

Annex D3

Maritime Heritage Impact Assessment

A maritime heritage impact assessment was conducted by
ACO Associates cc.

Maritime Heritage Impact Assessment: Block ER236, Proposed Exploration Well Drilling

Report prepared for

ERM Southern Africa (Pty) Ltd

On behalf of

ENI South Africa BV and Sasol Africa Limited

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Executive Summary

ACO Associates cc was appointed by ERM Southern Africa (Pty) Ltd to undertake a desktop maritime heritage impact assessment in respect of a proposed exploration drilling programme by ENI South Africa BV and Sasol Africa Limited in Block ER236 off the coast of KwaZulu-Natal. The proposed exploration drilling in two Areas of Interest within the block is to ascertain whether oil extraction will be viable. The drilling of up to six deep water wells is being considered in water depth ranging from 2,600m to 3,000m.

This maritime heritage assessment report, supported by recommendations for implementable mitigation measures will form part of an Environmental Impact Assessment being undertaken by ERM on behalf of ENI South Africa BV and Sasol Africa Limited.

Findings: In respect of submerged prehistoric archaeological potential, the desktop assessment indicates that water depth in Block ER236 ranges from approximately 300m at its most shallow to more than 3,000m. The maximum global sea level fall during the Quaternary, which opened areas of South Africa's continental shelf to early human occupation, was in the region of 120m. The proposed exploration drilling will take place in water in excess of 1,500m deep and there is thus no likelihood of any submerged prehistoric archaeological sites or material being encountered in either of the two Areas of Interest.

Regarding shipwrecks, most maritime casualties occur on or close to the coast where hazards are more numerous. The substantial distance offshore of the Areas of Interest means that relatively few historical shipwrecks can be expected in these areas. At the same time, however, uncertainty about the resource also increases with distance from the coast and the positional accuracy of reports of shipping losses far from the coast is generally much lower than for those close inshore.

The desktop review indicates that no recorded shipwrecks are located within the two Areas of Interest. Seven wrecks, of which five are World War II U-boat casualties, are recorded as having been lost within the area covered by Block ER236, however. The bulk of the wrecks discussed in this report are modern (i.e. 20th century) but all are older than 60 years of age and are thus protected by the National Heritage Resources Act. Given their recent date and history, the archaeological significance of the known wrecks in the study area is low. That said, the World War II wrecks, particularly the *Nova Scotia*, can be viewed as war graves and must therefore be treated as sensitive sites.

The reported positions of these losses are approximate and the wreck sites may not be at the given positions on the seabed. There is thus the potential for some of these wrecks to be within particularly the northern Area of Interest, or outside of the study area entirely.

With regard to the potential for encountering a shipwreck – either one of the known wrecks described above or a currently unknown wreck - during the marine-based activities associated with the exploration drilling programme in the two Areas of interest, this is assessed to be extremely unlikely.

Recommendations: No mitigation is required or proposed in respect of submerged prehistoric archaeology as it is extremely unlikely that sites or material are present in the Areas of Interest. Similarly, no mitigation is required or proposed in respect of the known

wrecks identified as being in the study area as their reported positions suggest that they all lie outside the Areas of Interest.

Within the Areas of Interest it is recommended that any pre-drill remote sensing data and/or video collected to ground-truth seabed conditions is archaeologically reviewed to establish whether any shipwrecks are present on the seabed. It is recommended that the archaeologist is consulted before data are collected to ensure that the survey specifications and data outputs are suitable for archaeological review.

Should wreck material be identified at or near the location of a proposed drill site, micro-siting of the well location and the possible implementation of a drilling activity exclusion zone around the archaeological feature should be sufficient to mitigate the risks to the site.

Should any wreck material that was not identified by the measures set out above be encountered during the exploration drilling process, work must cease until the project archaeologist and SAHRA have been notified, the significance of the material has been assessed and a decision has been taken as to how to deal with it.

If the mitigation measures proposed above are implemented the proposed exploration drilling in the two Areas of Interest in Block ER236 is unlikely to have any impact on known or unknown maritime and underwater cultural heritage resources and is considered archaeologically acceptable.

Details of the Heritage Practitioner

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1 Introduction

ACO Associates cc was appointed by ERM Southern Africa (Pty) Ltd to undertake a desktop maritime heritage impact assessment in respect of a proposed exploration drilling programme in Block ER236 off the coast of KwaZulu-Natal (KZN) by ENI South Africa BV and Sasol Africa Limited.

ENI South Africa BV and Sasol Africa Limited hold an Exploration Right (12/3/236) for Block ER236 and the proposed exploration drilling programme in two areas of interest within Block ER236 is to ascertain whether oil extraction will be viable.

The drilling of up to six deep water wells is being considered: four within a northern area of interest and two within a southern area of interest (see Figure 1). The wells will be drilled in water depth ranging from 2,600m to 3,000m and the drilling will be undertaken by a dynamically positioned deep water drillship.

