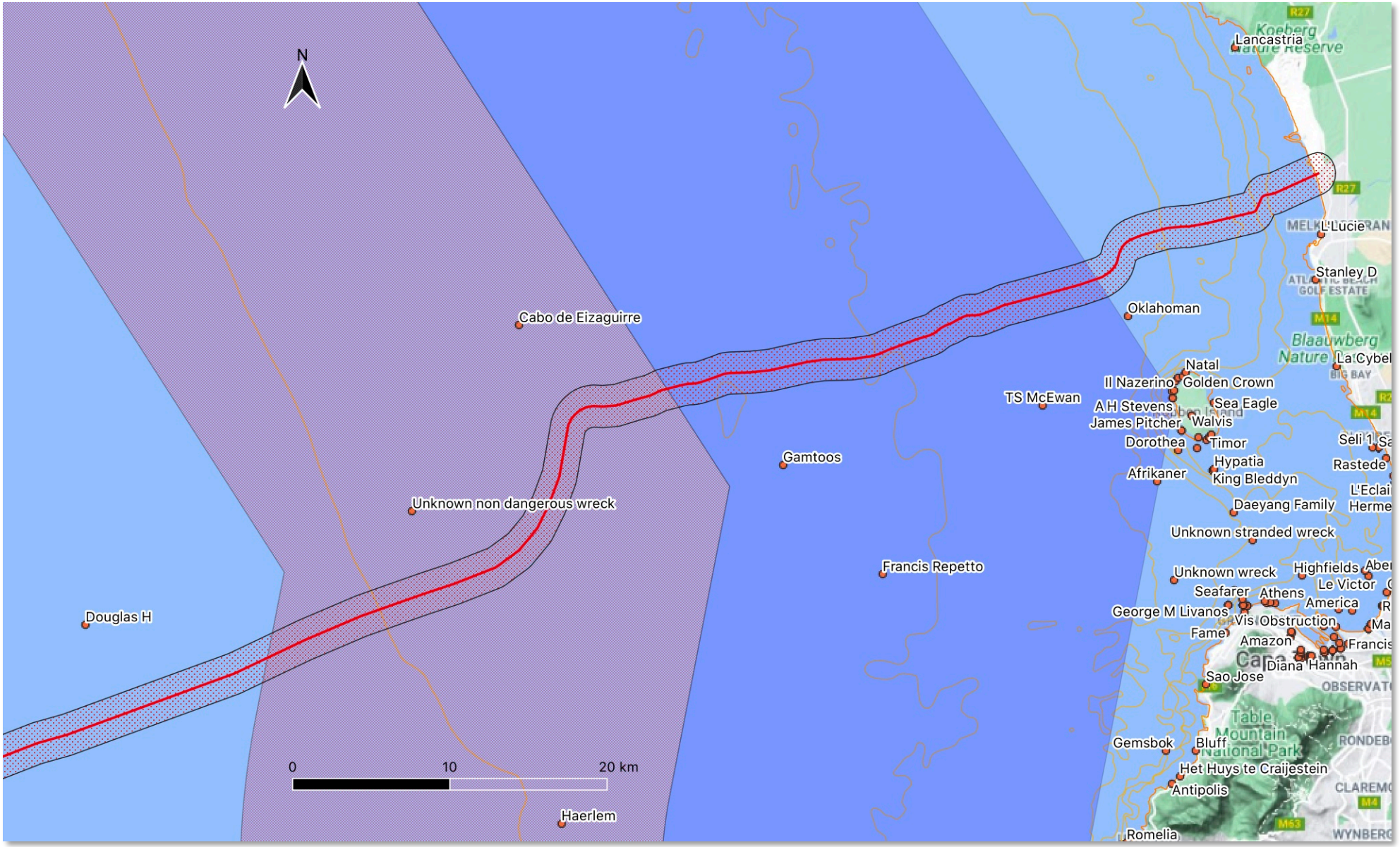

Figure 12: Proposed alignment of the 2AFRICA/GERA (East) cable system across the contiguous zone, territorial waters and inland waters. The 1 km buffer of the maritime assessment study area is shown on either side of the route as are the recorded wrecks in the vicinity, and some of the 400 plus historical wrecks Table Bay in the bottom right of the image (Source: Google Earth).

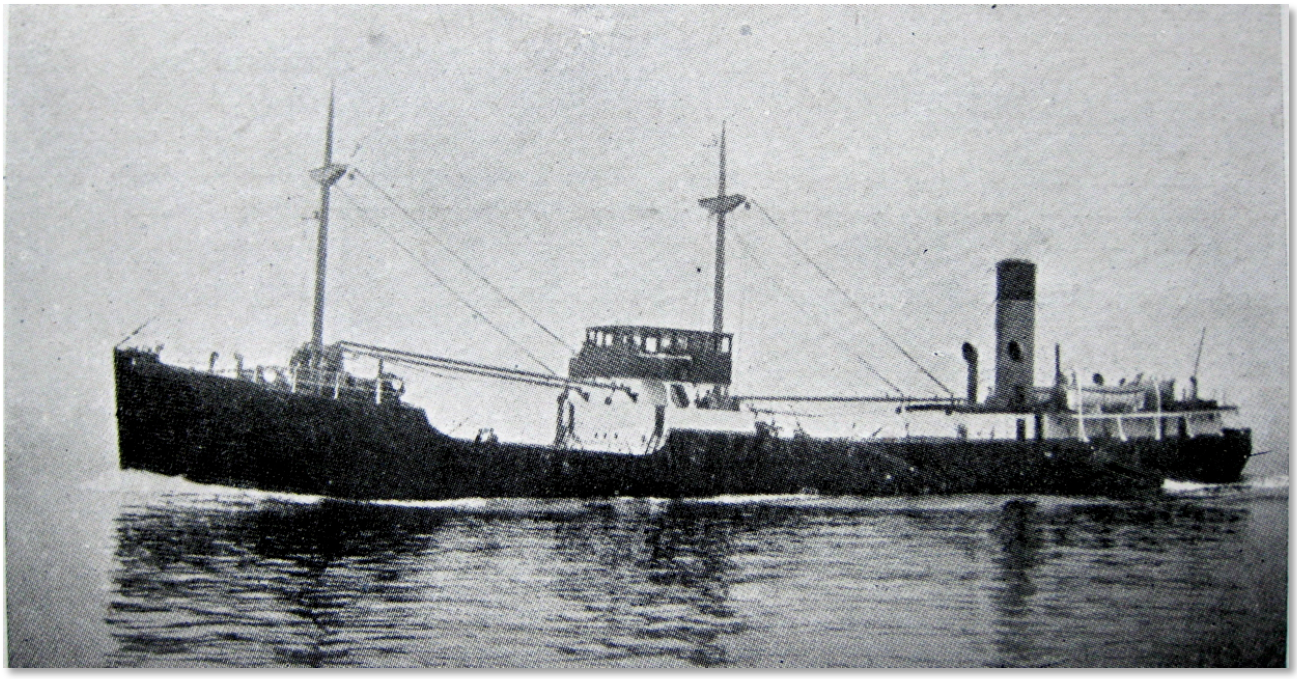

Plate 3: The *Gamtoos* (Source: http://www.clydeships.co.uk/view.php?ref=17236).

- ***Stanley D*** (1976): Purse sein trawler owned by Chapman's Peak Fisheries which grounded and was wrecked at Melkbosstrand in July 1976. No further information is available about this wreck.

  This wreck is currently less than 60 years of age and thus does not fall within the ambit of the NHRA.

- ***TS McEwan*** (1977): South African Railways and Harbours steam tug built in 1925 (Plate 4). At the time of her delivery, she was the world's most powerful tug. Retired from service around 1974. After some valuable souvenirs were removed, the bridge was dismantled and on 9 June 1977 she was towed from the Victoria Basin to a position six miles west of Robben Island where her seacocks were opened and she was scuttled in 50 fathoms of water.

  This wreck is currently less than 60 years of age and thus does not fall within the ambit of the NHRA.

- **"Haerlem**" (no date): Unknown wreck reported by the South African Navy in 79 m of water west of the Cape Peninsula.

- **Unknown Non-Dangerous Wreck** (no date): An unknown wreck on the seabed recorded in a South African Naval *Notice to Mariners*.

Plate 4: The tug *TS McEwan* (Source: http://www.clydeships.co.uk/view.php?ref=2859#v).

Because the reports of the “Haerlem” and the Unknown Non-Dangerous Wreck are based on South African Navy positions for wrecks identified on the seabed, it can be assumed that the positions of these two wrecks are fairly accurate. What each of these sites represents, however, is not clear from the available information and there is no way of knowing whether they are the remains of one of the other vessels on the list above, or different wrecks completely. Neither of these sites will, however, be affected by the cable route as both lie a substantial distance from the proposed alignment

A gazetteer of all of the wrecks described above is provided in **Appendix 1**.

6.4. **Review of Geophysical Survey Results**

The purpose of the geophysical survey was to survey a safe and economical route for the proposed cable by determining water depth, (Hesemann 2020).

The results of the sidescan sonar, multibeam bathymetry and magnetometer surveys carried out by Fugro Germany Marine, providing as they do primary evidence of seabed hazards, seabed geomorphology and other oceanographic and anthropogenic data, are of interest from a maritime archaeological perspective as they can provide concrete evidence of wrecks and other heritage resources on or in the seabed.

