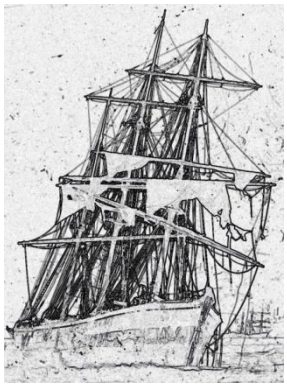
PETROSA – PROPOSED BYPASS PIPELINES AND REPOSITIONING OF SINGLE-POINT MOORING (SPM) BUOY
MOSSEL BAY,
SOUTH AFRICA

UNDERWATER HERITAGE IMPACT ASSESSMENT



PETROSA - PROPOSED BYPASS PIPELINES AND REPOSITIONING OF SINGLE-POINT MOORING (SPM) BUOY, MOSSEL BAY, SOUTH AFRICA: UNDERWATER HERITAGE IMPACT ASSESSMENT

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Declaration:
I, Vanessa Maitland, declare that I have no financial or personal interest in the proposed development, nor its developers or any of their subsidiaries, apart from the provision of heritage assessment and management services.

Vanessa Maitland
Maritime Archaeologist
26-10-2022

EXECUTIVE SUMMARY

The project entails repairs and modifications to the existing Single Point Mooring System (SPM) infrastructure. Portions of the pipelines have become corroded and PetroSA proposes to install two new ~1.4 km long bypass steel pipelines (12” and 14”), connected to the existing SPM infrastructure, to bypass the corroded section. The new bypass pipelines will be installed on the seabed, parallel to and 15 m from the existing SPM pipeline operating bundle. The new dual pipelines will terminate in a new Pipeline End Manifold (PLEM) seabed structure to be tied into the existing SPM buoy (to be repositioned to align with the new PLEM) and the existing operating bundle (the project).

The construction of the pipelines, in the early 1990s by Mossgas, was prior to the National Heritage Resources Act (NHRA) (No. 25 of 1999) and there is the potential for destroying or damaging Maritime and Underwater Cultural Heritage (MUCH) sites. As part of the Heritage Impact Assessment (HIA), an Underwater Heritage Impact Assessment (UHIA) needed to be undertaken to identify sensitive cultural heritage sites in the affected environment. This report has been prepared in terms of Section 38 of the NHRA and forms part of the Environmental Impact Assessment (EIA).

The aim of the Desktop Survey was to attempt to locate, identify, evaluate and document potential underwater and cultural heritage sites within the designated area, provide an assessment of possible impacts on cultural heritage and recommend management measures for the area.

SPECIALIST REPORT REQUIREMENTS AS PER EIA REGULATIONS 2014 (AS AMENDED)

Table 1 outlines the requirements of the Specialist Reports as per the NEMA EIA Regulations, 2014 (as amended). According to Appendix 6 (1) "A specialist report prepared in terms of these Regulations must contain …" the information outlined in Table 1 below.

TABLE 1: PRESCRIBED CONTENTS OF THE SPECIALIST REPORTS (APPENDIX 6 OF THE EIA REGULATIONS, 2014) (AS AMENDED)

Relevant section in GNR. 982	Requirement description	Relevant section in this report
(a)details of—	(i) the specialist who prepared the report; and	Page 2
	(ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Appendix III
(b)	a declaration that the specialist is independent in a form as may be specified by the competent authority;	Appendix IV
(c)	an indication of the scope of, and the purpose for which, the report was prepared;	Section 2
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 5 Section 7
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 7
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Not Applicable
(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
(f)	details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives.	Section 7.4
(g)	an identification of any areas to be avoided, including buffers;	Section 7.4
(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;	Section 7.4
(i)	a description of any assumptions made and any uncertainties or gaps in knowledge. Note: Uncertainties should be qualified within the report – there will always be uncertainties due to ?? and gaps in knowledge should also be qualified – a gap is to record that not all knowledge can be obtained for a study.	Section 5.2.2 Section 7
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 7 Section 9
(k)	any mitigation measures for inclusion in the EMPr; Note: We need to include whether these mitigation measures (excluding ongoing monitoring) can be practically implemented prior to commencement or not.	Section 8.3 Section 11
(l)	any conditions for inclusion in the environmental authorisation;	Section 11
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 11
(n) a reasoned opinion—	(i)whether the proposed activity, activities or portions thereof should be authorised;	Section 10
	(iA) regarding the acceptability of the proposed activity or activities; and	Section 10

	(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, and where applicable, the closure plan. Note: We need to include whether these mitigation measures (excluding ongoing monitoring) can be practically implemented prior to commencement or not.	Section 8.3 Section 11
(o)	a description of any consultation process that was undertaken during the course of preparing the specialist report;	Not applicable
(p)	a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	Not applicable
(q)	any other information requested by the competent authority.	Not applicable
(2)	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.	Not applicable

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GLOSSARY OF ACRONYMS AND ABBREVIATIONS

ASAPA	Association of Southern African Professional Archaeologists
ECO	environmental Control Officer
EIA	Environmental Impact Assessment
GTL	Gas to Liquid
HIA	Heritage Impact Assessment
MUCH	Maritime and Underwater Cultural Heritage (Includes underwater and land maritime heritage)
NHRA	National Heritage Resources Act (No. 25 of 1999)
SPM	Single Point Mooring
UHIA	Underwater Heritage Impact Assessment

1. INTRODUCTION

The Single Point Mooring System (SPM) infrastructure as part of the larger Mossel Bay Gas to Liquid (GTL) Refinery project was initiated in 1987. The portions of the pipelines have become corroded and PetroSA proposes to install two new ~1.4 km long bypass steel pipelines (12" and 14"), connected to the existing SPM infrastructure, to bypass the corroded sections. The new bypass pipelines will be installed on the seabed, parallel to and 15 m from the existing Single Point Mooring (SPM) pipeline operating bundle. The new dual pipelines will terminate in a new Pipeline End Manifold (PLEM) seabed structure to be tied into the existing SPM buoy (to be repositioned to align with the new PLEM) and the existing operating bundle (the project) (Consub 2020).

The construction of the pipelines, in the early 1990s by Mossgas, was prior to the National Heritage Resources Act (NHRA) (No. 25 of 1999) and there is the potential for destroying or damaging Maritime and Underwater Cultural Heritage (MUCH) sites. This report has been prepared in terms of Section 38 of the NHRA and is a desktop survey of shipwrecks and other MUCH. It covers the Mossel Bay marine area. It provides an assessment of possible impacts on cultural heritage and concludes with recommended management measures for the area.

2. TERMS OF REFERENCE

The aim of this desktop survey is to determine if there are any known MUCH resources within the defined area.

The Scope of Work consisted of the following:

- Conduct a desktop baseline assessment to identify (map) underwater maritime heritage sensitivities (known and/or suspected wrecks in the area (Figure **3**) as well as the potential for terrestrial maritime heritage sensitivities, through study of available written and oral resources;
- Identify potential maritime heritage impacts of the project and recommend mitigation measures to avoid and / or minimise impacts and/or optimise benefits associated with the proposed project; and
- Compile an Underwater Heritage Impact Assessment incorporating the above.

3. PROJECT DESCRIPTION

This project is the repair / modification of the existing SPM pipeline infrastructure from the PetroSA Tank Farm (Figure 1; Figure 2) by installing two new ~1.4 km long bypass steel pipelines (12" and 14"), connected to the existing SPM infrastructure, to bypass the corroded section. The new pipes will be fabricated and assembled at the Onshore Fabrication Yard within the PetroSA Tank Farm – 400 m to the north of the existing pipeline. Thereafter it will be towed to the installation route. The pipelines are towed using buoyancy tanks and ballast weights to ensure the pipes are kept off the seabed. They are then parked while awaiting a suitable weather window for installation (Figure 2: A1-A2). The new pipeline section will be installed parallel to and 15 m away from the corroded section (Figure 2: A3-L3). The bypass pipeline will be jetted below the seabed and allowed to backfill naturally (CONSUB Doc. No: C-0022-PLE-PHI-001). Several hydrographic surveys will be undertaken during the execution of the work.