This maritime heritage assessment report, supported by recommendations for implementable mitigation measures will form part of an Environmental Impact Assessment being undertaken by ERM on behalf of ENI South Africa BV and Sasol Africa Limited.

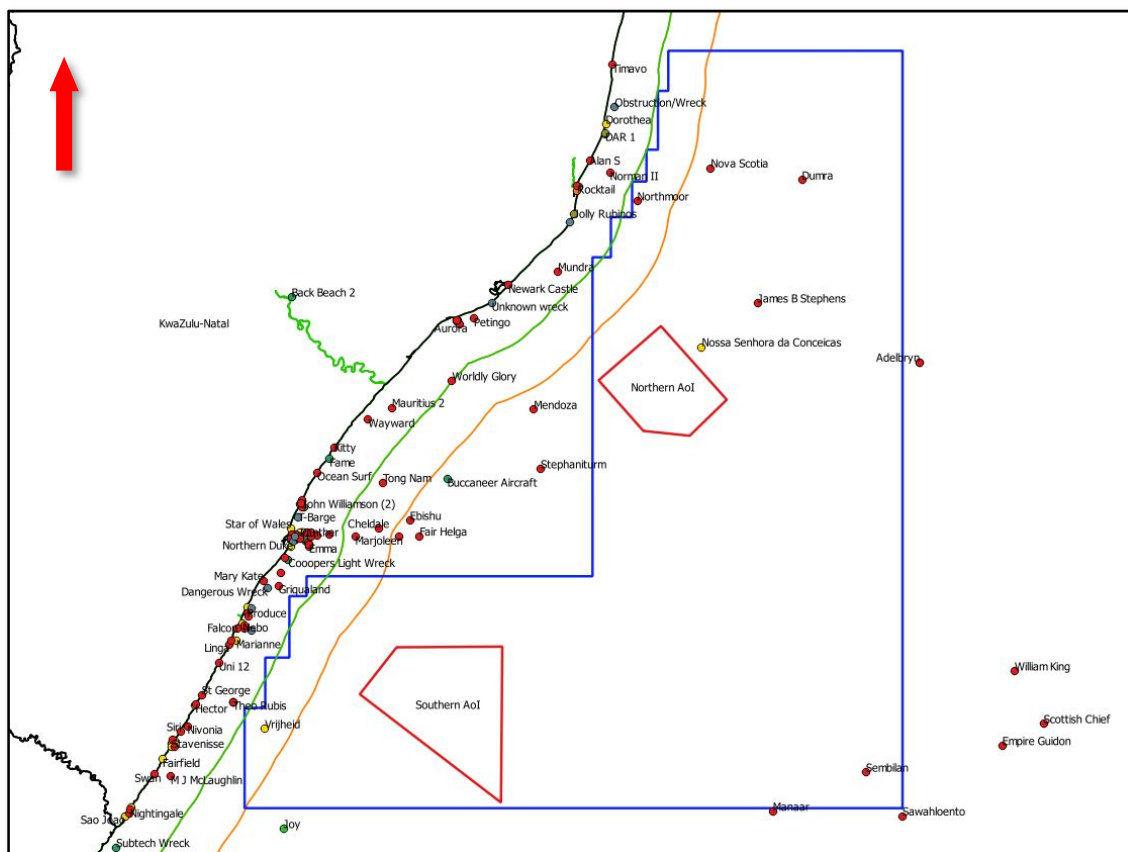


Figure 1: Block ER236 (blue) with the northern and southern Areas of Interest (red). The limit of South African territorial waters and the maritime cultural zone are shown in green and orange respectively. The positions of the seven wrecks discussed in the report below are shown within the study area defined by the limits of Block ER236.

2 Terms of Reference

ACO Associates was appointed to conduct a desktop maritime heritage impact assessment, supported by implementable mitigation measures for Block ER236, focussed particularly on the two proposed drilling Areas of Interest.

3 Legislation

The proposed exploration well drilling includes activities listed in the Environmental Impact Assessment (EIA) Regulations, 2014 (as amended by Government Notice No. 40772 of 7 April 2017), promulgated in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA). The proposed activities therefore require an Environmental Impact Assessment and Environmental Authorization under NEMA.

The South African Heritage Resources Agency (SAHRA) was notified of the proposed exploration drilling and sent a copy of the scoping report. In its response to Eni South Africa BV, dated 12 February 2018, SAHRA noted that the Scoping Report contained no mention of maritime and underwater cultural heritage and requested a Heritage Impact Assessment (HIA), as per sections 38(3) and 38(8) of the National Heritage Resources Act (Act 25 of 1999) (NHRA). The HIA must include a maritime archaeology component and any other applicable heritage components.

The application of the NHRA extends as far as the outer limit of the maritime cultural zone (i.e. 24 nautical miles or approximately 44.5km seaward of the baseline) of the Republic, as defined in Section 6 of the Maritime Zones Act (Act 15 of 1994). In terms of the Maritime Zones Act, within South Africa's territorial waters "any law in force in the Republic, including the common law, shall apply and within the and maritime cultural zone, subject to any other law, the Republic shall have, in respect of objects of an archaeological or historical nature, ... the same rights and powers as it has in respect of its territorial waters".