The archaeological review of the geophysical survey report for Segment E1.1 of the 2AFRICA/GERA (East) cable system, between the Duynefontein BMH and the offshore Port Elizabeth Branching Unit (BU) found the following:

Seabed Geology: The Shallow Water Survey begins at kilometre point (KP) 3.000 where the water depth is 17.5 m and the seabed consists of hardground made up of a very dense to cemented sand) covered by a veneer of loose fine sand (Figure 13 and Plate 5). The existing SAT 3 marine cable is crossed at KP 3.604 and is confirmed by two magnetometer contacts (see Figure 13) (Hesemann 2020).

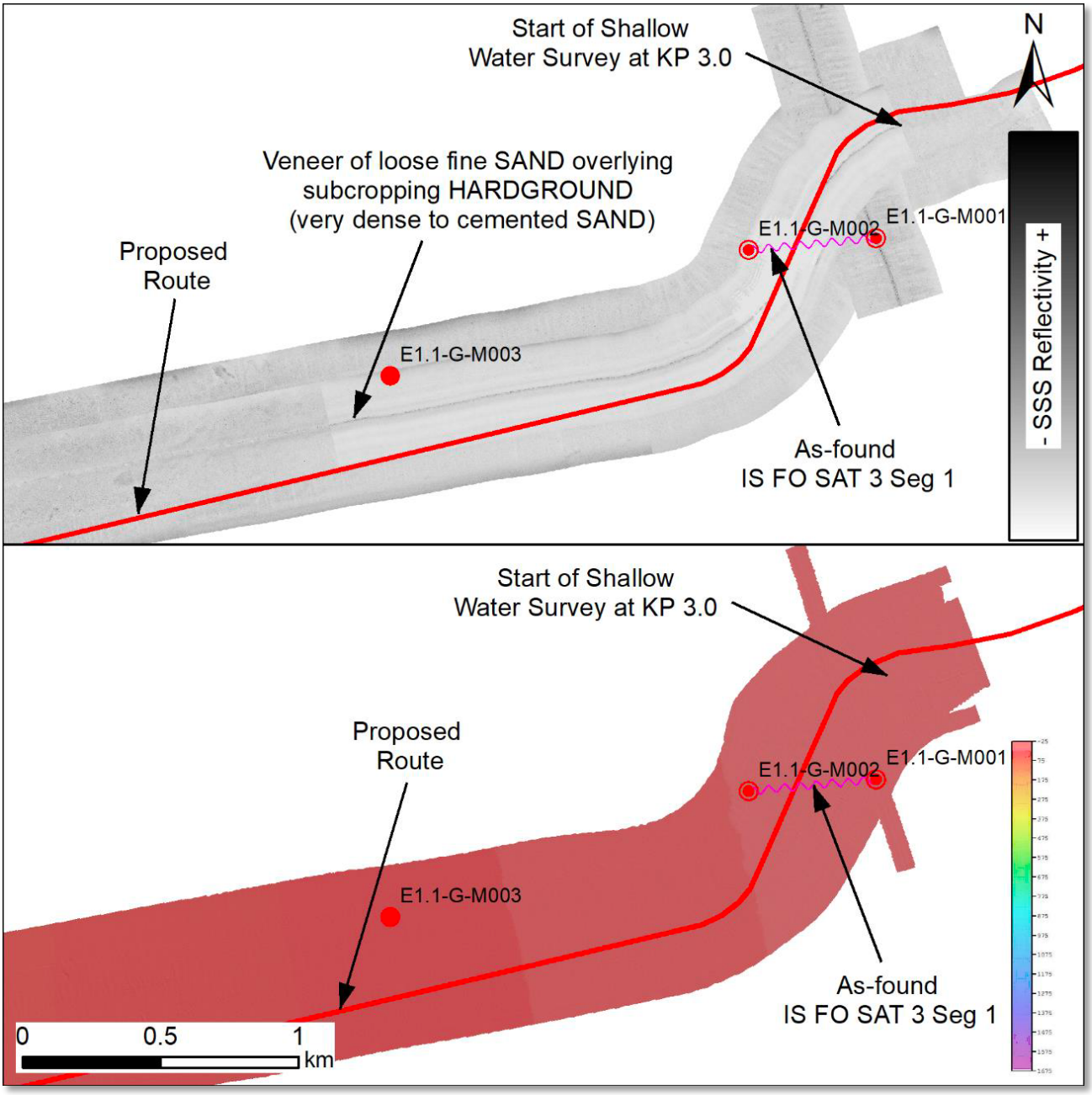

Figure 13: SSS mosaic (upper panel) and MBES bathymetry (lower panel) illustrating the Shallow Water Survey between at KP 3.000 and KP 5.600. Note the two magnetic anomalies (E1.1-G-M001 and E1.1-G-M002) marking the position of the existing SAT 3 seabed cable (After Hesemann 2020).

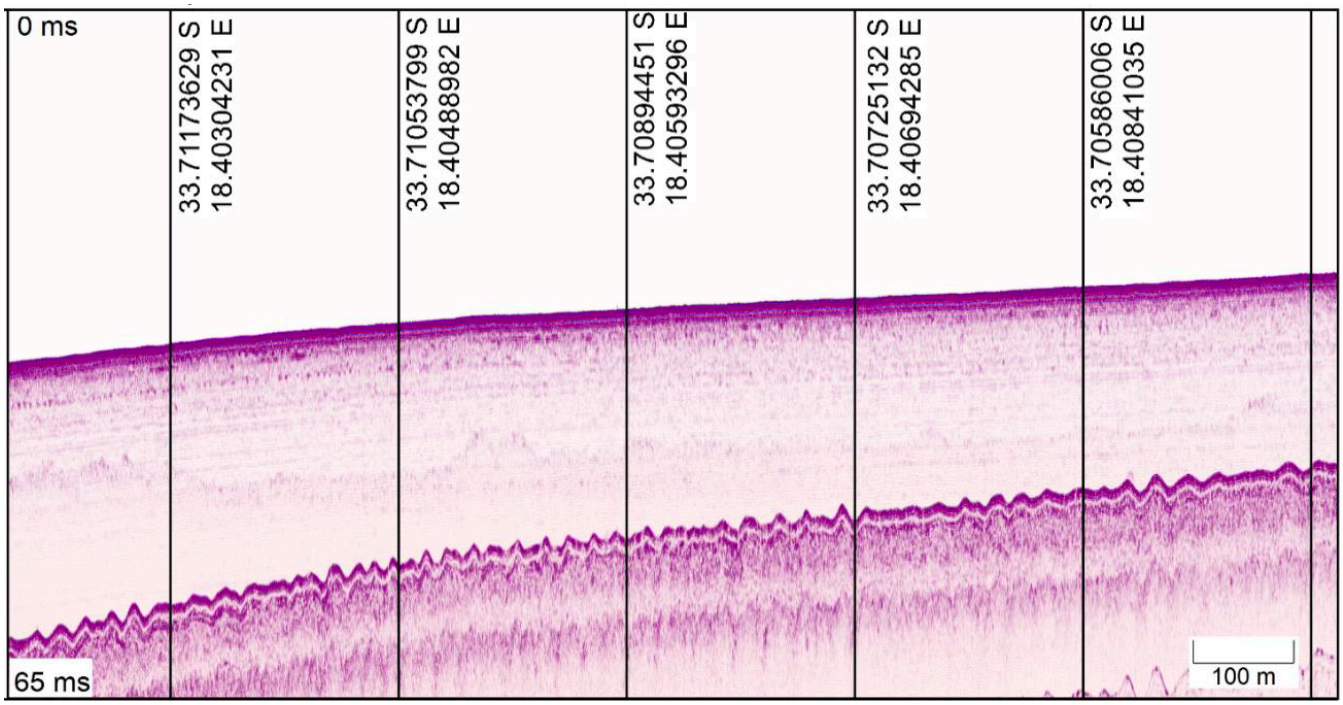

Plate 5: Sub-bottom profile from the start of the Shallow Water Survey between KP3.000 to KP 4.200 showing the compacted sand of the seabed (After Hesemann 2020).

Further away from the coast the seabed is characterised by areas of outcropping and subcropping rock (see for example Figure 14) with a seabed covering of loose sand. In areas where the rock is absent, subcropping hardground consisting very dense to cemented sand or hard silt occurs (Hesemann 2020).

Sonar Contacts: Two hundred and forty-nine (249) sonar contacts were detected along the proposed route. The majority (215) are interpreted as boulders, thirty (30) as depressions, three as debris and one as an unknown sonar contact. Two linear sonar contacts were observed which may be cables or chains (see Figure 15) (Hesemann 2020).

Magnetometer Contacts: Sixty three (63) magnetometer contacts were identified in the Shallow Water Survey area. There were three cable crossings: two associated with in service cables, SAT 3 at KP 3.604 (see Figure 13 above), and SAFE at KP 12.093. At the third crossing, of the out of service SAT 2 cable, at KP 43.5. some of the magnetometer contacts were found to be related to the local geology in the outcropping areas.

In summary, while a handful of the sidescan and magnetometer anomalies identified in or on the sea bed are humanly-derived debris (the linear features noted in the sidescan data and the magnetic anomalies associated with existing marine cables), the nature of a number of other anomalies was not possible to discern from the available data. No wrecks were, however, observed in any of the geophysical datasets.