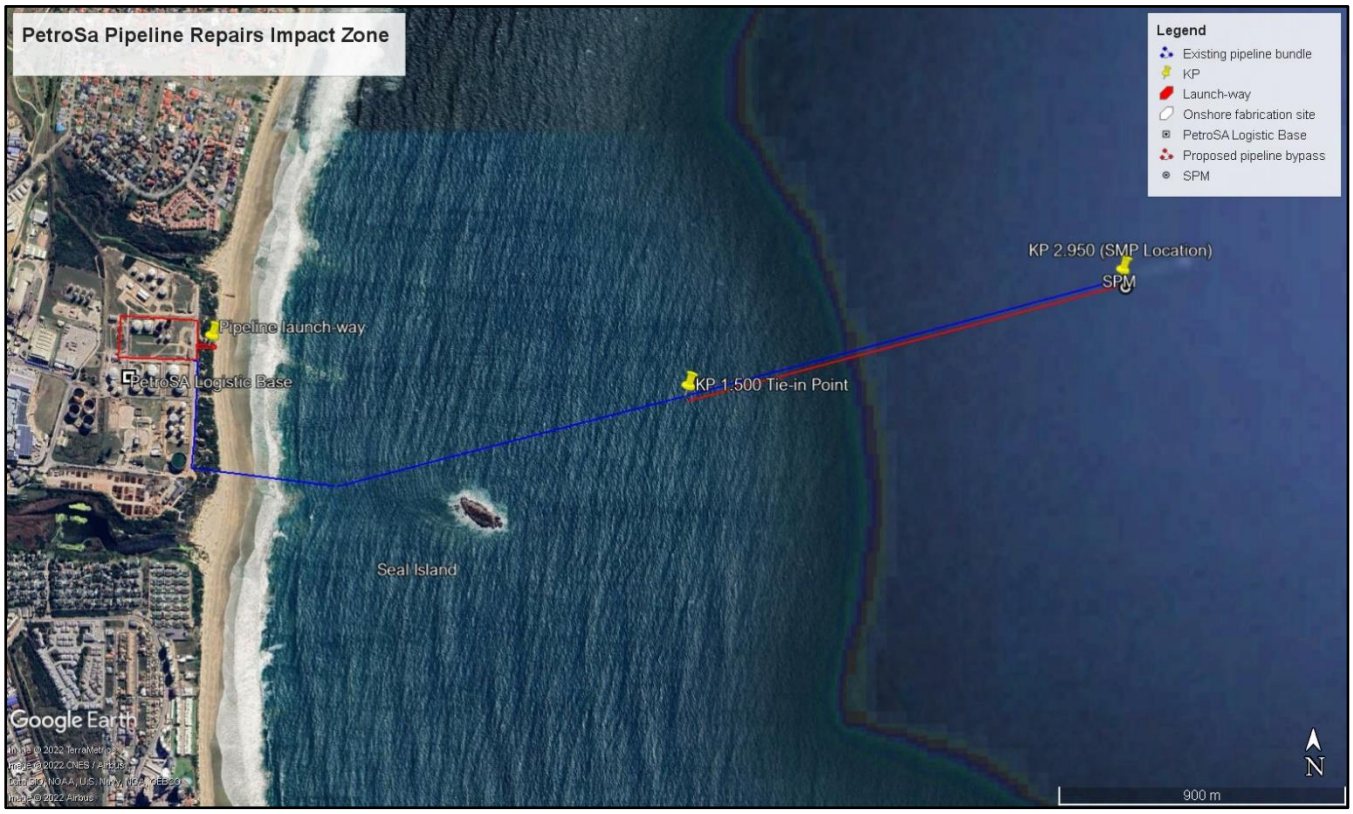


Figure 1: PetroSA existing pipeline (blue) and proposed bypass pipelines (red)

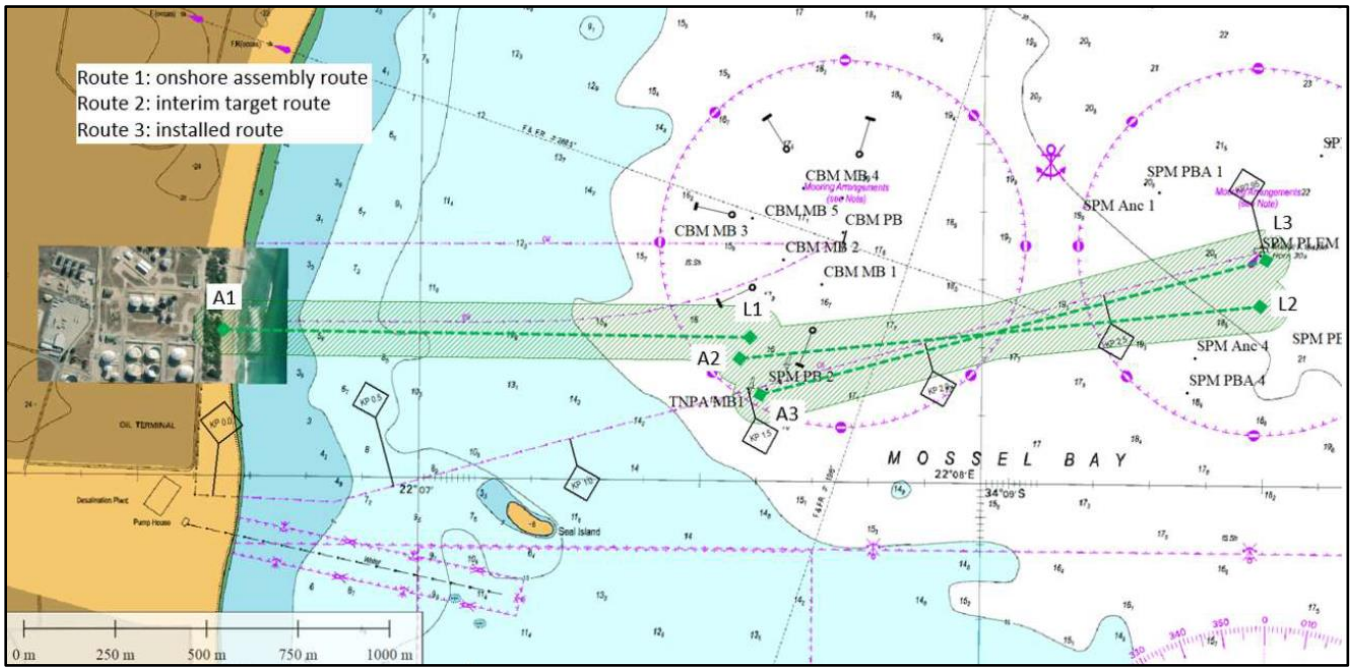


Figure 2: PetroSA pipeline tow corridor relative to onshore fabrication yard and target installation corridor (CONSUB Doc. No: C-0022-PLE-PHI-001:9)

4. HERITAGE RESOURCES

4.1. THE LEGISLATION

According to Section 32 (1) of the NHRA (No. 25 of 1999), heritage objects consist of:
"*An object or collection of objects, or a type of object or list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including— (a) objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects, meteorites and rare geological specimens.*"

The Act further stipulates that the term "archaeological" includes:
"*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, as 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 35 of the Act states:
"(*1) Subject to the provisions of Section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.*
(2) Subject to the provisions of Subsection (8)(a), all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.
(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.
(4) No person may, without a permit issued by the responsible heritage resources authority—
(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite;
(b) destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite;"
(c) trade in, sell for private gain, export or attempt to export from the Republic any category of archaeological or palaeontological material or object, or any meteorite; or
(d) bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites."

Furthermore Section 38 of the Act states:
"(1) Subject to the provisions of Subsections (7), (8) and (9), any person who intends to undertake a development categorised as—
(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
(b) the construction of a bridge or similar structure exceeding 50 m in length;
(c) any development or other activity which will change the character of a site—
(i) exceeding 5 000 m^2 in extent; or
(ii) involving three or more existing erven or subdivisions thereof; or
(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

(2) The responsible heritage resources authority must, within 14 days of receipt of a notification in terms of Subsection (1)—

(a) if there is reason to believe that heritage resources will be affected by such development, notify the person who intends to undertake the development to submit an impact assessment report. Such report must be compiled at the cost of the person proposing the development, by a person or persons approved by the responsible heritage resources authority with relevant qualifications and experience and professional standing in heritage resources management; or

(b) notify the person concerned that this section does not apply.

(3) The responsible heritage resources authority must specify the information to be provided in a report required in terms of Subsection (2)(a): provided that the following must be included:

(a) The identification and mapping of all heritage resources in the area affected;

(b) an assessment of the significance of such resources in terms of the heritage assessment criteria set out in Section 6(2) or prescribed under Section 7;

(c) an assessment of the impact of the development on such heritage resources;

(d) an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

(e) the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;

(f) if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and

(g) plans for mitigation of any adverse effects during and after the completion of the proposed development.

(4) The report must be considered timeously by the responsible heritage resources authority which must, after consultation with the person proposing the development, decide—

(a) whether or not the development may proceed;

(b) any limitations or conditions to be applied to the development;

(c) what general protections in terms of this Act apply, and what formal protections may be applied, to such heritage resources;

(d) whether compensatory action is required in respect of any heritage resources damaged or destroyed as a result of the development; and

(e) whether the appointment of specialists is required as a condition of approval of the proposal.

(5) A provincial heritage resources authority shall not make any decision under Subsection (4) with respect to any development which impacts on a heritage resource protected at national level unless it has consulted SAHRA.

(6) The applicant may appeal against the decision of the provincial heritage resources authority to the MEC, who—

(a) must consider the views of both parties; and

(b) may at his or her discretion—

(i) appoint a committee to undertake an independent review of the impact assessment report and the decision of the responsible heritage authority; and

(ii) consult SAHRA; and

(c) must uphold, amend or overturn such decision.

(7) The provisions of this section do not apply to a development described in Subsection (1) affecting any heritage resource formally protected by SAHRA unless the authority concerned decides otherwise.

(8) The provisions of this section do not apply to a development as described in Subsection (1) if an evaluation of the impact of such development on heritage resources is required in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989), or the integrated environmental management guidelines issued by the Department of Environment Affairs and Tourism, or the Minerals Act, 1991 (Act No. 50 of 1991), or any other legislation: Provided that the consenting authority must ensure that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of Subsection (3), and any comments and recommendations of the relevant heritage resources authority with regard to such development have been taken into account prior to the granting of the consent.

(9) The provincial heritage resources authority, with the approval of the MEC, may, by notice in the Provincial Gazette, exempt from the requirements of this section any place specified in the notice.
(10) Any person who has complied with the decision of a provincial heritage resources authority in Subsection (4) or of the MEC in terms of Subsection (6) or other requirements referred to in Subsection (8), must be exempted from compliance with all other protections in terms of this Part, but any existing heritage agreements made in terms of Section 42 must continue to apply."