The bulk of Block ER236, including the two Areas of Interest within which the exploratory well drilling will take place, lies beyond the maritime cultural zone, within South Africa's Exclusive Economic Zone (EEZ) (see Figure 1, above) and technically the NHRA does not apply.

However, in terms of Section 9 of the Maritime Zones Act, any law in force in the Republic, including the common law, shall also apply on and in respect of an installation. The definition of an installation includes:

- a pipeline, which is used for the transfer of any substance to or from (i) a ship; (ii) a research, exploration or production platform; or (iii) the coast of the Republic;
- any exploration or production platform used in prospecting for or the mining of any substance;
- any exploration or production vessel; and/or
- any vessel or appliance used for the exploration or exploitation of the seabed.

The activities on or related to the platform to be used in the proposed exploratory drilling may thus be subject to the requirements of the NHRA.

Regardless of the applicability of the NHRA, since the proposed exploration drilling is subject to NEMA and an Environmental Impact Assessment process is taking place, ENI South Africa BV and Sasol Africa Limited have chosen to carry out the maritime heritage assessment requested by SAHRA as part of the environmental process.

4 Maritime Assessment Study Area

The study area for this maritime archaeological assessment has been defined as the maximum extents of the northern and southern Areas of Interest, with Block ER236 serving as a buffer (see Figure 1).

5 Method

This desk-based report provides an assessment of the maritime and underwater cultural heritage potential of the study area defined above. Given the distance offshore of Block ER236 and the two Areas of Interest, there is limited maritime casualty or precise shipwreck site information available and this desktop assessment is, of necessity, fairly high level.

The report includes a description of what comprises South Africa's maritime and underwater cultural heritage and a discussion of potential maritime heritage resources within the study area. The report draws information from readily available documentary sources and SAHRA's Maritime and Underwater Cultural Heritage database.

An assessment of the potential impacts of the proposed project on maritime and underwater cultural heritage resources is provided and this is supported by recommendations for measures to mitigate possible impacts arising from the proposed exploration drilling.

5.1 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, and limited primary sources such as geophysical data and other field-based observations and site recordings.

While the numbers of underwater heritage sites diminish as distance offshore increases - most maritime casualties occur on or close to the coast where there are more hazards - so uncertainty about the resource also increases with distance from the coast. The positional accuracy of reports of shipping losses far from the coast is generally much lower than for those close inshore, and in many instances, particularly further back in the past, vessels were lost far offshore without any record.

These gaps in the historical record mean, therefore, that while every effort has been made to ensure the accuracy of the information presented below, the potential does exist for currently unknown and/or unrecorded maritime heritage sites to be encountered in the course of the proposed project.

6 Underwater Cultural Heritage

South Africa has a rich and diverse underwater cultural heritage. Strategically located on the historical trade route between Europe and the East, South Africa's rugged and dangerous

coastline has witnessed more than its fair share of shipwrecks and maritime dramas in the last 500 years. 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 the Middle Stone Age, more than 150,000 years ago. 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 in the vicinity Block ER236 namely submerged prehistoric resources and historical shipwrecks.

6.1 Submerged Prehistory

Global sea levels have fluctuated substantially on at least three occasions during the last 500,000 years. As with modern sea level change, these changes have been the result of increased and decreased polar glaciation tied to global climatic patterns. The dropping of sea levels was 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, Weichselian glaciation, the sea was more than 120m lower than it is today (Van Andel 1989).

The lower sea levels of the Weichselian (c. 115,000 - 11,700 years ago) and earlier Saalian (c. 352,000 - 130,000 years ago) and Mindel (c. 478,000 - 424,000 years ago) glaciations would at times 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. This would have been most pronounced on the wide Agulhas Bank off the southern Cape coast, but would also have occurred along the narrow continental shelves on South Africa's west and east coasts. It is estimated that this exposed continental shelf may have represented a new area of land as much as 80,000km² in extent during the successive glacial maxima (Fisher et al 2010). Figure 2 below gives an indication of the extent of the continental shelf exposure during the second to last glaciation.



Figure 2: Possible extent of the South African continental shelf c. 137,000 years ago during the Saalian glaciation. Approximate location of Kleinzee marked by the red star (Source: Franklin et al, 2105)

The exposed continental shelf was quickly populated by terrestrial flora and fauna, and also by our human ancestors who were dependant on these resources. 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 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 fishing nets in the North Sea between the United Kingdom and the Netherlands throughout the 20th century (Peeters et al 2009; Peeters 2011) and the 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).

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 handaxes from the seabed under the wrecks. The stone tools, which are between 300,000 and 1.4 million years old, were found at a depth of 7-8m below mean sea level and were associated with Pleistocene sediments associated with an ancient submerged and infilled river channel. Their unrolled and unworn condition indicated 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 10m lower than it is today (Werz and Flemming 2001).