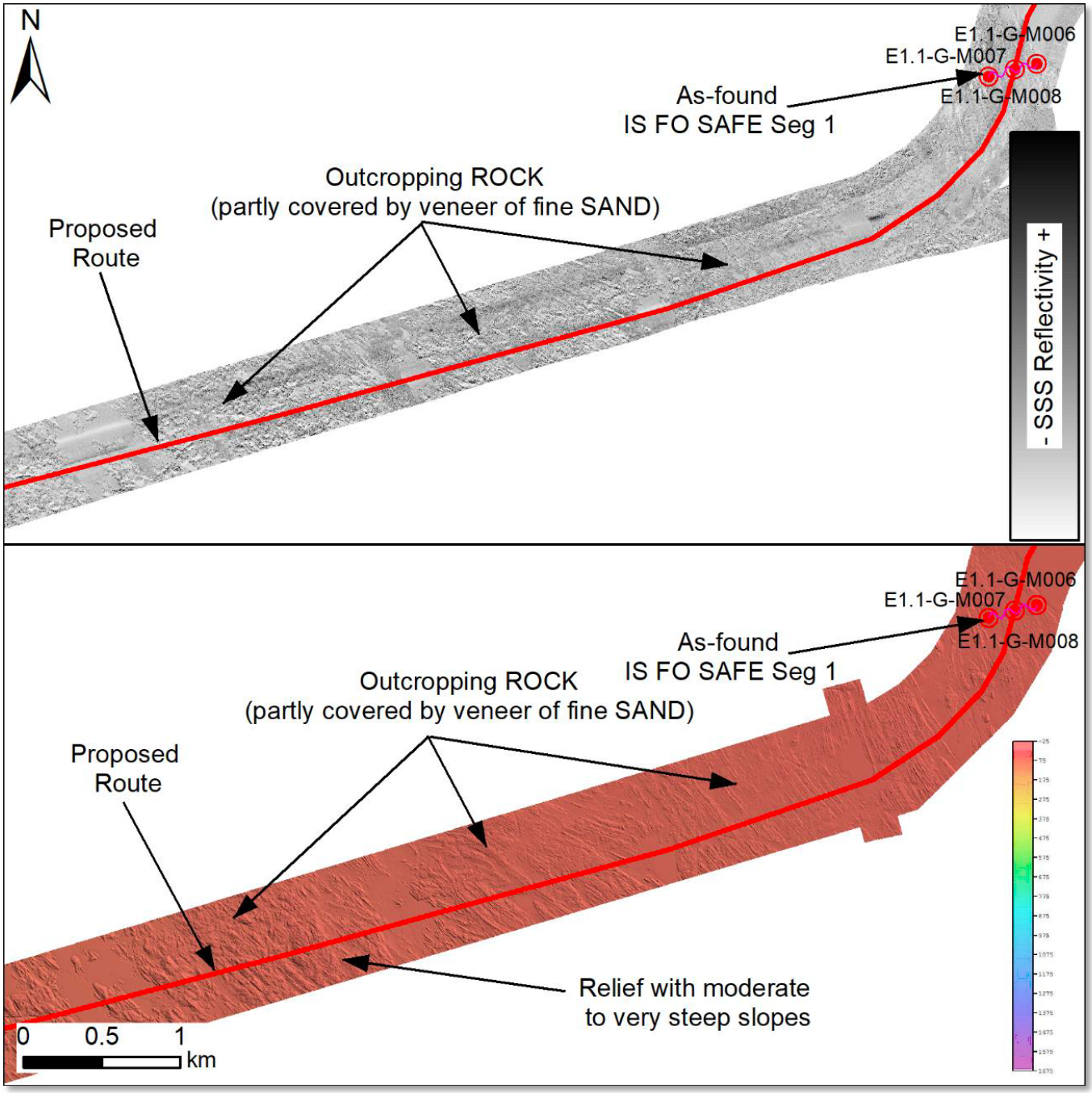

Figure 14: SSS mosaic (upper panel) and MBES bathymetry (lower panel) illustrating the rock outcrop and areas of subcropping rock between KP 11.500 and KP 16.500. Note the magnetic anomalies where the route crosses the existing SAFE cable. (After Hesemann 2020).

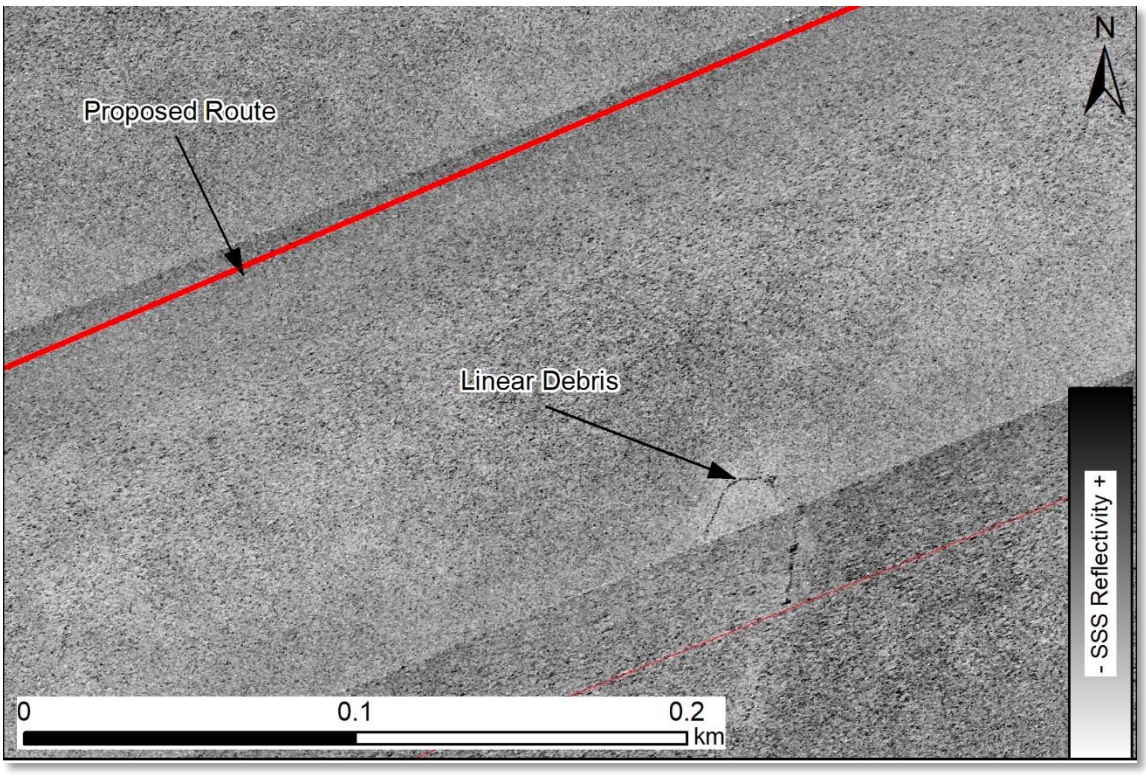

Figure 15: Example of linear debris sonar contact at KP 60.8 (116.7x1.0xnmh) (After Hesemann 2020).

6.5. **Maritime Heritage in the EEZ and Continental Shelf**

Although outside the remit of the NHRA and therefore this assessment, it is worth noting the presence, within the EEZ and on the continental shelf of a number of wrecks in proximity to the proposed cable route (Figure 16 and Figure 17). They are:

- ***Douglas H***: A South African wooden fishing vessel which foundered in heavy seas, 64 km west of Cape Town in December 1994. No further information is available.

  This wreck is currently less than 60 years of age and thus does not fall within the ambit of the NHRA.

- ***Pantelis***: A Greek merchant steamer (Plate 6) torpedoed by U-172 at 01h40 on 8 October 1942, about 40 miles southwest of Cape Town. She was hit on the starboard side, forward of amidships by one torpedo and sank by the bow within two minutes after a boiler explosion. No lifeboats could be launched because the ship sank so fast and the five survivors rescued themselves on a raft that floated free. 28 Greek crew members were lost. The five survivors (the master and four crew members) were picked up by HMS *Rockrose* on landed at Cape Town two days later. (https://uboat.net/allies/merchants/ship/2243.html)