4.2. Conclusion – The legislation in terms of the project

There is extensive national legislation covering cultural and natural heritage sites. Within the scope of this project a HIA needed to be undertaken in terms of Section 38 of the NHRA (No. 25 of 1999). This desktop study covers the underwater environment from a heritage perspective.

5. Study Approach and Methodology

5.1. Extent of the Assessment

This desktop survey is concerned with MUCH resources and covers the area as described in Section 6. However, shipwrecks are a difficult cultural resource to pin to a specific area, and therefore this UHIA covers a broader area.

5.2. Methodology

5.2.1. Desktop Survey

A shipwreck database was compiled from the available written (published and unpublished) and oral sources and is presented in Section 7.

5.2.2. Limitations of the Shipwreck Database

- The database is a research tool that is constantly evolving as information is uncovered and added.
- The solitary nature of many wrecks means that information may be scarce and/or inaccurate. Therefore, without definitive information, shipwrecks are allocated to an area, based on limited information and certain assumptions regarding the dynamic nature of the environment.
- Shipwrecks that may initially be considered outside of the area, may drift many miles on the surface or just under the water surface after being abandoned. Therefore, these shipwrecks are also included in the desktop survey.

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

6.1. SITE LOCATION

The PetroSA Tank Farm is north of the Port of Mossel Bay, between two estuaries, Tweekuilen on the north and Gericke on the south (Cape Farm Mapper 2020). To the east is Seal Island.

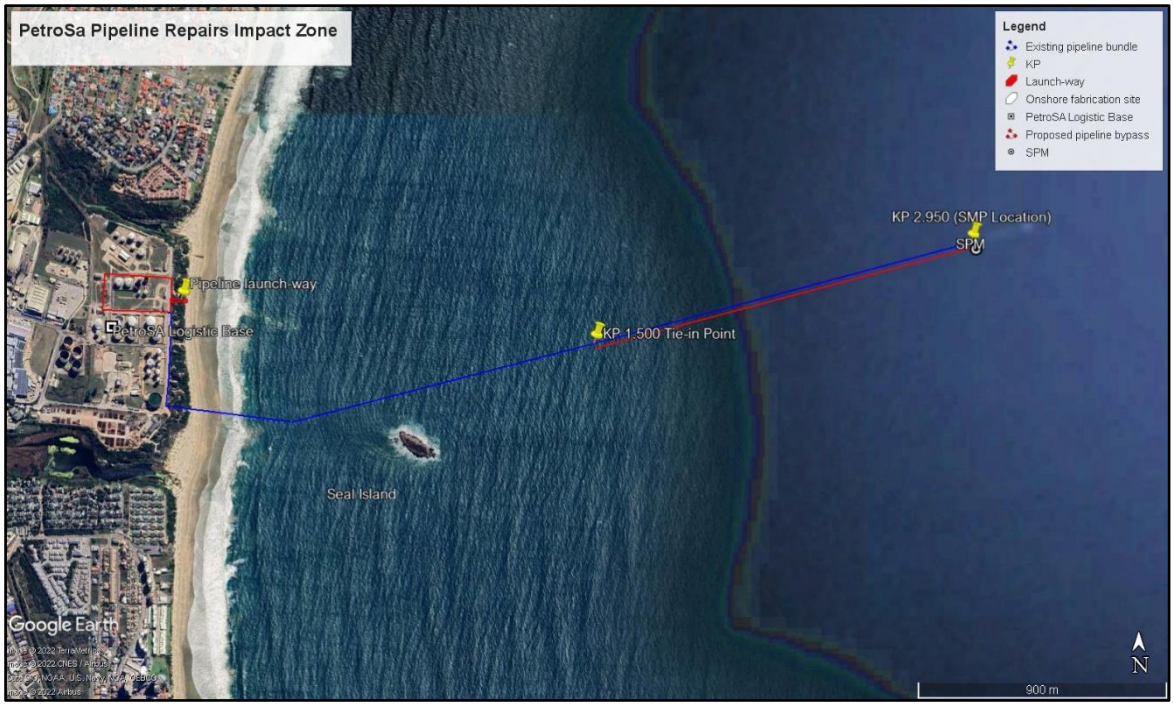


Figure 3: Location map of the PetroSA pipeline route (Google Earth 2022)

6.2. SITE DESCRIPTION - BATHYMETRY AND SEAFLOOR COMPOSITION

The bathymetry of the proposed pipeline route starts at about -3 m and increases to about -19 m (Figure 4). Mossel Bay is situated on the Eastern Agulhas Bank where the continental shelf is very wide. This protects the inshore area from the Agulhas current. Alluvial sands are carried east by the longshore drift and get trapped on the east side of the bays. The Seal Island area has a sandy bottom with some sandstone outcrops nearer the shore (Cawthra 2014).

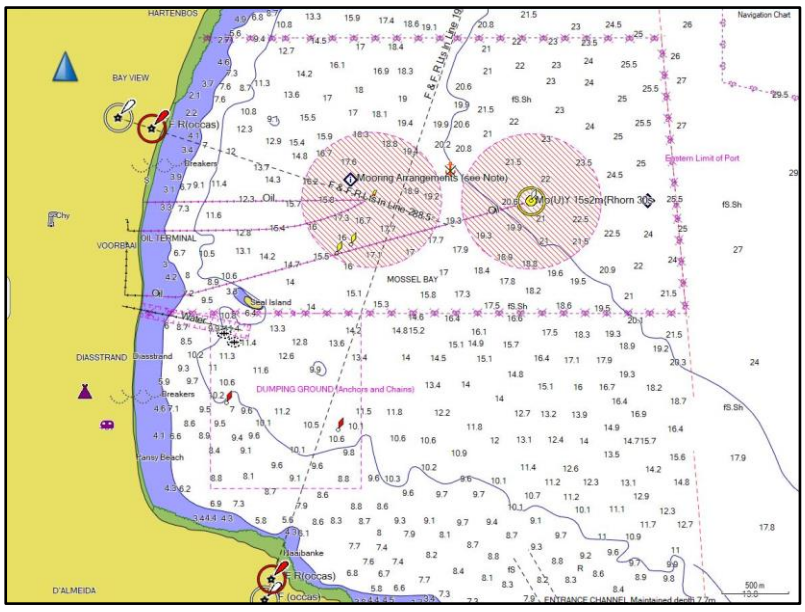


Figure 4: Garmin Marine Chart 2018

6.3. The Environment and the Role it has on Cultural Heritage

In the past, ships often stayed within sight of the land. This was, in part, due to primitive navigational methods. It was only in the early to mid-1800s that ships carried accurate chronometers and could calculate longitude accurately. Additionally, early vessels were governed by the wind. The geophysical and biophysical aspects of the South African coast, which include but are not limited to, the variable continental shelf with the immediate nearshore area consisting predominantly of a narrow rugged rocky zone that slopes steeply seawards; seasonal wind patterns; and strong wave and swell action has always affected shipping. Not only did adverse weather conditions cause ships to wreck, but the mobile sediments may also periodically cover and uncover wrecks.

While the high energy coastline causes wrecks to break up and disperse, in certain areas, the sediment deposition and movement on the seabed will also cover wrecks and preserve them.

7. Shipwreck Database

There are over two thousand known wrecks around the coast of South Africa (Figure 5). The nature of the environment, poor historical reporting and the length of time since the wrecks occurred means that underwater cultural heritage sites may literally be anywhere and are thus difficult to pinpoint with any accuracy beforehand. It is important to have a database because if MUCH sites are uncovered during the project; it will be easier to identify the wreck and thus assess its cultural and historical significance.

7.1. Maritime History of Mossel Bay

The first recorded contact between indigenous Khoe herders and Portuguese explorers in Mossel Bay was on 3 February 1488, Bartolomeu Dias was trying to establish a sea route to the East to trade in precious spices. They named it São Bras; this name was later anglicised to St. Blaize. In 1601, the Dutch renamed the bay Mosselbaai. When Dias attempted to contact the locals, they tried to chase the Portuguese away by throwing rocks. Dias then killed one of the Khoe with a crossbow.

The first recorded shipping incident in Mossel Bay is in November 1497, four vessels under Vasco da Gama entered the bay. The flotilla stayed in the bay for 13 days. During the voyage from Portugal, several seamen had fallen sick. Unable to man all the vessels, they unloaded their supply ship, loading the contents onto the other three vessels. They filled their casks with fresh water and managed to barter for some livestock. However, the Khoe were apparently unhappy with the Portuguese taking water without permission and a fight ensued. The seamen fired their cannon at the herders and onto Seal Island amongst the Cape fur seals. During their stay, they killed penguins on the island and erected a stone padrão and wood cross on the mainland. They set fire to the abandoned supply ship and left the bay. The Khoe destroyed the symbols as the Portuguese sailed out of Mossel Bay (Axelson 1973; 1998).