Ancient river courses, whose channels are today buried under modern seabed sediment, would have been an important focus for hominin activity in the past and as demonstrated in Table Bay there is the potential for the occurrence of ancient, submerged archaeological material in association with palaeo-river channels.

Where alluvial sediment within these channels has survived post-glacial marine transgressions there is also the potential to recover palaeoenvironmental data which can contribute contextual information to our understanding of the ancient human occupation of South Africa.

6.2 Shipwrecks

On Christmas Day 1497, the coast in the vicinity of what is now Durban was sighted by a small Portuguese fleet under the command of Vasco da Gama and named Terra Natalis in commemoration (Axelson 1973). Da Gama's was the first European maritime incursion into the Indian Ocean and his success in reaching of India four months later laid the foundation for more than 500 years of subsequent European maritime activity in the waters of the south western Indian Ocean.

The Portuguese and other European nations who followed their lead into the Indian Ocean joined a maritime trade network that was thousands of years old and in which east and south east Africa was an important partner. 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.

European maritime activity along the KZN coast was, until the establishment and expansion of colonial settlement in the Cape and Natal colonies, largely transitory in nature, with most maritime traffic transiting these waters, en route elsewhere. There were, nevertheless, from the very start, numerous shipping casualties along the adjacent coast, the earliest recorded

on the KZN coast being the *Sao Joao*, a Portuguese *nau* wrecked at Port Edward in 1552, south of Block ER236 (Axelson 1973; Burger 2003).

As is clear from the available shipwreck records for the KZN coast (see Figure 1), the bulk of these casualties occurred close inshore, with relatively few of the recorded losses occurring in deeper waters, further from the coast. Reasons for this are varied but include the fact that early European shipping, with rudimentary charts and navigational technology, would have hugged the coast. The later presence of a port at Durban would have drawn vessels sailing in deeper waters in towards the coast - during World War I, for example, when Durban became an important port for taking on coal bunkers - where shipping hazards are greater than further offshore (Ingpen 1979).

In the broader study area defined for this assessment, there are records of seven maritime losses (Figure 1). Based on their given positions none of these wrecks are located within either of the two Areas of Interest for exploration drilling, although the level of confidence in the available positions is generally low.

All but two of the wrecks are 20th century losses related to German and Italian U-boat activity in the approaches to the Mozambique Channel during World War II. The remaining two wrecks are sailing vessels which date from the second half of the 19th century.

The details of these known wrecks are as follows:

6.2.1 *Dumra*:

Position: -28.3609 S; 33.5133 E (WGS84)

The *Dumra* was a British motor vessel of 2,304 tons, built in Bristol in 1922 and owned by the British India Steam Navigation Company Limited of London.

At the time of her loss she was en route from Tulear in Madagascar to Durban with a cargo of lorries. At 07h50 hours on 5 June 1943 she was hit by two torpedoes fired by U-198. Her bow was destroyed but she remained afloat until another torpedo hit her ten minutes later, at which point she sank. Twenty-four members of her crew, including her captain and one gunner were lost. The surviving 65 crew members and one gunner landed at St Lucia Bay in KZN (<https://uboat.net/allies/merchants/ship/2946.html>).