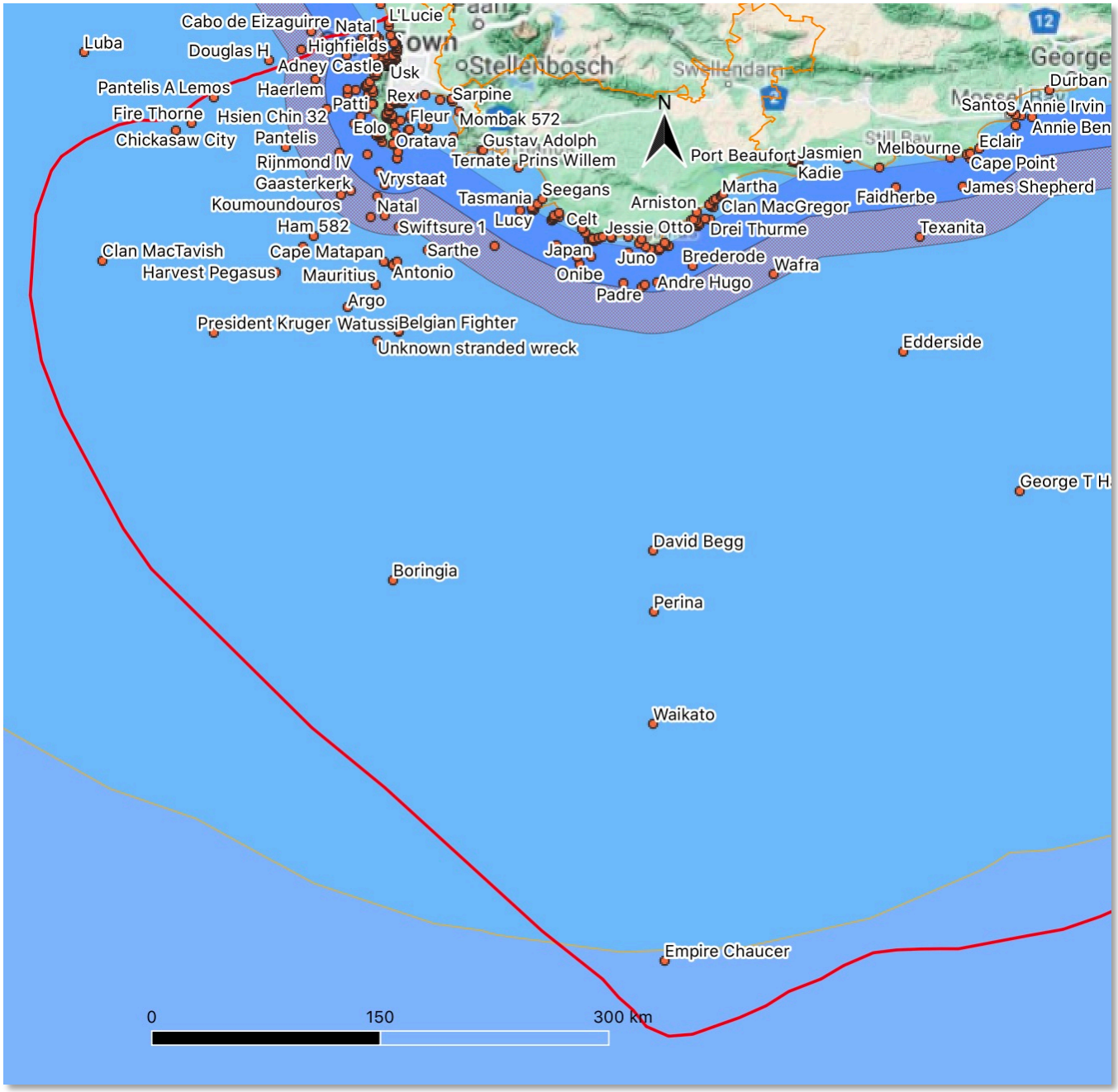

Figure 16: Wrecks in EEZ and on the continental shelf in the vicinity of the 2AFRICA/GERA (East) cable system (red line), west of Cape Agulhas (Source: Google Earth).

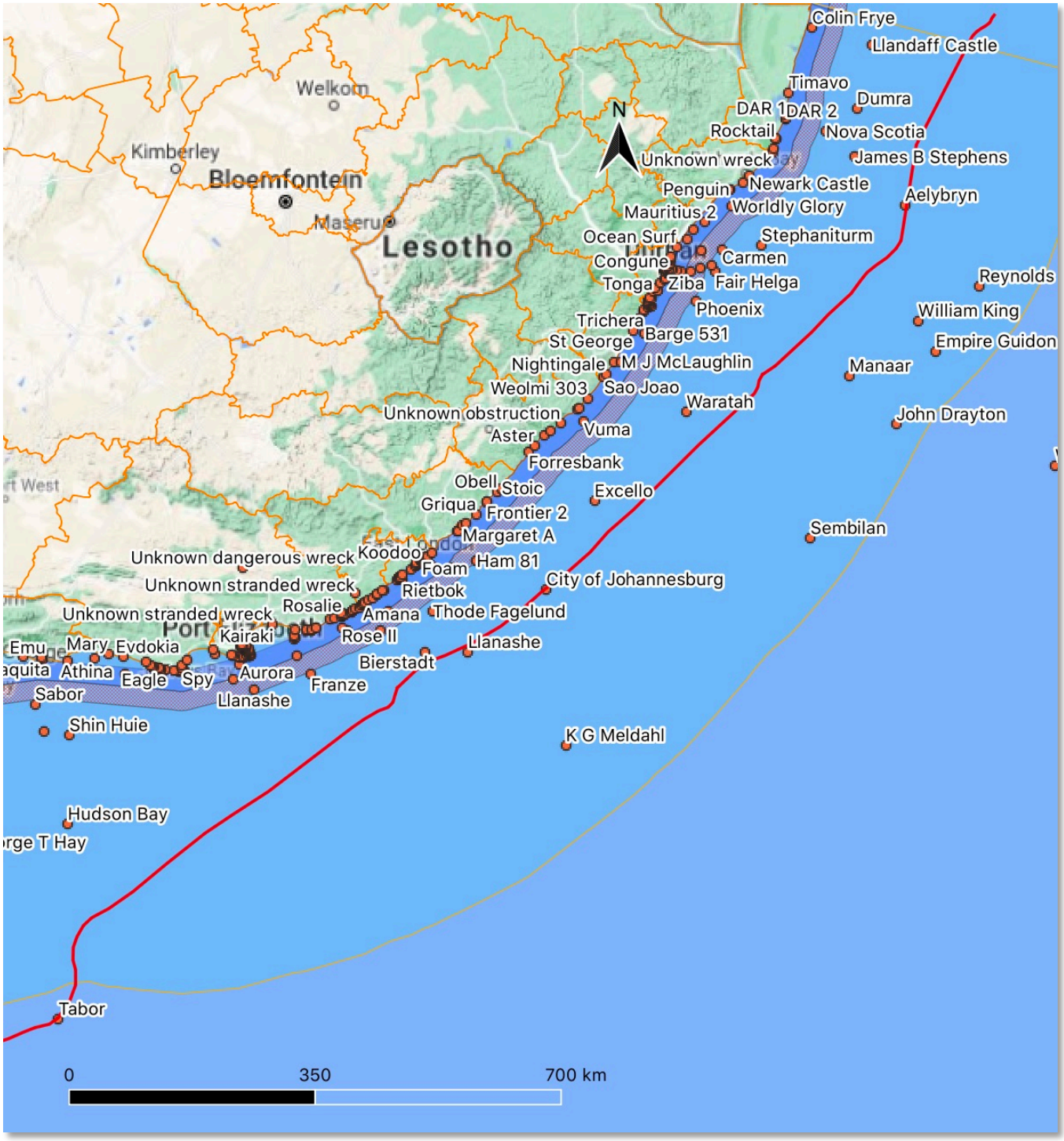

Figure 17: Wrecks in EEZ and on the continental shelf in the vicinity of the 2AFRICA/GERA (East) cable system (red line), east of Cape Agulhas (Source: Google Earth).

- ***Firethorn***: A Panamanian registered steamship built in 1937 (Plate 7). Torpedoed 60 miles northwest of Cape Town by U-172, at 09h26 on 7 October 1942, the day before the same U-boat sunk the *Pantelis*. Hit by two torpedoes, the first just below the bridge and the second in the engine room a few seconds later, the *Firethorn* sank within two minutes. No lifeboats could be launched and the 40 crew members and 21 armed guards abandoned ship in four rafts and

a yawl boat which floated free. The master, nine crew members and two armed guards died. The U-boat surfaced after the ship sank and questioned the survivors before leaving the area.

Six men in the yawl boat set off for the coast and were spotted by an aircraft the next day and picked up four hours later by HMS *Rockrose*. The remaining survivors on the life rafts were rescued by the same corvette and the converted whaler HMSAS *Springs* on 9 October and taken to Cape Town (https://uboat.net/allies/merchants/ship/2237.html).

Plate 6: *Pantelis* (Source: https://uboat.net/allies/merchants/ship/2243.html)

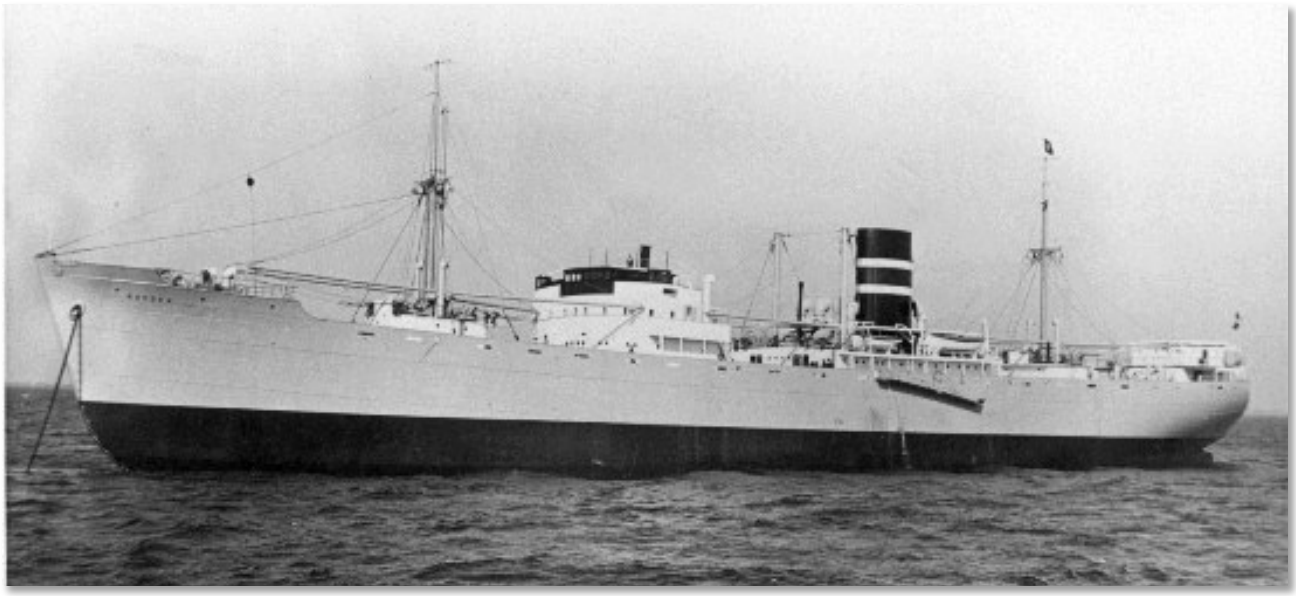

Plate 7: *Firethorn* under her original name *Norden*. Photo courtesy of Danish Maritime Museum, Elsinore (Source: (https://uboat.net/allies/merchants/ship/2237.html).