A description of Mossel Bay by Sparrman (1786) in September 1775:
“The country people who lived nearest the spot assured me, that ships would frequently traverse at the mouth of the harbour, as though they were in search of the port, but could not rightly tell where to look for it. One in particular, was said to have fired several guns as signals of distress, without venturing to enter it. The reason for this was supposed to be, that the place is easily mistaken, as from the charts people are induced to look for an island here; which, however, is, in fact, nothing more than a low inconsiderable rock, which at flood lies for the greater part under water, and must necessarily appear to the ships that are running into it as if it was joined to the land; and, indeed, it was partly this circumstance that was the occasion of Captain Swenfinger’s misfortune [see the *Kron-Prinsess* below]. In fine, it is said, that on the whole coast between *False-bay* and *Mossel-bay* there is no anchorage to be found. In fact, it seems as if the government wished to keep navigators in some degree in the dark with respect to *Mossel-bay*, as a flag with a pole on it, together with a store-house, which the captain of the Danish vessel had erected here, were taken down and destroyed immediately after his departure from the place; and at the same time, all buildings prohibited within sight of the harbour. This policy is certainly not founded on the soundest policy; for a more accurate knowledge of *Mossel-bay*, may in the future means of saving some vessel, which may by stress of weather be forced to run into it. Being convinced of this from divers [*sic*] considerations, and no one having given any description (at

least in print) of this harbour, I think it my duty, til further information is given on this subject, to communicate my observations, however imperfect upon it. There was not a boat to be found in the bay, therefore I cannot give the soundings. By means of the compass I had brought with me, I traced out the shore here, having investigated it, partly on foot and partly on horseback, as far as is indicated by the dots in the map. The Danes who ran aground here assured the inhabitants, that there was a good sandy bottom for anchorage; and that the small creek or inlet to the south-west, had depth of water sufficient to contain a ship. … that the north or north-west shore, is without any rocks or stones, being composed of verdant hills covered with shrubs and bushes, excepting just at each of the spots, where *Heert* and *Kleine Brak* rivers empty themselves; the sand thereabouts having been raised up to some height by the seawinds, so as to have encroached on the verdure of the prospect. The south-west shore, on the contrary, is very stony and mountainous; though just at the waterside it is low, excepting at one place, which at a very small distance from the water appears to be a klip-krans, as it is called, or a rocky hill flat on the top, and perpendicular on the side towards the sea.

It is, probably, not difficult to land here with boats in fair weather; but at this time, the bay was greatly agitated by the wind from the sea; and the height of the water, which continued even in the afternoon … Watering must be a very tedious and laborious business, as things are situated here at present; for there is only one very inconsiderable rill of fresh water here, which runs down into the above-mentioned inlet, where the anchoring place is; but at the distance of a few stones throw from the strand, it is the well-spring itself, of such a width and depth, as to give one reason to suppose, that one might fill with ease a couple of hogsheads at a time with fresh, clear, and well-tasted water."

TABLE 2: RELEVANT HISTORY OF MOSSEL BAY

Date	Event
1843	First harbour infrastructure was approved, Harris's Jetty. However, it is unknown whether it was built or not.
1852	Mossel Bay granted municipal status
1854	Daniel Bland builds a stone wharf on the east side of Varken's Bay
1862	Pilkington's Jetty built
1864	St Blaize Lighthouse commissioned
	Cornerstone for new jetty
1895	Seawall constructed
1913	Whaling Station dismantled

7.2. UNDERSTANDING THE DATABASE

There are several points to bear in mind when compiling and making use of any shipwreck database.

- The first recorded European voyages down the west coast of Africa were by the Portuguese. When the first Portuguese explorers travelled down the west African coast, they stuck close to the coastline, to map the land. Matching the historical names to present day locations can aid in charting shipwrecks. An example of this is Cape Voltas, the etymology may be traced to the Portuguese location *Volta das Angras*.
  Bartolomeu Dias and his fleet passed the Orange River Mouth in 1487/1488 (Axelson 1973). Thereafter, the rate of exploration and trade increased exponentially, as is evidenced by the increase in shipwrecks over the centuries. These early voyages were not well documented, and the archives often merely report that a fleet of a certain number of vessels left and only a certain amount returned, with only vague references to their place and manner of loss. Therefore, there are many undocumented wrecks.
- There is some anecdotal evidence that the Phoenicians circumnavigated Africa (Herodotus 1954). If this is true, these ships had to stick right to the coastline and therefore are likely to be inshore.
- There's increasing evidence that the Chinese voyages of the 1400s explored parts, if not all, of the African coast (Paine 2013). However, once again the archival evidence to date, and availability to Western researchers, limits this knowledge.
- There are many ships that are only recorded as having disappeared between Europe and the Far East, as well as between Cape Town and other coastal towns, for example Port Elizabeth, East London, and Durban. Some of these can be seen in Figure 6.

Part of investigating the locations of the wrecks from the historical record is understanding the location of key landmarks and places in the record and relating them to modern locations (See Figure 8 and Figure 9). Where the location names have changed, these are in brackets.

The Shipwreck Database uses several conventions to assess the impact of projects on cultural heritage resources (Appendix I).

The database is divided geographically and as to the prediction certainty of shipwrecks being in a given area.

Certainty of prediction:
Definite: More than 90% sure of a particular fact. Substantial supportive data to verify assessment
Probable: More than 70% sure of a particular fact, or of the likelihood of that impact occurring
Possible: Only more than 40% sure of a particular fact, or of the likelihood of an impact occurring
Unsure: Less than 40% sure of a particular fact, or the likelihood of an impact occurring

The database's starting point is including all wrecks that are recorded in any database as in Mossel Bay. As the research proceeds, certain shipwrecks are shown conclusively to be near, but not in Mossel Bay. They are still mentioned in the original database but are removed from further inclusion. The location of the wrecks is narrowed down as much as possible. Sometimes a wreck's location is fairly precise, e.g., Danger Point, Dias Beach, etc. Other reports are vague and merely state at Mossel Bay. These wrecks have to be included in the final database as there is a small possibility that the wreck may be in the Impact Zone.

The overall database is then reduced to the Impact Zone. The Impact Zone Shipwreck Database is divided into the following: Improbable, Probable and Highly Probable. Each wreck based on the principles outlined in Section 8 are assigned a significance and extent.

Figure 5: South African Shipwrecks (Google Earth 2017; Wallace 1929; Turner 1988; Levine 1989; van den Bosch 2009; SAHRIS 2017; Reocities 2017; Maitland 2020; u-boat.net 2017)

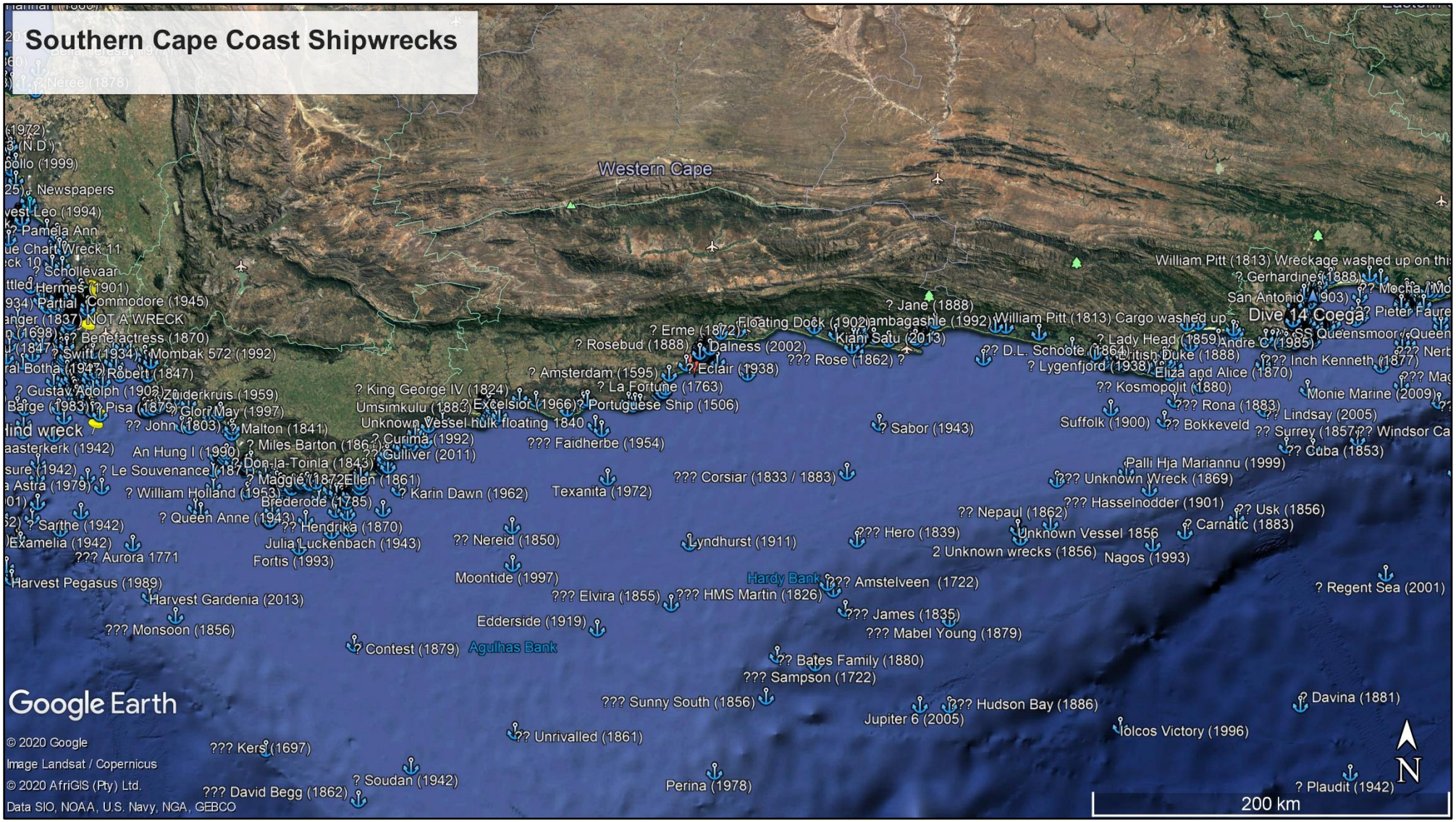


Figure 6: Southern Cape Coast Shipwrecks (Google Earth 2018; Turner 1988; Levine 1989; van den Bosch 2009; SAHRIS 2017; Reocities 2017; Maitland 2020; u-boat.net 2017)