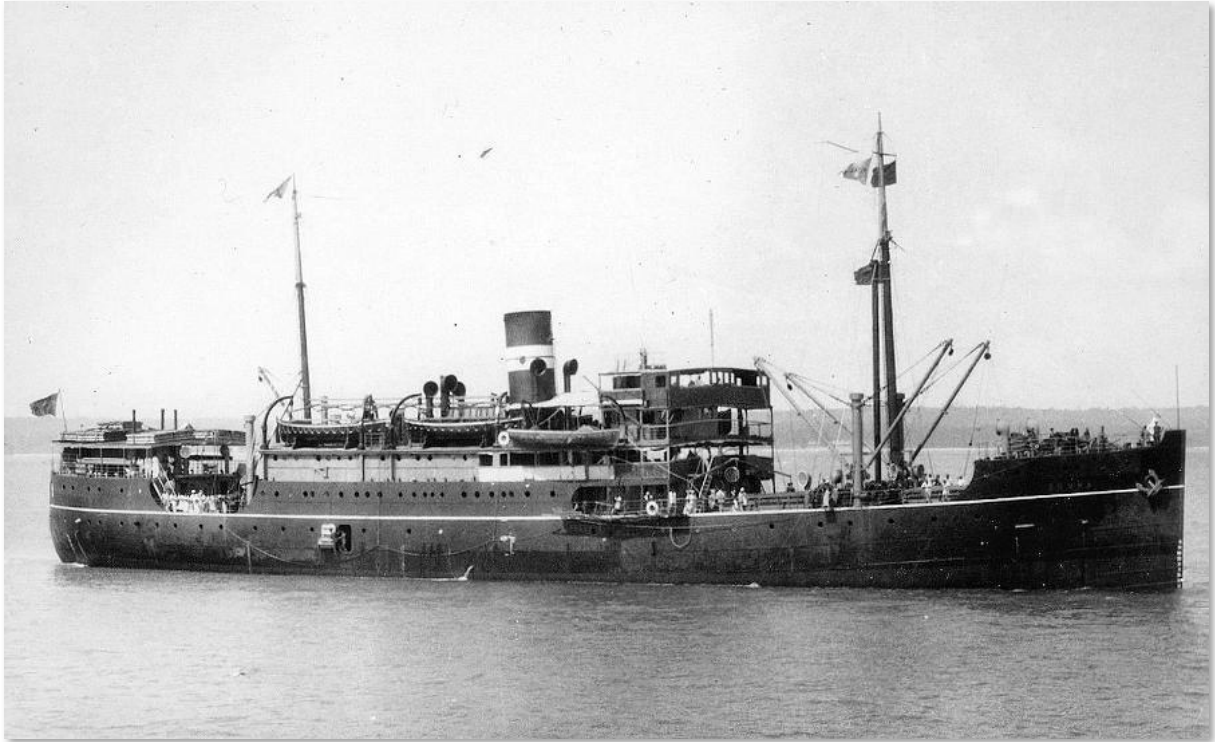


Plate 1: The motor vessel *Dumra* (Source: [http://www.sixtant.net/2011/artigos.php?cat=u-boats-in-action-south-atlantic-*&sub=u-154-u-199*&tag=24\)u-198](http://www.sixtant.net/2011/artigos.php?cat=u-boats-in-action-south-atlantic-*&sub=u-154-u-199*&tag=24)u-198))

6.2.2 *James B Stephens*:

Position: -28.8833 S; 33.3 E (WGS84)

This merchant steamship of 7,176 tons was one of a class of ships produced in large numbers in the United States during World War II and commonly known as Liberty ships.

She was sunk on the evening of 8 March 1943 by U-160, about 150 miles northeast of Durban. A first torpedo struck her port side and the explosion set her fuel oil alight and she started sinking by the bow. Twelve minutes later a second torpedo broke the *James B Stephens* in half but both sections of the wreck stayed afloat, burning fiercely until the following morning. An Allied warship sank the stern section by gunfire and a British warship tried to tow the fore section to Durban, but it sank under tow in heavy seas. All but one of the 63 crew and gunners survived and took to the lifeboats.

One of the boats was spotted from the air three days later and 19 survivors were picked up by the armed trawler HMS *Norwich City* and taken to Durban. A further 30 survivors were picked up by the HMS *Nigeria* (60) on 12 March, and the remaining 13 survivors were subsequently rescued by a South African Air Force crash boat one mile off Durban, after they were spotted by an aircraft (<https://uboat.net/allies/merchants/ship/2734.html>).

Based on the description above of the loss of the *James B Stephens* - the fact that it was afloat and adrift for many hours after the U-boat attack - it is unlikely that the wreck will be at the co-ordinates given, which is the position recorded by the U-boat at the time of the attack.



Plate 2: A photograph, purportedly of the *James B Stephens* sinking after being torpedoed by U-160 (Source: <https://uboat.net/allies/merchants/ship/2734.html>)

6.2.3 *Northmoor*:

Position: -28.45 S; 32.7166 E (WGS84)

The *Northmoor* was a steam cargo vessel of 4,392 tons, built in Sunderland in England in 1928 and owned by Walter Runciman and Company of the Newcastle-upon-Tyne.

She was sunk by U-198 – the same U-boat that was to sink the *Dumra* less than three weeks later – shortly after 14h00 on 17 May 1943.

Sailing as part of a convoy, north of Durban, the *Northmoor* was hit by at least one of four torpedoes fired and sank. Eleven crew members and one gunner were lost. The captain, 20 crew members, four gunners and two passengers were rescued by the armed trawler HMS *St. Loman* and landed at Durban (<https://uboat.net/allies/merchants/ship/2928.html>).



Plate 3: The steamship *Northmoor*, one of two victims of U-198 off the KZN coast (Source http://www.sixtant.net/2011/artigos.php?cat=u-boats-in-action-south-atlantic-*&sub=u-154-u-199*&tag=24)u-198)

6.2.4 *Nossa Senhora da Conceicas*:

Position: -29.069 S; 33.029 E (WGS84)

The *Nossa Senhora da Conceicas* was a Portuguese vessel lost somewhere between Durban and Delagoa Bay (Maputo) on 29 May 1869. No other information about the ship or its loss has been found in the records consulted. The position given for the wreck is thus an estimate, and it may lie in either Area of Interest or may not be in the study area at all. Similarly, no other information about the ship is available, but it is possible, given where she was lost, the date and her nationality that she was a slaver. If so, she was one of more than 300 Portuguese slaving vessels that, according to Harris (1999), carried the name *Nossa Senhora da Conceicas* over the centuries.