- ***Chickasaw City***: An American merchant steamer built in 1920 (Plate 8) and carrying a cargo of 1400 tons of chrome ore, coffee and hides. The first ship to be sunk by a U-boat off the South African coast during World War II, she was torpedoed by U-172 at 05h02 on 7 October 1942, a few hours before the same U-boat sank *Firethorn*.

  Struck by two torpedoes *Chickasaw City* sank within three minutes with the loss of 10 people. The 39 survivors were questioned by the captain of the U-boat, Carl Emmermann, about the ship's name, port sailed from and destination and cargo carried. The survivors were picked up after 38 hours later by HMS *Rockrose* and taken to Cape Town (https://uboat.net/allies/merchants/ship/2239.html).

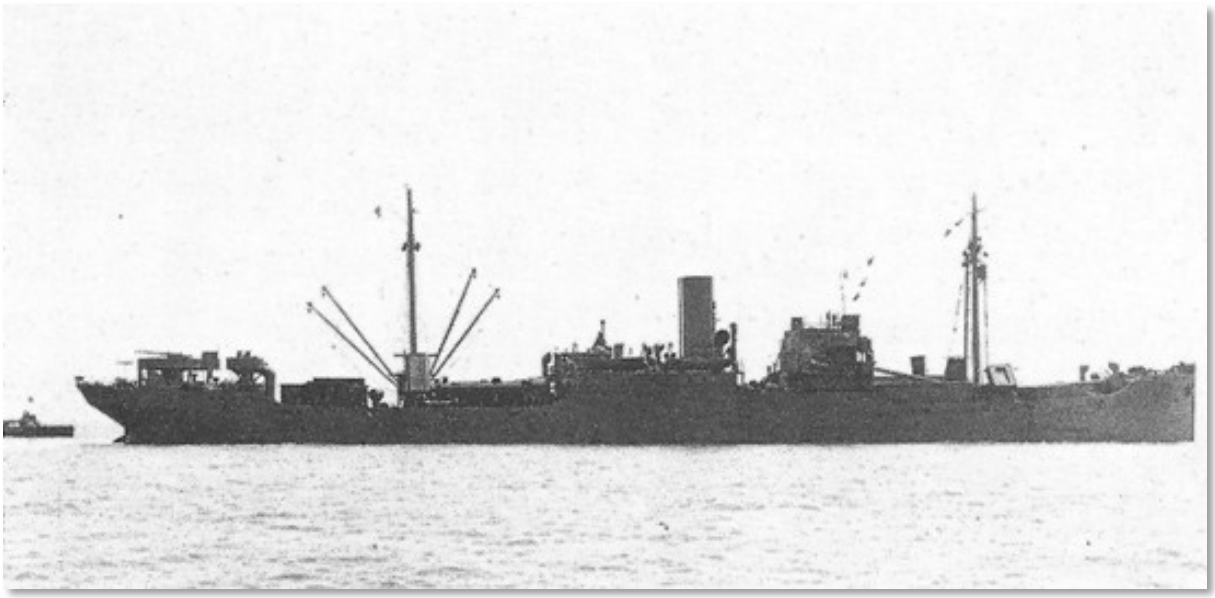

Plate 8: The *Chickasaw City*. Photo from the SSHSA Collection, University of Baltimore Library (Source: https://uboat.net/allies/merchants/ship/2239.html).

- ***Empire Chaucer***: A British merchant steamer completed in 1942. Sunk by U-504 on 17 October 1942, off the Cape south coast. Carrying 2000 tons of pig iron and 6500 tons of general cargo, including tea and mail. Three crew members were lost. The master and 11 survivors were picked up by the *Empire Squire* and landed at Trinidad. 15 survivors in one lifeboat were picked up by the *Nebraska* after 23 days in an open boat and landed at Cape Town. The remaining 20 survivors in another lifeboat landed at Bredasdorp after 14 days at sea (https://uboat.net/allies/merchants/ship/2281.html).

- ***Tabor***: A Norwegian motor vessel built in 1936 (Plate 9) and en route from Alexandria via Cape Town to Lagos in ballast when torpedoed by U-506 at 06h13 on 9 March 1943, southeast of Cape Agulhas. The ship was disabled completely and lost all power, forcing the surviving crew

to abandon ship in four lifeboats before a second torpedo hit the engine room at 07h14. The *Tabor* remained stubbornly afloat, so the U-boat then shelled the ship until she sank at 08h57.

The injured survivors were transferred to the motor boat and lifeboats which were separated by stormy weather and high seas and two of them, containing 22 survivors, made landfall at Still Bay on 17 March. Ten survivors in another boat landed at Gansbaai on 18 March. On 19 March, the last lifeboat with 12 survivors capsized about 5 miles off Cape Agulhas, although they all managed to get back into the boat all but two died of exposure during the day (https://uboat.net/allies/merchants/ship/2742.html).

Plate 9: *Tabor*. Photo from the Norsk Teknisk Museum (Source: https://uboat.net/allies/merchants/ship/2742.html).

- **Llanashe**: A British steam merchant vessel built in 1936 (Plate 10). Torpedoed and sunk by U-182 on 17 February 1943, south of Cape Saint Francis. Carrying a cargo of 3500 tons of tinplate and aluminium. Thirty-three of the crew of 42 were lost. The nine survivors were picked up after 11 days adrift by the Dutch merchant vessel *Tarakan* before being transferred to HMS *Carthage* and HMS *Racehorse* which transported them to Cape Town (https://uboat.net/allies/merchants/ship/2656.html).

Plate 10: *Llanashe* (https://uboat.net/allies/merchants/ship/2656.html)

- ***City of Johannesburg***: Ellerman Lines steamship bound from Calcutta via Colombo and Cape Town to England with a general cargo, including 2000 tons of pig iron, cotton, jute and tea (Plate 11). Hit by one of two torpedoes fired by U-504 at 23h12 on 23 October 1942 while steaming an evasive zigzag course about 80 miles east-southeast of East London.

  The ship was immobilised and the crew abandoned ship in four lifeboats within five minutes despite rough sea and high swell. At 23h40, the U-boat surfaced after firing an unsuccessful *coup de grâce* at the ship which. The Germans questioned the survivors in one of the lifeboats and left the area after the *City of Johannesburg* broke in two amidships and sank at midnight. Four Lascar crewmen were lost in the sinking (https://uboat.net/allies/merchants/ship/2530.html).

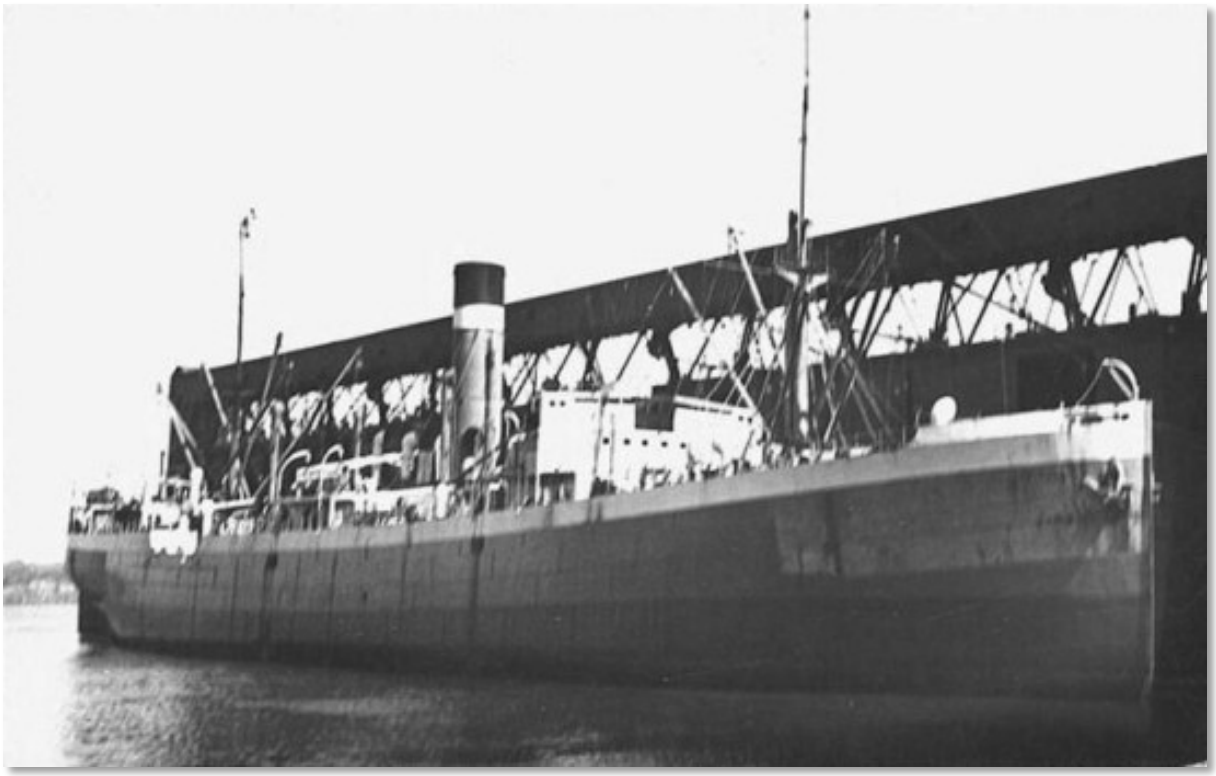

Plate 11: *City of Johannesburg* (Source: https://uboat.net/allies/merchants/ship/2530.html)

- **Aelybryn**: A British merchant vessel of 4986 tons carrying a general cargo from Calcutta, via Cochin and Durban, to England. Hit by two torpedoes from U-160 at 23h10 on 11 March 1943 the unescorted *Aelybryn* finally sank after a *coup de grâce* torpedo. Nine crew members were lost. The master, 27 crew members and four gunners were picked up by the Portuguese steam passenger ship *Lourenço Marques* and landed at Cape Town.