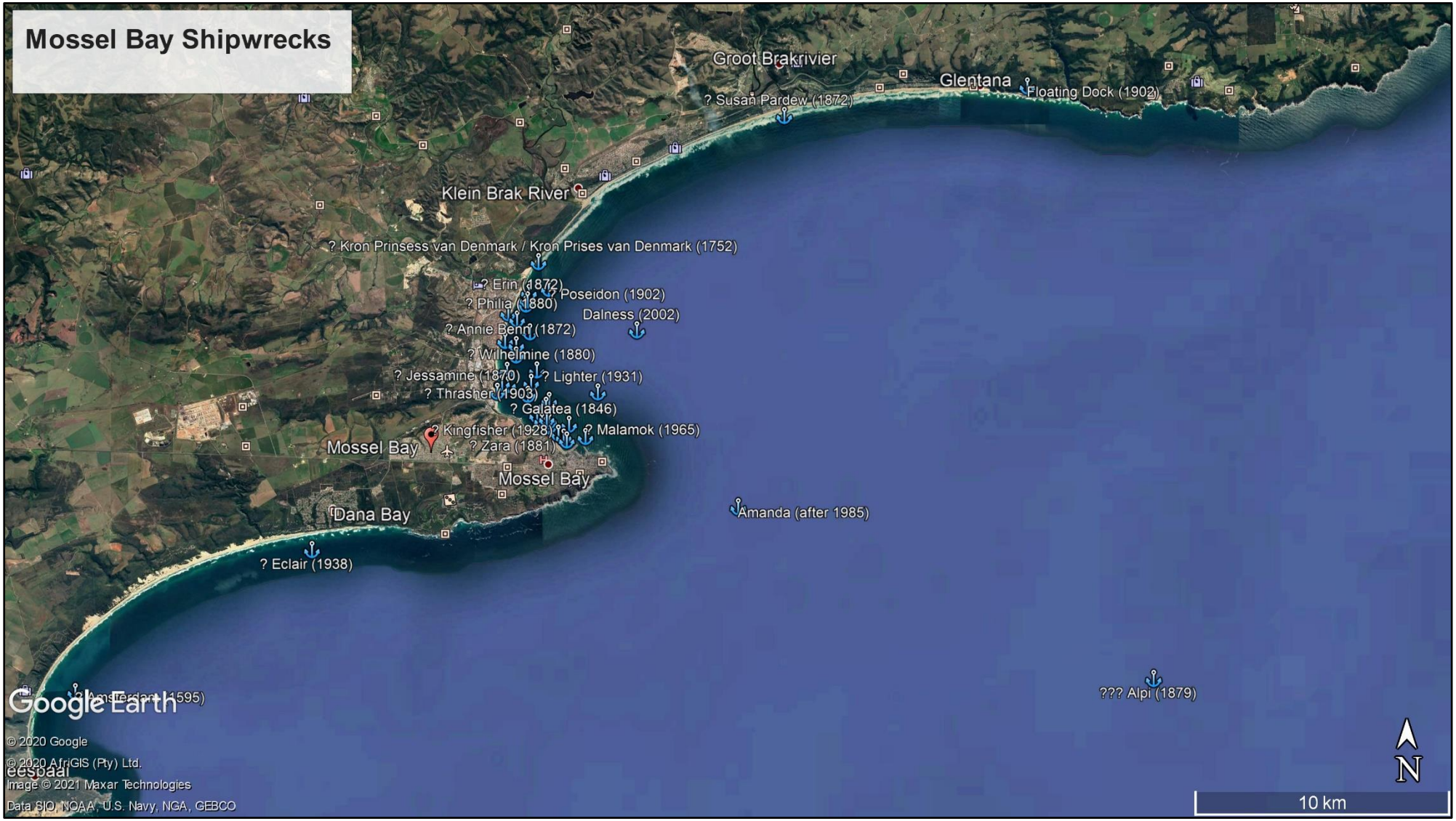


Figure 7: Mossel Bay shipwrecks (Google Earth 2020; Turner 1988; Levine 1989; van den Bosch 2009; SAHRIS 2017; Maitland 2020)

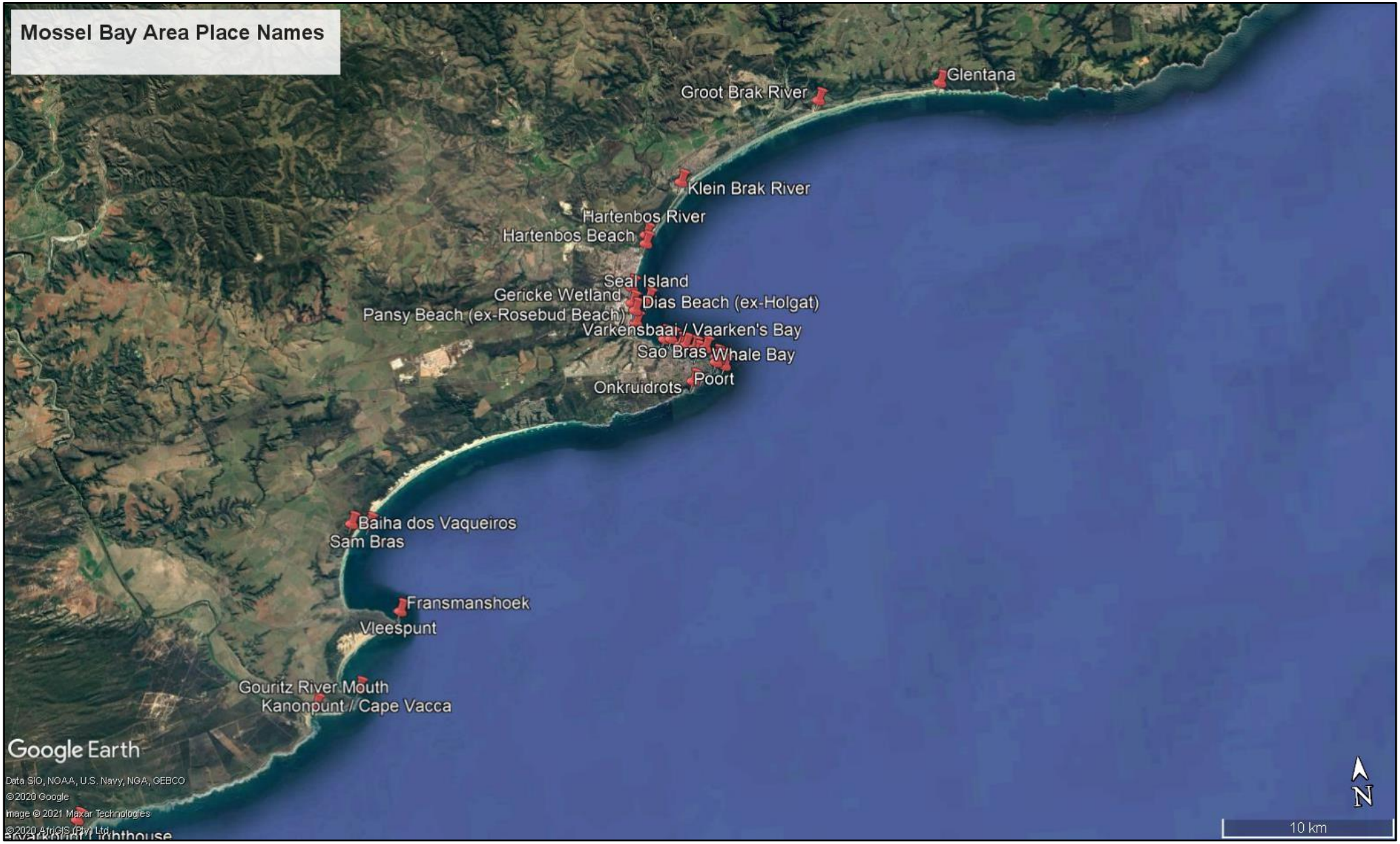


Figure 8: Mossel Bay Area Place Names (Google Earth 2020; Scheffler 1990; Cape Farm Mapper 2020; Garmin Marine Chart 2018; SAN Chart 1020)

Figure 9: Mossel Bay Site Location Place Names and Landmarks (Google Earth 2020; Scheffler 1990; Cape Farm Mapper 2020; Garmin Marine Chart 2018; SAN Chart 1020)

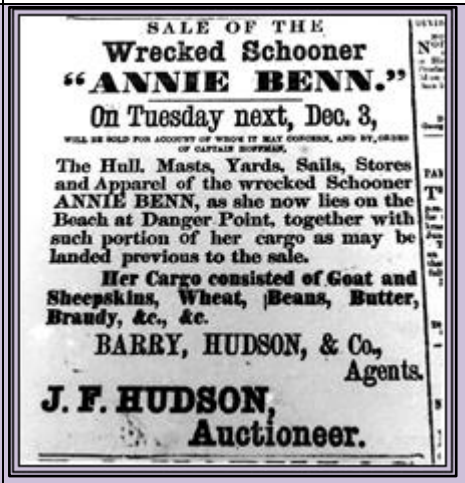
7.3. MOSSEL BAY SHIPWRECK DATABASE

	General Location of Wrecks	Certainty of Prediction
	These wrecks have been removed from the Mossel Bay database. They were either damaged while at Mossel Bay or wrecked nearby.	Definite
	These wrecks are in well recorded positions and are unlikely to be found in the Impact Zone	Definite
	These wrecks could be in the Impact Zone	Possible
	These wrecks' location is unknown, or there was insufficient evidence to narrow down the location	Possible