6.2.5 *Nova Scotia*:

Position: -28.3094 S; 33.0722 E (WGS84)

The sinking of the *Nova Scotia* by U-177 shortly after 07h00 on 28 November 1942 was the worst shipping loss in South African waters of World War II.

The *Nova Scotia* was a passenger steamship of 6,796 tons, completed in 1926 in Barrow-in-Furness in northern England. In January 1941 she was requisitioned by the Ministry of War Transport for war service as a troopship (<https://uboat.net/allies/merchants/ship/2476.html>).

On her last voyage she was carrying 1052 passengers and crew, including 650 Italian wartime internees and 88 South African guards. She was hit by three torpedoes from U-177 and sank within 10 minutes.

After spending two days in the water where large numbers of men were taken by sharks, 17 crew members, a gunner, three military and naval personnel, one passenger, 42 guards and 130 internees were rescued by a Portuguese frigate, *Alfonso de Albuquerque* out of Maputo. 858 of those aboard the ship lost their lives (Uys 1993).

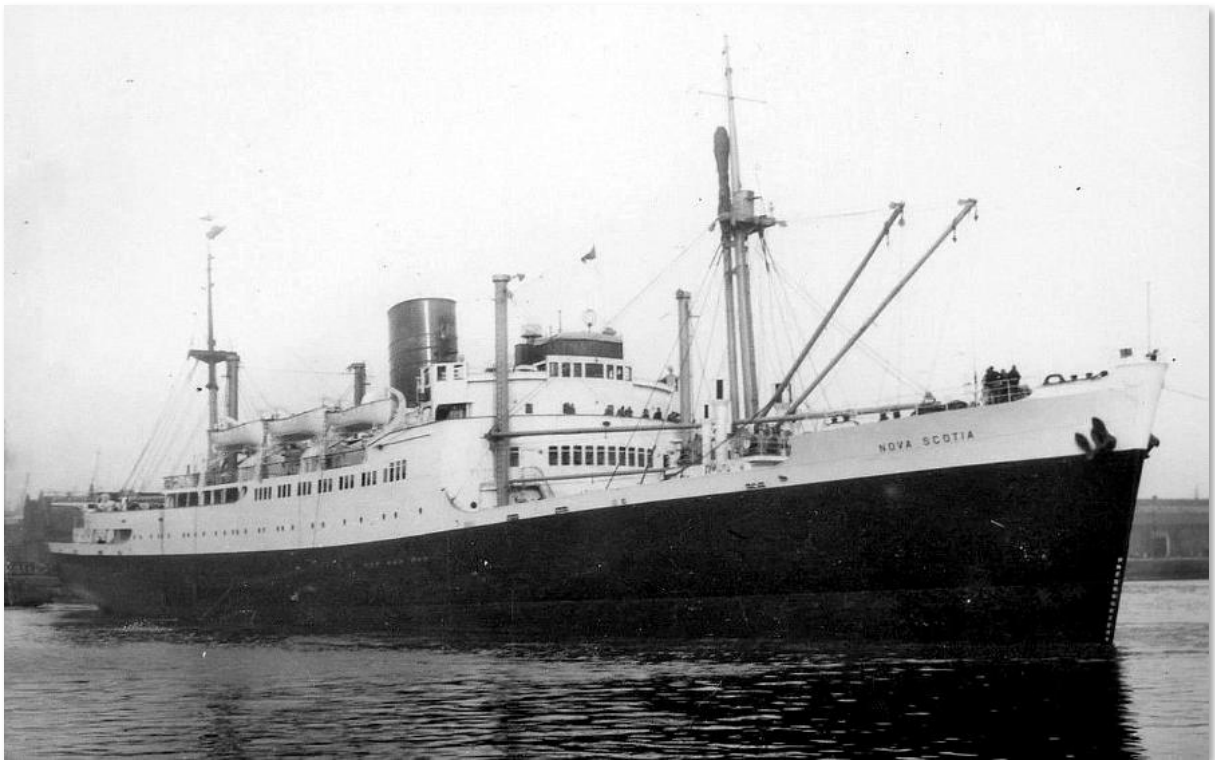


Plate 4: The *Nova Scotia* in pre-war days (Source [http://www.sixtant.net/2011/artigos.php?cat=u-boats-in-action-south-atlantic-*&sub=u-154-u-199*&tag=14\)u-177](http://www.sixtant.net/2011/artigos.php?cat=u-boats-in-action-south-atlantic-*&sub=u-154-u-199*&tag=14)u-177))

6.2.6 *Sembilan*:

Position: -30.8518 S; 33.8233 E (WGS84)

The *Sembilan* was a Dutch steamship of 6,566 tons sunk on 17 April 1943 by the Italian submarine, *Leonardo da Vinci*.

Only one person survived the sinking – a lascar crew member – and 85 others died (<https://samilhistory.com/2017/04/26/the-leonardo-da-vinci-wreaks-havoc-off-south-africas-coastline/>; <http://www.stoomvaartmaatschappijnederland.nl/ss-sembilan-3/>).