  The *Aelybryn* survived a previous encounter with a U-boat in May 1941 when she was damaged by torpedoes fired by U-556 while sailing with a convoy in the north Atlantic.

While not protected by the NHRA because they are located in the EEZ or on the continental shelf, and currently too young to fall under the protection of the 2001 UNESCO Convention, the circumstances of their loss during wartime nevertheless makes these wrecks sensitive sites.

The loss of life that accompanied each of their sinkings means that they should be viewed as war graves and every effort should be made to avoid these sites in the installation of the cable system.

These wrecks, if encountered during the installation of the cable system also pose a potential risk to equipment and should be avoided.

A gazetteer of the wrecks described above is provided in Appendix 2.

7. IMPACT ASSESSMENT

Among the potential impacts associated with the proposed 2AFRICA/GERA (East) cable system are impacts on submerged prehistoric and maritime archaeological heritage resources and on palaeontological features and fossil material. In all cases impacts can arise where interventions on and in the seabed intersect with heritage resources – either directly where sites or material are damaged or disturbed, or indirectly where particularly the downstream effects of seabed activities can affect sites or material.

Direct impacts to buried heritage resources are caused by the cable burial process itself, where trenching or jetting cut into the seabed. Where cables are laid on the seabed rather than buried, their placement can also have a direct impact on heritage sites and materials in their footprint. Interactions between cables, seabed ploughs and other equipment and historical wrecks can also have a direct impact in the form of damage to the former and it is thus desirable to ensure that direct interactions between project infrastructure and heritage resources are avoided.

Indirect impacts on heritage resources in seabed development contexts usually arise from the downstream effects of interventions on or in the seabed on nearby heritage resources. For example, the placement of cables on the seabed may affect local current patterns, causing seabed scour, which can in turn affect nearby heritage sites, both on or within the sea bed.

That said, the small footprint and low profile of the cable is unlikely to cause downstream effects on the surrounding seabed.

On the basis of the heritage resources review in the preceding sections, the heritage receptors defined for this impact assessment are:

- Submerged prehistoric archaeological resources;
- Palaeontological features and fossil material; and
- Maritime archaeological resources, mostly historical shipwrecks.

The assessment of impacts on these receptor classes is based on the methodology set out in Appendix 5 below.

7.1. **Submerged Prehistory**

Available evidence from South Africa and elsewhere in the world indicates that there is the potential for the survival in submerged, seabed contexts of archaeological material and palaeoenvironmental evidence deposited on the continental shelf, to approximately the -120 m contour, during periods of lower sea level within the last 900 000 years.

Where such material has survived post-glacial marine transgression, it will form part of the sedimentary make-up of the seabed and may be impacted by interventions on and in the seabed.

The small footprint of the seabed intervention that will result from the installation of the cable system, however, makes the potential for **direct** impacts on submerged prehistoric archaeological material in the study area unlikely.

The nature of the proposed seabed intervention, namely the burial of the cable in the seabed within the area covered by this assessment suggests that **indirect** impacts, which manifest themselves after and/or downstream of the activity are also unlikely.

Based on the likely direct and indirect of the installation of seabed cables off the Cape west coast, the **cumulative impacts** of this cable system on submerged prehistorical archaeological material, in combination with other systems already installed on the seabed, are likely to be low.

The **nature** of impacts, were they to occur, will be negative because the finite and non-renewable nature of heritage resources means that they cannot recover if disturbed, damaged or destroyed.

The potential impacts of the installation of the 2AFRICA/GERA (East) cable system on submerged prehistoric archaeological resources can be summarised as follows:

	Spatial Extent	**Duration**	**Intensity**	**Frequency**	**Probability**	**Irreplaceability & Reversibility**	**Significance**	**Confidence**
Without mitigation	Site specific	Short-term	Low	Once off	Improbable	- High irreplaceability - Non-reversible	Medium	Low
	Essential mitigation measures: • No mitigation proposed in Deep and Shallow Water • Inshore Waters and on the beach crossing, it is recommended that an alert for the occurrence of submerged prehistoric archaeological material, be included in the EMPr for the project, specifically for the divers working in the shoreface and the operators excavating the trench in the beach and dune.							
With mitigation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

7.2. **Palaeontology**

As described above, extensive cemented crusts or “hardgrounds” formed on formations exposed at the seabed and eroded and reconsolidated during glacial sea level oscillations have produced a wide array

of multiphase phosphorite nodules and phosphatic shell casts of various ages. The bones and teeth of sharks and other fishes, the skulls of extinct whale species and the occasional remains of land-living animals that roamed the ice age exposed shelf are also phosphatized and reworked into the latest, loose sediments on the seabed.

Although the seabed plough method of cable burial on the shelf means that it is not possible to perform palaeontological mitigation as seabed materials are not brought up to the vessel for inspection and sampling, the limited subsurface seabed disturbance entailed in burying the cable by seabed plough, means that **direct** palaeontological impacts are considered to be negligible.

Where the cable crosses the shoreface and beach sands, the water jetting and trench digging may encounter reworked marine and terrestrial fossil bones and teeth, but the probability is unlikely given the widely scattered occurrence and the small, narrow volume of the excavation. This impact is therefore considered to be low to negligible.

The Velddrif Formation shelly deposits which may be encountered comprise a predominantly extant shell fauna which is of **low** palaeontological sensitivity. Given the small volume which will be affected, and the availability of Velddrif Formation exposures at many places along the coast, the impact may be considered negligible.

The nature of the proposed seabed intervention also suggests that **indirect** impacts, which manifest themselves after and/or downstream of the activity are likely to be negligible.

Based on the likely direct and indirect of the installation of seabed cables off the Cape west coast, the **cumulative impacts** of this cable system on palaeontological material, in combination with other systems already installed on the seabed, are likely to be low.

The **nature** of impacts, were they to occur, will be negative because the finite and non-renewable nature of palaeontological material means that they cannot recover if disturbed, damaged or destroyed.

The potential impacts of the installation of the 2AFRICA/GERA (East) cable system on palaeontological resources can be summarised as follows:

	Spatial Extent	Duration	Intensity	Frequency	Probability	Irreplaceability & Reversibility	Significance	Confidence
Without mitigation	Site specific	Short-term	Low	Once off	Improbable	- High irreplaceability	Medium	Low

						- Non-reversible		
	Essential mitigation measures: • No mitigation proposed in Deep and Shallow Water • Inshore Waters and on the beach crossing, it is recommended that an alert for the occurrence of palaeontological material, be included in the EMPr for the project, specifically for the divers working in the shoreface and the operators excavating the trench in the beach and dune.							
With mitigation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

7.3. **Maritime Archaeology**

Based on the discussion of maritime heritage resources and the results of the seabed surveys above, no wrecks have been identified within the 1 km study area buffer around the proposed cable alignment.

The seabed surveys noted the presence along the route of a possibly humanly-derived debris, although with the exception of the linear features which probably represent cable or chain, none of these contacts could be more accurately described. It is therefore not known whether any of these anomalies represent historical shipwrecks or related material.

The small footprint of the seabed intervention and the potential for seabed debris to damage the cable plough, which means that these contacts are likely to be carefully avoided during cable installation, suggests that the potential for **direct** impacts on maritime archaeological sites or material in the study area is negligible.

The nature of the proposed seabed intervention suggests that **indirect** impacts, which manifest themselves after and/or downstream of the activity and can take the form of, for example, seabed scour, are unlikely to affect any of the handful of known wrecks in vicinity of the cable system.

Based on the likely direct and indirect of the installation of seabed cables off the Cape west coast, the **cumulative impacts** of this cable system on maritime heritage resources, in combination with other systems already installed on the seabed, are likely to be low.

The **nature** of impacts, should they to occur, will be negative because the finite and non-renewable nature of heritage resources means that they cannot recover if disturbed, damaged or destroyed.