TABLE 3: MOSSEL BAY SHIPWRECK DATABASE

#	Name	Events	Nation	Date	Type	History	Location
1	*Alpi* (ex-*Chili*)	Damaged; abandoned	Italy	1879-10-07	Wood barque	This 1015-ton barque under Captain Sapelli, was built in 1869 by F. Chiarelli in the Biasco shipyard in Sestri Ponente. The barque was on a voyage from Akyab (modern-day Sittwe, Myanmar) to Falmouth with a cargo of rice when she lost her rudder and was leaking severely. The crew abandoned her somewhere off Mossel Bay. They were rescued by the German barque *Albatross* and taken to Algoa Bay, where they landed on 16 October (Levine 1889; van den Bosch 2009)	Off Mossel Bay
2	*Amanda*	Sunk	South Africa	c. 2004	Fishing trawler	This fishing trawler of 5m length is reported as being sunk in these co-ordinates (van den Bosch 2009; Hydrographic Office 2004).	Off Cape St. Blaize 34°12'.086 S 022°12'.821 E
3	*Amsterdam*	Abandoned, burned	Netherlands	1595	East Indiaman	The Dutch were trying to break the monopoly that the Portuguese had on the sea route to the Far East. Cornelius de Houtman's fleet of four vessels left Texel (Netherlands) on 2 April 1595. These were the *Amsterdam*, *Mauritius*, *Hollandia* and *Duifke*. The fleet reached Mossel Bay on 4 August. "… we entered into a haven called *Agne Sambras*, where we anchored, and found good depth at eight or nine fathom water, sandy ground. The 5th day we went on shore to gather fruit, therewith to refresh our sick men, that were thirty or thirty-three in one ship. In this bay lieth a small island, wherein are many birds called *Pynguins*, about the bigness of a goose; not good to eat: and sea wolves, or sea dogs, not good to eat; but very tame, that are taken with mens hands. We went into the country and spake with the inhabitants, who brought divers fresh victuals aboard our ships, for a knife, or a small piece of iron. Etc. giving us an ox or a sheep, etc. three oxen and five sheep for a bill, an axe, a shovel, a great iron nail. A knife, and other little pieces of iron not worth four livres … " Their food and water had spoilt in the heat too many crew members had died on the voyage to sail all four vessels. The stores and people from the *Amsterdam* were transferred to the other vessels. The abandoned ship was burned (Levine 1989) The *Amsterdam* was a ship of 200 tons, had a crew of 59. The ship was armed with six brass cannon, 10 iron cannon, and "six pieces for stones" (a short barrelled cannon specifically designed to fire stone shot, known as a pedrero). The Captain was John Jacobson Schellinger and the trader, Reginer van Hel. Although this voyage was a financial disaster, it did open up the sea route to the Dutch. However, the only database that this wreck is in, in Levine 1989. The information for this entry came from the book *By Strength of Heart* by Victor de Kock. In reality, the *Amsterdam* did get abandoned and burned, but in Bawean Island, East Java, Indonesia (de Houtman and Phillips 1745)	NOT MOSSEL BAY actually Bawean Island, East Java, Indonesia

#	Name	Events	Nation	Date	Type	History	Location
4	*Annie Benn*	Aground, wrecked	South Africa	1872-11-27	Wood schooner	This vessel of 34 (Parkes and Williams 1988) or 50 (Turner 1988) tons was built by John Benn in Knysna in 1867 and was the last coastal sailing vessel to be built here (Figure 10). Apparently, the builder used stinkwood as well as timber salvaged from the wreck of the *Nepaul* (1850), that was wrecked off the Swart River mouth. Her keel was laid down by George McCall Theal, who is famous for his archival publications. After Theal left Knysna, Benn bought the keel and built the *Annie Benn*. Under Captain Stubbington, with a cargo of 100 bundles of skins, she was wrecked "off Mossel Bay at 5 o'clock in the morning" during a south-easterly gale while *en route* to Cape Town. While it states off Mossel Bay, the cargo and wreck were consequently sold, which implies that the vessel went ashore and indeed in van den Bosch (2009), he has a sale notice that states the *Annie Benn* went ashore near Danger Point (Figure 11), which is near the old whaling station. (Parkes and Williams 1988: 72; Turner 1988; Levine 1989)  Figure 10: The *Annie Benn* in 1867 at Knysna during her launch (Parkes and Williams 1988)	Beach near Danger Point

#	Name	Events	Nation	Date	Type	History	Location
						 Figure 11: Sales notice for the *Annie Benn* (The Eastern Province Herald 29-11-1872 in van den Bosch 2009)	
5	*Argyle*	Aground; refloated; condemned	Britain	1860-07	Wood barque	Under Captain E. Smith, this vessel, damaged and leaking, put into Mossel Bay. She went ashore at Vaarken's Bay. However, she was refloated and condemned (Levine 1989). It is therefore possible that she was beached and broken up, or sank at the anchorage, or that she was sold, refitted and renamed.	Unknown
6	*Da Gama's Supply Ship*	Abandoned, burnt	Portugal	1497	Wood supply ship	On 8 July 1497, Vasco da Gama left Portugal. He was in command of four vessels. One of these vessels was a supply ship. In November 1497, the vessel entered the bay. The flotilla stayed in the bay for 13 days. During this time, they unloaded the supply ship, loading the contents onto the other three vessels. They filled their casks with fresh water and managed to barter for some livestock. However, the Khoe were apparently unhappy with the Portuguese taking water without permission and a fight ensued. The seamen fired their cannon at the herders and onto Seal Island amongst the seals. During their stay, they killed penguins on the island and erected a stone padrão and wood cross. They set fire to the abandoned supply ship and left the bay. It is probable that they anchored near Seal Island as it offered some protection from the wind, had a steady supply of food and allowed them to stay aboard, protecting them from the Khoe.	Possibly near Seal Island
7	*Dalness*	Sunk	South Africa	2002	Fishing vessel	The 36-ton,15 m long fishing vessel sank in these co-ordinates and is at a depth of 33 m (van den Bosch 2009; Hydrographic Office 2002).	In Mossel Bay 34°08.38 S 022°10.24 E
8	*Devonia*	Aground; wrecked	Britain	1864-10-19	Wood brig	In some databases (Turner 1988) this wreck is called the *Dennia*. The *Devonia* was a vessel of 180 tons on a voyage from London with a general cargo, including: 8s0 tons of coal, salt and slates under Captain Crimp. While anchored in the bay, a south-easterly wind increased, the *Devonia* dragged anchor and drifted down the bay, until her cables parted, and she went aground a few hundred meters from the shore (Levine 1989; van den Bosch 2009)	Possibly near Hartenbos River
9	*Éclair*	Aground, wrecked	South Africa	1938-12-02	Fishing trawler	This trawler owned by Irvine & Johnson was built in 1908 in Nylands. It had a 45 hp triple expansion engine. Under Captain Higgins, it went aground "west of Mossel Bay" and while the crew was rescued by the rocket brigade, one crew member died (Levine 1989). According to van den Bosch (2009), the vessel went ashore at Kanon (Cape Vacca)	Kanon, Cape Vacca, west of Mossel Bay

#	Name	Events	Nation	Date	Type	History	Location
10	*Erin*	Aground, wrecked	Britain	1872-11-27	Wood barque	In the East Province Herald of 29-11-1872, the *Erin* is referred to as the *Erme.* She was built at Salcombe in 1863, and owned by Messrs. Balkwell & Co. This 306-ton vessel, under Captain King, was loading her cargo for London, which included, 40 bales wool, 120 bundles of skins, 250 cases of aloes, gum and horns. The vessel was beached and wrecked during a south-easterly gale, and apparently lies "on the beach beyond Danger Point" (Figure 12) (The Mossel Bay Advertiser 28-11-1872 in van den Bosch 2009; Turner 1988; Levine 1989)  SALE OF Wrecked Schooner "ERME." On Thursday, Dec. 5, 1872. The Hull, Masts, Yards, Rigging, Ropes, Sails, Boats, Anchors, Chains, Stores and Apparel of the stranded Schooner "ERME," as she now lies on the Beach beyond Danger Point, in Mossel Bay. *Also such Cargo as may be saved, and which consisted of* 20,000 Goat and Sheep skins (more or less). 31 Bales Grease Wool. 250 Cases Aloes. 4 Cases Gum. 3 Bags Ox & Cow Horns. SALE TO COMMENCE AT 10 O'CLOCK, A. M. PRINCE, VINCENT, & Co., Agents. *J. F. HUDSON, Auctioneer.* Figure 12: Sales notice for the *Erin* (Mossel Bay Advertiser 28-11-1872 in van den Bosch 2009)	Beach west of Danger Point
11	*Firefly*	Aground, wrecked	South Africa	1961-09-31	Fishing trawler	The 24-ton fishing trawler, built in 1935, was stranded on Santos beach during a south-easterly gale. There was little hope the vessel could be salvaged, and it broke up rapidly (Levine 1989; van den Bosch 2009).	Santos Beach
12	*Floating Dock*	Aground, wrecked	South Africa	1902	Steel Floating dock	Durban port ordered a large floating dock, it measured 122 x 24 m, it was capable of lifting vessels of 4 000 tons. The dock was in tow from Tyne (United Kingdom) however, a gale was blowing when the vessel broke tow from the *Baralong*. A tug and a steam trawler tried to save the dock, but the seas were too big. The dock was washed high on the beach at Glentana. The iron hulk is still visible (Figure 13). Her iron railings were repurposed outside the Anglican Church in George and a flight of iron steps was used at a house in York Street, George (Green 1969)	Glentana Beach