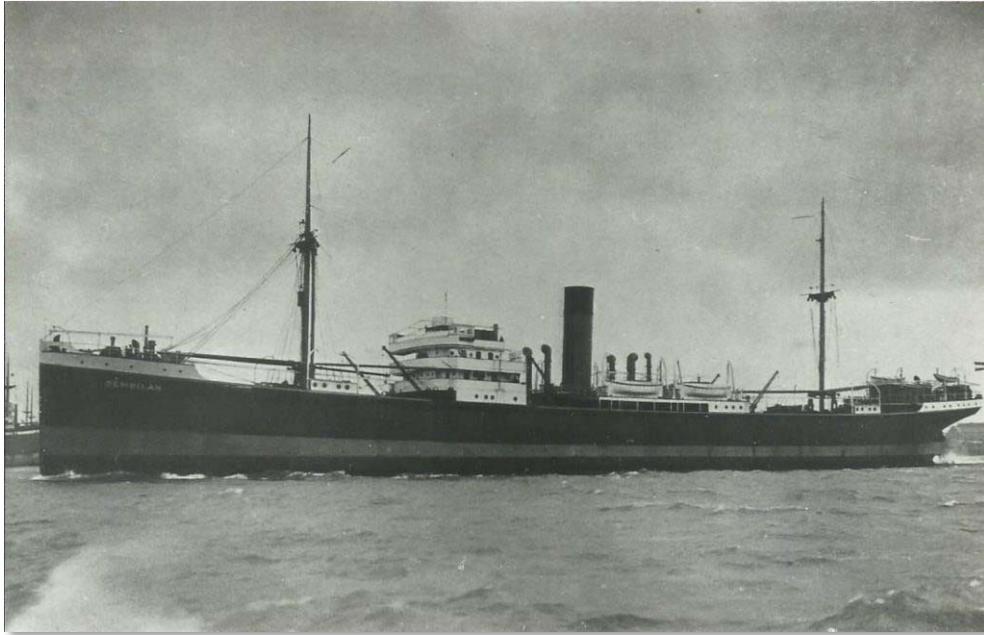


Plate 5: The *Sembilan* (Source <http://www.stoomvaartmaatschappijnederland.nl/ss-sembilan-3/>)

6.2.7 *Vrijheid*:

Position: -30.6711 S; 30.915 E (WGS84)

The *Vrijheid* was a Dutch brig of 232 tons which sank off Port Shepstone on 30 April 1883 after springing a leak. There were no casualties.

6.2.8 *Unknown Shipwrecks in the Study Area*

In its response to the scoping report, SAHRA mentioned the possibility that the wreck of the steamship *Waratah*, which went missing without a trace in 1909, may be in the study area. The last reported sighting of a vessel believed to be the *Waratah* took place in very heavy weather on the evening of 26 July 1909, roughly 180 miles south of Durban. Other reports suggested she sank off the Mbashe River in the former Transkei, and bodies and wreckage possibly associated with the *Waratah* were found as far south as Mossel Bay (Smith 2009). Although there was speculation at the time of her disappearance that the *Waratah* was disabled and afloat, searches of the sea both the north and south of the coast of the former Transkei found no trace of her. It is most likely that the *Waratah* sank in the area she was last seen – in the vicinity of the Mbashe River - although recent geophysical surveys have not located the wreck (Brown, 2016). It is unlikely that the wreck is located within the proposed Areas of Interest for the exploration drilling.

As stated above, however, gaps in South Africa's underwater cultural heritage record mean that the potential does exist for currently unknown or unrecorded wrecks to be present within the study area.

7 Impact Assessment

7.1 Submerged Prehistory

The maximum global sea level fall during the Quaternary (the last approximately 2.5 million years) was in the region of 120m. Although the most westerly edges of Block ER236 lie in relatively shallow water, the entire block and particularly the two Areas of Interest that will be the focus of the exploration drilling are in water that is too deep for the seabed to have been exposed in the recent past by glacially driven fluctuations in world sea levels and thus accessible to our human ancestors.

Water depth in Block ER236 ranges from approximately 300m at its most shallow to more than 3,000m. The two Areas of Interest are located in water in excess of 1,500m and there is thus no likelihood of any submerged prehistoric archaeological sites or material being encountered in the course of exploration drilling in either of these two areas.