The potential impacts of the installation of the 2AFRICA/GERA (East) cable system on maritime heritage resources can be summarised as follows:

	Spatial Extent	Duration	Intensity	Frequency	Probability	Irreplaceability & Reversibility	Significance	Confidence
Without mitigation	Site specific	Short-term	Low	Once off	Improbable	- High irreplaceability - Non-reversible	Medium	Low
	Essential mitigation measures: • Any further geophysical data generated to support to installation of the cable system must be archaeologically reviewed for the presence of historical shipwrecks or related material; • Should the data identify wreck material at or near the location of any portion of the cable, micro-siting of the cable and/or the possible implementation of an exclusion zone around the archaeological feature should be sufficient to mitigate the risks to the site; • Should any maritime archaeological sites or material be accidentally encountered during the course of laying the cable, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.							
With mitigation	Site specific	Short-term	Low	Once off	Improbable	- High irreplaceability - Non-reversible	Low	Low

8. CONCLUSIONS AND RECOMMENDATIONS

This assessment of the heritage resources within the study area established around the 2AFRICA/GERA (East) cable system suggests that although there is the potential for the presence of submerged prehistoric archaeological and palaeontological material on or in the seabed, particularly above the -120 m contour, the patchiness in the distribution of these heritage resource and the minor seabed interventions associated with the installation of the cable system mean that impacts to such material are very unlikely.

The nature of buried prehistoric archaeological sites and palaeontological material means that it will be virtually impossible to detect such sites during ploughed offshore cable burial. No mitigation is thus proposed in respect of submerged prehistoric archaeological or palaeontological resources in the Shallow or Deep Water areas of the cable route..

In the Inshore Waters and on the beach crossing, in respect of both submerged prehistoric archaeology and palaeontology, it is recommended that an alert for the occurrence of fossil bones and teeth, as well as potential submerged prehistoric archaeological material, be included in the EMPr for

the project, specifically for the divers working in the shoreface and the operators excavating the trench in the beach and dune.

Due to the dynamic nature of the environment, any possible archaeological or palaeontological material encountered in these activities must be immediately collected by the diver or operator before it is lost. The ECO and/or the monitoring archaeologist must be informed and take custody of the find and obtain its context. All such finds must be recorded and their contextual information (a report) must be deposited at an SAHRA-approved institution.

With regard to historical shipwrecks, the proposed 2AFRICA/GERA (East) cable system has a very low potential for impacts arising out of the installation of the seabed cable. However, in view of the potential, albeit very small, for the presence of currently unknown wrecks close to the cable route, the following recommendations are made in respect of mitigation measures to be applied during the installation of the cable system:

- If any further geophysical data, particularly in the Inshore Waters portion of the cable route, is generated to support the installation of the cable system it be archaeologically reviewed for the presence of historical shipwrecks or related material. If possible, the project archaeologist should be consulted before data are collected to ensure that the survey specifications and data outputs are suitable for archaeological review;
- Should the data identify wreck material at or near the location of any portion of the cable, micro-siting of the cable and/or the possible implementation of an exclusion zone around the archaeological feature should be sufficient to mitigate the risks to the site;
- Should any archaeological material be accidentally encountered during the course of cable installation, work must cease in that area until the project archaeologist and SAHRA have been notified, the find has been assessed by the archaeologist, and agreement has been reached on how to deal with it.

8.1. **Acceptability of the Proposed Activity with Respect to Heritage Resources**

Based on the information and assessment above, it is our reasoned opinion that the proposed installation of the 2AFRICA/GERA (East) cable system raises no red flags, contains no fatal flaws and is unlikely to have any impact on known or unknown maritime and underwater cultural heritage resources. It is, therefore, considered acceptable.

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APPENDIX 1: CORRESPONDENCE WITH HWC RE NEED FOR TERRESTRIAL HERITAGE STUDIES

From: **Waseefa Dhansay** Waseefa.Dhansay@westerncape.gov.za
Subject: RE: 2AFRICA Submarine Cable landfills at Duynefontein and Yzerfontein: Requirement for NIDs?
Date: 22 December 2020 at 13:26
To: john.gribble john.gribble@aco-associates.com, **Stephanie Barnardt** Stephanie.Barnardt@westerncape.gov.za
Cc: Giles Churchill giles.churchill@acerafrica.co.za, **Carina Boonzaaier** carina.boonzaaier@acerafrica.co.za

Dear John

There will be no S38(1) trigger and no NID required as the cables affecting HWC's jurisdiction would be less than 100m.
The standard archeological approach will apply nonetheless – if any heritage resources are uncovered work is to stop and HWC to be informed.

HWC December 2020 and January 2021 Operations

Kind regards,

Waseefa Dhansay
Assistant Director: Professional Services
Heritage Resource Management Services
Heritage Western Cape

Email: waseefa.dhansay@westerncape.gov.za
Website: https://www.hwc.org.za

iLifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

From: John Gribble <john.gribble@aco-associates.com>
Sent: Tuesday, December 22, 2020 12:28 PM
To: Stephanie Barnardt <Stephanie.Barnardt@westerncape.gov.za>; Waseefa Dhansay <Waseefa.Dhansay@westerncape.gov.za>
Cc: Giles Churchill <giles.churchill@acerafrica.co.za>; Carina Boonzaaier <carina.boonzaaier@acerafrica.co.za>
Subject: 2AFRICA Submarine Cable landfills at Duynefontein and Yzerfontein: Requirement for NIDs?
Importance: High

Dear Stephanie and Waseefa

I'm doing impact assessments for two submarine telecoms (fibre) cables that will be landed on the west coast - one at Duynefontein and the other at Yzerfontein.

SAHRA has requested HIA's for the offshore component (i.e. below the high water mark) of each cable route and these are underway.

I need to check with you both about the whether NIDs for the terrestrial portions of both cables will be required.

At Duynefontein the cable will land at the existing ACE Cable landing point where a number of other cable systems already come ashore (SAT2, SAT3, ACE and the future Equiano cable system), and at Yzerfontein landfall will be at the existing submarine cable WACS landing point, where again a number of existing cable make landfall.

In both instances once they have crossed the beach and high/low water boundary the cables will be routed to existing Beach Manholes (BMH) and from there each will routed in an existing buried cable sleeves to their respective Cable Landing Stations (CLS) which are the control centres for the cable systems and where they connect to the domestic telecoms network. No disturbance to the terrestrial environment will thus occur between the BMH and CLS in either case.

Where there will be disturbance to the ground between the high water mark and the BMHs, the documentation I have for both projects indicates that the total length of new terrestrial cabling will be approximately 100 m in the case of Yzerfontein and approximately 250 m or 200 m (depending on which BMH option is used) at Duynefontein. In both cases, therefore, less than the 300 m required to trigger a NID.

Could you please confirm for me that a NID application is thus not required for either of these two projects?

I have attached a copy of the BIDs for both projects for your information.

All the best

John

APPENDIX 2: RECORDED WRECKS AND SHIPPING CASUALTIES WITHIN & PROXIMATE TO THE MARITIME ARCHAEOLOGICAL STUDY AREA

Ship Name	Area	Place	Latitude (estimated)*	Longitude (estimated)*	Event Type	Vessel Category	Type	Date Wreck
Cabo de Eizagurre	Robben Island	North-west of	-33,7666	17,9833	Mined - sank	Steel steamship	Freighter	1917/05/26
Gamtoos	Robben Island (off)	21km 262 degrees of Robben Island	-33,83297	18,1341	Scuttled	Steel Steamship	Coaster	1976/06/10
"Haerlem"	Cape Peninsula	West of	-34,0031556	18,0075	Unknown	Unknown	Unknown	Unknown
L'Lucie	Table Bay	Losperds Bay (Blaauwberg)	-33,7232	18,4413	Wrecked	Wooden sailing Vessel	Unknown	1808/10/11
Lancastria	Table Bay	Matroos Point	-33,6344	18,3925	Wrecked	Wooden Sailing Vessel	Barque	1880/12/31
Oklahoman	Robben Island	2.4 miles north west of	-33.76	18.331	Foundered	Steel Steamship	Freighter	1942/07/07
Stanley D	Table Bay	Melkbosstrand	-33,745	18,4385	Wrecked	Wooden Motor Vessel	Fishing vessel	1976/07/06
TS McEwan	Robben Island	9.7km west of	-33,804643	18,28247	Scuttled	Steamship	Tug	1977/06/10
Unknown non dangerous wreck	Robben Island	West of in approximately 180m of water	-33.855	17.9223	Unknown	Unknown	Unknown	Unknown

* **PLEASE NOTE**: The shipwreck positions provided above are estimated positions based on descriptions of loss in the historical record. With the possible exception of "Haerlem" and the Unknown non dangerous wreck, confidence in the accuracy of these positions is thus very low and it is unlikely that the vessels concerned will be found at the given co-ordinates.

APPENDIX 3: RECORDED WRECKS AND SHIPPING CASUALTIES IN THE EEZ AND CONTINENTAL SHELF

Ship Name	Area	Place	Latitude (estimated)*	Longitude (estimated)*	Event Type	Vessel Category	Type	Date Wreck
Aelybryn	EEZ	East of Richards Bay	-29,1333	34,0833	Torpedoed	Steel Steamship	Merchant	1943/03/11
Douglas H	EEZ	64 km west of Cape Town	-33,908845	17,735607	Foundered	Wooden Motor Vessel	Fishing vessel	1994/12/10
Chickasaw City	EEZ	135km, 274 degrees off Cape Point	-34.25	17.1833	Torpedoed	Steel motor vessel	Merchant	1942/10/07
City of Johannesburg	EEZ	100 km east of East London	-33,3333	29,5	Torpedoed	Steel Steamship	Merchant	1942/10/23
Empire Chaucer	Continental Shelf	434km 180.4 degrees of Cape Agulhas	-38,2	20,0666	Torpedoed	Steel Steamship	Merchant	1942/10/17
Firethorn	EEZ	96 km 265 degrees of Slangkop Point	-34,215846	17,279278	Torpedoed	Steel Steamship	Merchant	1942/10/07
Llanashe	EEZ	South of East London	-34	28,5	Torpedoed	Steel Steamship	Merchant	1943/02/17
Pantelis	EEZ	84km 274 degrees of Slangkop Point	-34,089232	17,408738	Torpedoed	Steel Steamship	Merchant	1942/10/08
Tabor	EEZ	166.5 degrees 413km of Cape St Blaize	-37,798728	23,264303	Torpedoed	Steel Steamship	Merchant	1943/03/19

* **PLEASE NOTE**: The shipwreck positions provided above are estimated positions based on descriptions of loss in the historical record. Confidence in the accuracy of these positions is thus very low and it is unlikely that the vessels concerned will be found at the given co-ordinates.