#	Name	Events	Nation	Date	Type	History	Location
						 Figure 13: Visible remains of the wreck of the Floating Dock (1902) (Google Earth 2020)	
13	*Galatea*	Aground, wrecked	Britain	1846-10-10	Wood brig	This 223-ton vessel was built in 1829 at Chepstow, U.K. Under Captain T. Owen, she was anchored at Mossel Bay and parted her cables during a south-easterly gale. The vessel was wrecked on the rocks at 2 in the morning and four people drowned. (Turner 1988; van den Bosch 2009). According to Levine (1989), she was wrecked at "Danger Point", and her bell was recovered in 1970.	Danger Point
14	*Galera*	Aground, wrecked	Norway	1892-08-25	Wood barque	This vessel of 446 tons was built in 1873. Under Captain J.M. Abrahamsen, on a voyage from the Friendly Isles (present day Tonga, Polynesia) to France, with a cargo of copra, she was in Mossel Bay when a south-easterly gale sprung up. She was "wrecked in the big gully on the west side of Danger Point, Mossel Bay … 34° 10.30 S 22° 08.00 E" (Turner 1988: 179). Apparently, Turner dived on the site in 1983 but not much was visible due to sand. The co-ordinates in Turner (1988) are often incorrect, as Turner was trying to keep certain wreck locations secret from other salvors. However, his co-ordinates are in the general vicinity of what Scheffler (1990) names Danger Point, near the old whaling station. No historical maps record this name.	Danger Point
15	*George T. Hay*	Leaking, abandoned, set afire	Britain	1906-03-26	Wood Sailing	Although the Mossel Bay Shipwreck map has this vessel as situated in Mossel Bay, this is inaccurate. On March 26th, 1906, the British ship, built in 1887 at Spencer's Island was on a voyage from Rosario to Lobito Bay with a cargo of hay. Stormy weather caused the vessel to leak uncontrollably. Two days later the crew was saved by the Norwegian barque *Pestalozzi*. The stricken ship was set alight so that she would burn, sink, and not become a navigational hazard. It was abandoned 475 km south-east of Mossel Bay (van den Bosch 2009)	NOT IN MOSSEL BAY
16	*Huijs te Marquette*	Aground, repaired, refloated		1734		Stranded after losing her rudder, this vessel was repaired and refloated.	NOT A WRECK

#	Name	Events	Nation	Date	Type	History	Location
17	*Jessamine*	Wrecked, abandoned, offered for sale	Britain	1870	Wood ship	This 1089-ton ship built in New Brunswick in 1858 was wrecked and abandoned. The vessel and its damaged rice cargo were offered for sale in Mossel Bay. Although I could find no record of where this wreck occurred. I found the ship in the Lloyd's Register of Shipping in 1869 and 1870, the 1870 Register records the vessel as wrecked (Figure 14) and the Eastern Province Herald of 16-08-1873 offers her for sale in Mossel Bay (Figure 15). It is possible that she was beached and broken up, or sank at the anchorage, or that she was sold, refitted and renamed.	Unknown

6	Jessamine	Sw	C.Cotton	214	94·0|24·0|14·5	Sndrl'd	1855	Watson&Co.	Sunderlnd	Sld.	7					
SUFX		pt I.B.			Drp.66							2,66				
Wicklow		S	J.Mahony	1089	182·8|36·6|22·8	N.Brns	1858	P.Magee	Liverpool	Liv.India	7					
		pt r.&a.59 r.&YM.65	over pt I.B.		w.r.&a.65					S.S.65–5yrs	C. 2	4,65				

Figure 14: Lloyd's Register 1870 records the Jessamine as wrecked

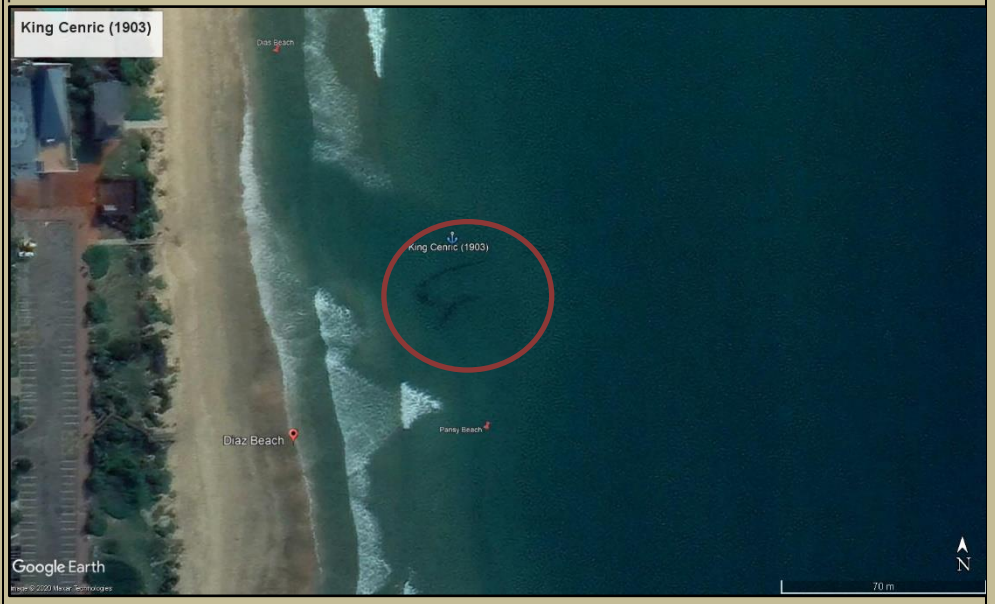
PUBLIC SALE OF THE
ABANDONED
SHIP "JESSAMINE."

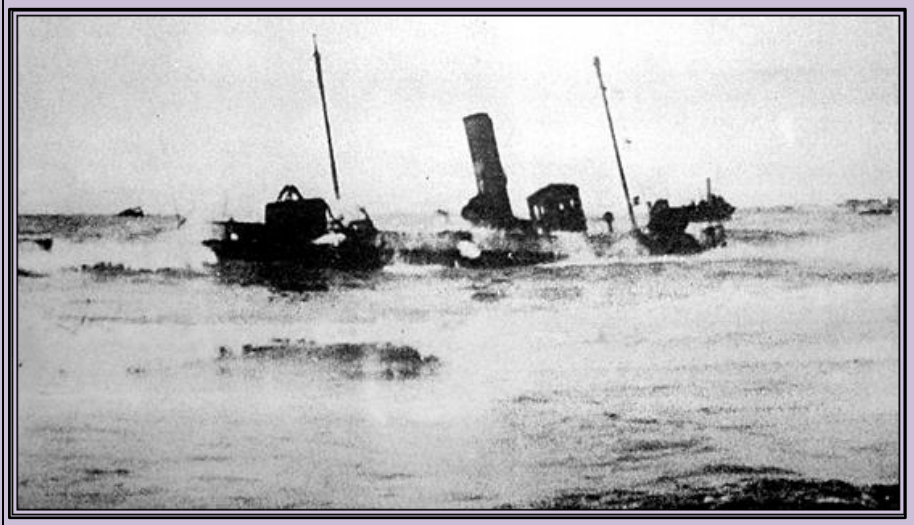
A PUBLIC SALE WILL BE HELD
AT MOSSEL BAY,
To-morrow, Wednesday, 17th Aug.,
AT 10 A.M., OF THE
Hull, Masts, Spars, Rigging, Sails, Apparel, and Stores
Of the abandoned ship "Jessamine,"
For account of whom it may concern, and by order of Captain
Jas. T. GEMMELL.
BARRY & NEPHEWS, Agents.

DAMAGED RICE.

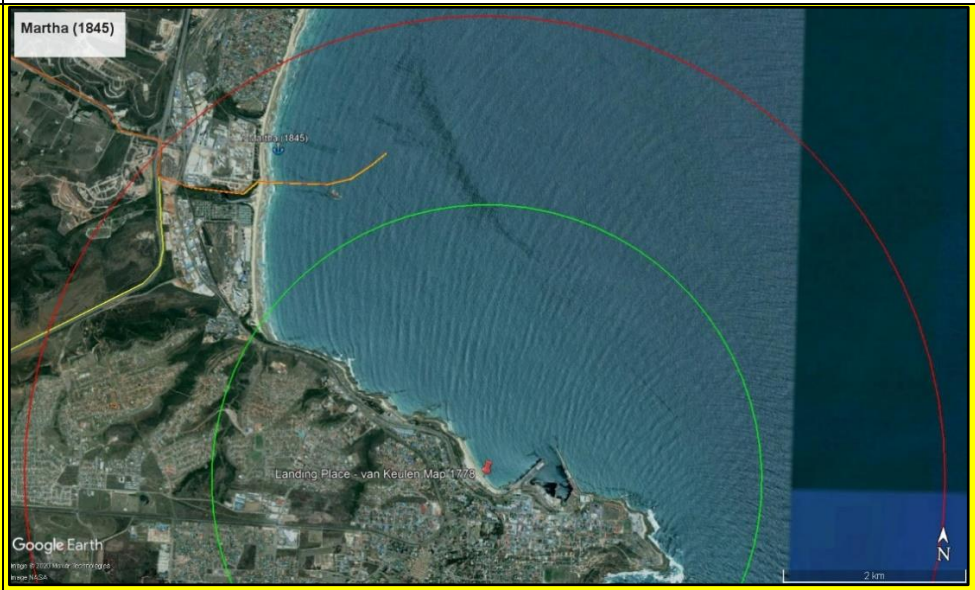
A Public Sale of Damaged Rice, ex "Jessamine," Capt. Gemmell, from Rangoon,
WILL BE HELD AT MOSSEL BAY,
To-morrow, Wednesday, 17th Aug.,
OF
About 5,000 BAGS RICE,
All more or less damaged by Sea Water,
For account of whom it may concern, by order of Captain Jas. T. Gemmell.
BARRY & NEPHEWS, Agents.