The potential impacts of the proposed exploration drilling on submerged prehistoric archaeological resources can be summarised as follows:

Potential impact on submerged prehistoric archaeology	
Nature of impact	Damage to, or destruction of submerged prehistoric archaeological resources
Extent and duration of impact	Localized and short term
Intensity of impact	Potentially high, but water depth in the Areas of Interest means that impacts on submerged prehistoric archaeology are not likely
Probability of occurrence	Improbable
Degree to which impact can be reversed	Irreversible
Irreplaceability of resources	High – submerged prehistoric archaeological resources are non-renewable and cannot be replaced
Cumulative impact prior to mitigation	Extremely Low
Significance of impact pre-mitigation	Extremely Low
Degree of mitigation possible	Extremely Low
Proposed mitigation	None – the water depth in the Areas of Interest means that impacts on submerged prehistoric archaeology are not likely
Cumulative impact post mitigation	Extremely Low
Significance after mitigation	N/A – no mitigation required

7.2 Shipwrecks

There are no known or recorded shipwreck within the two Areas of Interest identified for exploration drilling as part of this project. However, the co-ordinates of the known wrecks within the wider study area are approximate (none having been ground-truthed to remains on the seabed) and these sites may thus not be at the given positions on the seabed. There is thus the potential for some of these wrecks to be within particularly the northern Area of Interest, or outside of the study area entirely.

The bulk of the wrecks discussed in this report are modern (i.e. 20th century) but all are older than 60 years of age and are thus protected by the National Heritage Resources Act. Given their recent date and history, the archaeological significance of the known wrecks in the study area is low.

That being said, the World War II wrecks, and most particularly the *Nova Scotia*, can be viewed as war graves and must therefore be treated as sensitive sites.

With regard to the potential for encountering a shipwreck – either one of the known wrecks described above or a currently unknown wreck - during the marine-based activities associated with the exploration drilling programme in the two Areas of Interest, this is assessed to be extremely unlikely.

The potential impacts of the exploration drilling on historical shipwrecks can be summarised as follows:

Potential impact on historical shipwrecks	
Nature of impact	Damage to, or destruction of historical shipwrecks
Extent and duration of impact	Localized, short term
Intensity of impact	Low
Probability of occurrence	Improbable
Degree to which impact can be reversed	Irreversible
Irreplaceability of resources	High – historical shipwrecks are non-renewable and cannot be replaced
Cumulative impact prior to mitigation	Extremely Low
Significance of impact pre-mitigation	Extremely Low
Degree of mitigation possible	High
Proposed mitigation	Known Wrecks – None, as the available information suggests that there will be no interaction with known historical shipwrecks in the vicinity
	Unknown / Unrecorded Wrecks – Should shipwreck material be encountered at any stage during the exploration drilling project the relevant mitigation measures outlined below must be implemented
Cumulative impact post mitigation	Extremely Low
Significance after mitigation	Low

8 Mitigation

No mitigation is required or proposed in respect of submerged prehistoric archaeology as it is extremely unlikely that sites or material are present in the study area.

No mitigation is required or proposed in respect of the known wrecks identified as being in the study area as their reported positions suggest that they all lie outside the two exploration drilling Areas of Interest.

Within the Areas of Interest it is recommended that any pre-drill remote sensing data collected to ground-truth seabed conditions is archaeologically reviewed to establish whether any shipwrecks are present on the seabed. Datasets that are particularly useful in this regard are magnetometer, side scan sonar and multibeam bathymetric data. It is recommended that the archaeologist is consulted before data are collected to ensure that the survey specifications and data outputs are suitable for archaeological review.

Any video footage collected in the vicinity of proposed well locations should ideally also be reviewed for evidence of shipwreck material on the seabed.

Should reviews of data identify wreck material at or near the location of a proposed drill site, micro-siting of the well location and the possible implementation of a drilling activity

exclusion zone around the archaeological feature should be sufficient to mitigate the risks to the site.

Should any shipwreck material that was not identified by the measures set out above be encountered during the exploration drilling process, work must cease until the project archaeologist and SAHRA have been notified, the significance of the material has been assessed and a decision has been taken as to how to deal with it.

9 Conclusion

The proposed exploration drilling in the two Areas of Interest in Block ER236 is unlikely to have any impact on known or unknown maritime and underwater cultural heritage resources and is considered archaeologically acceptable.

The impact of the project on any maritime archaeological material encountered during the process can be mitigated through the implementation of the measures proposed in this report.

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10.1 Online Resources

<https://samilhistory.com/2017/04/26/the-leonardo-da-vinci-wreaks-havoc-off-south-africas-coastline/>

<http://www.sixtant.net/>

<http://www.stoomvaartmaatschappijnederland.nl/ss-sembilan-3/>

<https://uboat.net/allies/merchants/ship/>

Appendix A: Specialist's 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: <1
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 Archaeologists (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:

Gribble, J. and Scott, G., 2017, *We Die Like Brothers: The sinking of the SS Mendi*, Historic England, Swindon

Lloyd Jones, D., Langman, R., Reach, I., Gribble, J., and Griffiths, N., 2016, Using Multibeam and Sidescan Sonar to Monitor Aggregate Dredging, in C.W. Finkl and C. Makowski (eds) *Seafloor Mapping along Continental Shelves: Research and Techniques for Visualizing Benthic Environments*, Coastal Research Library 13, Springer International Publishing, Switzerland, pp 245-259.

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Appendix B: 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;
- 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 24(F) of the Act.



Signature of the specialist

ACO Associates cc

Name of company (if applicable):

10 May 2018

Date