APPENDIX 4: SPECIALIST CV

Name:	John Gribble
Profession:	Archaeologist
Date of Birth:	15 November 1965
Parent Firm:	ACO Associates cc
Position in Firm:	Senior Archaeologist
Years with Firm:	2+
Years of experience:	27
Nationality:	South African
HDI Status:	n/a

Education:

1979-1983	Wynberg Boys' High School (1979-1983)
1986	BA (Archaeology), University of Cape Town
1987	BA (Hons) (Archaeology), University of Cape Town
1990	Master of Arts, (Archaeology) University of Cape Town

Employment:

- ACO Associates, Senior Archaeologist and Consultant, September 2017 – present
- South African Heritage Resources Agency, Manager: Maritime and Underwater Cultural Heritage Unit, 2014 – 2017 / Acting Manager: Archaeology, Palaeontology and Meteorites Unit, 2016-2017
- Sea Change Heritage Consultants Limited, Director, 2012 – present
- TUV SUD PMSS (Romsey, United Kingdom), Principal Consultant: Maritime Archaeology, 2011-2012
- EMU Limited (Southampton, United Kingdom), Principal Consultant: Maritime Archaeology, 2009-2011
- Wessex Archaeology (Salisbury, United Kingdom), Project Manager: Coastal and Marine, 2005-2009
- National Monuments Council / South African Heritage Resources Agency, Maritime Archaeologist, 1996-2005
- National Monuments Council, Professional Officer: Boland and West Coast, Western Cape Office, 1994-1996

Professional Qualifications and Accreditation:

- Member: Association of Southern African Professional Archaeologists (No. 043)

- Principal Investigator: Maritime and Colonial Archaeology, ASAPA CRM Section
- Field Director: Stone Age Archaeology, ASAPA CRM Section
- Member: Chartered Institute for Archaeologists (CIfA), United Kingdom
- Class III Diver (Surface Supply), Department of Labour (South Africa) / UK (HSE III)

Experience:
I have nearly 30 years of combined archaeological and heritage management experience. After completing my postgraduate studies, which were focussed on the vernacular architecture of the West Coast, and a period of freelance archaeological work in South Africa and aboard, I joined the National Monuments Council (NMC) (now the South African Heritage Resources Agency (SAHRA)) in 1994. As the Heritage Officer: the Boland I was involved in day to day historical building control and heritage resources management across the region. In 1996 I become the NMC's first full-time maritime archaeologist in which role was responsible for the management and protection of underwater cultural heritage in South Africa under the National Monuments Act, and subsequently under the National Heritage Resources Act.

In 2005 I moved to the UK to join Wessex Archaeology, one of the UK's biggest archaeological consultancies, as a project manager in its Coastal and Marine Section. In 2009 I joined Fugro EMU Limited, a marine geosurvey company based in Southampton to set up their maritime archaeological section. I then spent a year at TUV SUD PMSS, an international renewable energy consultancy based in Romsey, where I again provided maritime archaeological consultancy services to principally the offshore renewable and marine aggregate industries.

In August 2012 I set up Sea Change Heritage Consultants Limited, a maritime archaeological consultancy. Sea Change provides archaeological services to a range of UK maritime sectors, including marine aggregates and offshore renewable energy. It also actively pursues opportunities to raise public awareness and understanding of underwater cultural heritage through educational and research projects and programmes, including some projects being developed in South Africa.

Projects include specialist archaeological consultancy for more than 15 offshore renewable energy projects and more than a dozen offshore aggregate extraction licence areas.

In addition to managing numerous UK development-driven archaeological projects, I have also been involved in important strategic work which developed guidance and best practice for the offshore industry with respect to the marine historic environment. This has included the principal authorship of two historic environment guidance documents for COWRIE and the UK renewable energy sector, and the development of the archaeological elements of the first Regional Environmental Assessments for the UK marine aggregates industry. In 2013-14 I was lead author and project co-ordinator on the

Impact Review for the United Kingdom of the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage. In 2016 I was co-author of a Historic England / Crown Estate / British Marine Aggregate Producers Association funded review of marine historic environment best practice guidance for the UK offshore aggregate industry.

I returned to South African in mid-2014 where I was re-appointed to my earlier post at SAHRA: Manager of the Maritime and Underwater Cultural Heritage Unit. In July 2016 I was also appointed Acting Manager of SAHRA's Archaeology, Palaeontology and Meteorites Unit.

I left SAHRA in September 2017 to join ACO Associates as Senior Archaeologist and Consultant.
I have been a member of the ICOMOS International Committee for Underwater Cultural Heritage since 2000 and have served as a member of its Bureau since 2009. I am currently the secretary of the Committee.

I have been a member of the Association of Southern African Professional Archaeologists for more than twenty years and am accredited by ASAPA's CRM section. I have been a member of the UK's Chartered Institute for Archaeologist's (CIfA) since 2005, and served on the committee of its Maritime Affairs Group between 2008 and 2010. Since 2010 I have been a member of the UK's Joint Nautical Archaeology Policy Committee.

I am currently a member of the Advisory Board of the George Washington University / Iziko Museums of South Africa / South African Heritage Resources Agency / Smithsonian Institution 'Southern African Slave Wrecks Project' and serve on the Heritage Western Cape Archaeology, Palaeontology and Meteorites Committee.

Books and Publications:
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Gribble, J., Parham, D. and Scott-Ireton, D., 2009, Historic Wrecks: Risks or Resources? In *Conservation and Management of Archaeological Sites*, Vol. 11 No. 1, March, 2009, 16–28.

Gribble, J. and Athiros, G., 2008, *Tales of Shipwrecks at the Cape of Storms*, Historical Media, Cape Town.

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APPENDIX 5: IMPACT ASSESSMENT METHODOLOGY

The following conventions have been adopted and applied to this impact assessment:

- Direct impacts are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity. These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.
- Indirect impacts of an activity are indirect or induced changes that may occur because of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place because of the activity.
- Cumulative impacts are those that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over time and can include both direct and indirect impacts.

- Nature – the evaluation of the nature is impact specific. Most negative impacts will remain negative, however, after mitigation, significance should reduce:
    - Positive.
    - Negative.

- Spatial extent – the size of the area that will be affected by the impact:
    - Site specific.
    - Local (limited to the immediate areas around the site; < 2 km from site).
    - Regional (would include a major portion of an area; within 30 km of site).
    - National or International.

- Duration – the timeframe during which the impact will be experienced:
    - Short-term (0-3 years or confined to the period of construction).
    - Medium-term (3-10 years).
    - Long-term (the impact will only cease after the operational life of the activity).
    - Permanent (beyond the anticipated lifetime of the project).

- Intensity – this provides an order of magnitude of whether the intensity (magnitude/size/frequency) of the impact would be negligible, low, medium or high):
    - Negligible (inconsequential or no impact).
    - Low (small alteration of natural systems, patterns or processes).

- Medium (noticeable alteration of natural systems, patterns or processes).
- High (severe alteration of natural systems, patterns or processes).

- Frequency – this provides a description of any repetitive, continuous or time-linked characteristics of the impact:
  - Once off (occurring any time during construction).
  - Intermittent (occurring from time to time, without specific periodicity).
  - Periodic (occurring at more or less regular intervals).
  - Continuous (without interruption).

- Probability – the likelihood of the impact occurring:
  - Improbable (very low likelihood that the impact will occur).
  - Probable (distinct possibility that the impact will occur).
  - Highly probable (most likely that the impact will occur).
  - Definite (the impact will occur).

- Irreplaceability – of resource loss caused by impacts:
  - High irreplaceability of resources (the project will destroy unique resources that cannot be replaced).
  - Moderate irreplaceability of resources (the project will destroy resources, which can be replaced with effort).
  - Low irreplaceability of resources (the project will destroy resources, which are easily replaceable).

- Reversibility – this describes the ability of the impacted environment to return/be returned to its pre-impacted state (in the same or different location):
  - Impacts are non-reversible (impact is permanent).
  - Low reversibility.
  - Moderate reversibility of impacts.
  - High reversibility of impacts (impact is highly reversible at end of project life).

- Significance – the significance of the impact on components of the affected environment (and, where relevant, with respect to potential legal infringement) is described as:
  - Low (the impact will not have a significant influence on the environment and, thus, will not be required to be significantly accommodated in the project design).
  - Medium (the impact will have an adverse effect or influence on the environment, which will require modification of the project design, the implementation of mitigation measures or both).

- High (the impact will have a serious effect on the environment to the extent that, regardless of mitigation measures, it could block the project from proceeding).

- Confidence – the degree of confidence in predictions based on available information and specialist knowledge:
  - Low.
  - Medium.
  - High.