Figure 15: Sales Notice for the *Jessamine* (Eastern Province Herald 16-08-1873)

#	Name	Events	Nation	Date	Type	History	Location
18	*Kate*	Aground, wrecked	Britain	1849-07-16	Wood schooner	This vessel is called the *Kale* on the Shipwrecks of Mossel Bay poster. This is incorrect. The *Kate* of 271 tons was built by Hutchinson in 1849 at Peterhead. Under Captain Kirby, on a voyage from London, she was wrecked at night during a south-easterly gale. No lives were lost and reportedly lies next to the *Mary* (1853) (Turner 1988; Levine 1989). The wreck and stores were sold on the beach by public auction (van den Bosch 2009)	On the beach
19	*Kimon*	Abandoned, towed, beached	Norway	1890-01	Wood brig	The *Kimon* was on a voyage from Natal to Grimstad, when she was abandoned 75 miles (c. 120 km) south-west of Port Elizabeth, she had a cargo of deals (timber). The crew were rescued by the *Robert* and taken to Cape Town. In the meantime, the *Hawarden Castle* found the abandoned vessel and towed it to Mossel Bay. There, after an inspection, the vessel was beached at Holgat (now Dias Beach) and the cargo salvaged. The hull was reportedly sold for £27 (van den Bosch 2009)	Dias Beach
20	*King Cenric*	Aground, wrecked	Norway	1903-11-14	Wood sailing ship	This vessel of 1519 tons, was built in 1874 by Dunlop & Co, St Johns, Canada. Under the command of Capt. A. Paulsen, the vessel was on a voyage from Frederikstad with Baltic timber. A terrible storm was raging, houses were flooding, and this vessel parted both her anchor cables and she ran aground. The rocket brigade saved all the crew. She apparently lies near the *Rosebud* (1888) (Green 1969; Turner 1988). An article in the Mossel Bay Advertiser (08-11-2013), using information from Daniel Rogers states that a wreck that was uncovered is that of the *King Cenric*. Using their photograph from the beach, I was able to find it on Google Earth and the wreck was still visible on 24-06-2020. The location is about 50 m from van den Bosch's (2009) stated location of the wreck. Although this is not definitely the *King Cenric*, it is probable.  Figure 16: Remains of the *King Cenric* (Google Earth 2020)	Dias Beach

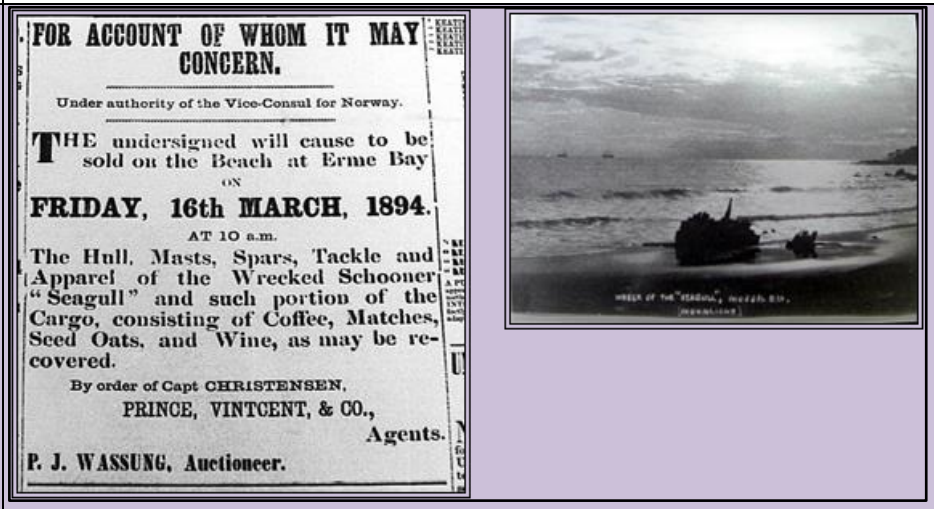
#	Name	Events	Nation	Date	Type	History	Location
21	*Kingfisher*	Aground, wrecked	South Africa	1928-04-14	Steel fishing trawler	This 47-ton steel, clinker-built vessel was built in 1884 by Cox and Co., of Falmouth. Its anchors parted and the trawler drifted onto Santos Beach where she became a wreck (Figure 17) (Levine 1989; van den Bosch 2009).  Figure 17: The *Kingfisher* wreck (Diaz Museum in van den Bosch 2009)	Santos Beach
22	*Kron Prinsess van Denmark / Kron Prises van Denmark*	Beached, wrecked	Denmark	1752-06-10	Wood	This vessel was homeward bound from Tranquebar (India) with a cargo of rice, cotton, pepper, sandalwood In May 1752, a gale damaged the ship severely and the captain decided to sail north until they found land. Eventually on 10 June 1752, they reached Mossel Bay and anchored. After an inspection of the vessel, it was discovered that the bow planks below the waterline were rotten. The rice was spoiled and thrown overboard. The crew then removed ammunition, cotton, pepper, supplies and the sails to construct a tent to house the cargo. A rider was sent to Cape Town to report the wreck and return with inspectors, to survey the damage. In the meantime, bad weather forced the captain to bring the stricken vessel closer to shore, where it was eventually beached. At the end of October, most of the crew travelled to Cape Town, to travel back to Denmark. 28 crew were left guarding the cargo. It was only in the beginning of October 1753, that a Danish vessel arrived to collect the cargo and remaining crew members (van den Bosch 2009). Sparrman (1786) stated that when he visited Mossel Bay in September 1775 he saw: “On a stone hereabouts is engraved an inscription as follows: Captain Swenfinger, of the Danish ship *Kron-Prinsess*, 1752.” He then recounts the story but does not state the exact location of the wreck. There is a Wikipedia page (https://af.wikipedia.org/wiki/Kroonprinses_van_Denemarke) for this wreck that states the wreck is near the Hartenbos River, however I was unable to independently verify this.	Mossel Bay Possibly near the Hartenbos River
23	*La Fortuné*	Aground, wrecked	France	1763-09-11	Wood 56-gun warship	Some databases (Levine 1989) state this vessel is in Mossel Bay. Homeward bound from Mauritius, the ship was damaged during a gale, Pumping the water out of her, the crew kept the ship afloat until entering “Fish Bay”. Everything of value was unloaded and the vessel was abandoned on the 27th of September. Apparently, she went down at her anchorage and on the 29th,	Fransmanshoek, Vleesbaai

#	Name	Events	Nation	Date	Type	History	Location
						broke up. The crew and soldiers, 441 in all walked to Cape Town where they boarded French vessels heading home. Fransmanshoek, a peninsula in Vleesbaai is said to be named after this wreck. In 2011 a cannon from the wreck was recovered, this is the fourth cannon to be found in the area (Jordon 2011).	
24	*Lady Pryse*	Wrecked	Britain	1880-11-06	Wood brigantine	This vessel of 286-tons, under the command of Captain E.L. Lloyd was built in Aberystwyth in 1875 by Evans. The brigantine was on a voyage from London with a general cargo. While anchored in the bay, her cables parted during a south-easterly gale and she was wrecked. The crew were rescued by the rocket brigade. The reports in the Mossel Bay Advertiser of 10-11-1880, state she was “on the beach”. The wreck apparently lies near the *Louisa Dorothea* (1882) (Turner 1988; Levine 1989; van den Bosch 2009)	Probably Dias Beach, Mossel Bay
25	*Lighter*	Collision, sank	South Africa	1931-03-10	Lighter	While unloading cargo from the anchored *Glouchester Castle* during a gale, this lighter broke loose and was in a collision with another lighter. It was severely damaged and sank immediately (Levine 1989; van den Bosch 2009)	Anchorage, Mossel Bay
26	*Louisa Dorothea* (ex-*Adelaide*)	Aground, wrecked	Germany	1882-05-29	Wood schooner	This vessel of 227-tons was on a voyage from Adelaide with a wheat and flour cargo, under Captain Albert Voss. A south-east gale caused her to wreck. Two men drowned but the remaining six were rescued by the rocket brigade. She apparently went ashore near “Bakke” (Levine 1989). She lies near the *Lady Pryse* (1880) (Turner 1988; van den Bosch 2009)	De Bakke
27	*Malamok*	Wrecked, sank	South Africa	1965-08-12	Steel fishing trawler	This fishing trawler, built in Kalk Bay in 1948, was moored in the Mossel Bay harbour during a storm. It was wrecked against the seawall and sank (Levine 1989)	Near the ship repair facilities in the Mossel Bay harbour
28	*Martha*	Aground, wrecked	Britain	1845-08-30	Wood brig	This vessel, built in Devon, England in 1835 was under the command of Captain Boustead. She was on her way from Sydney to Table Bay with 20 immigrants and the mail. They were putting into Mossel Bay to stock up on provisions during a south-easterly gale. Apparently wrecked between 3 and 5 km of the landing place, depending on the database (Levine 1989; van den Bosch 2009; Turner 1988).	On the beach

#	Name	Events	Nation	Date	Type	History	Location
						 Figure 18: Possible location of the Martha, depending on the distance from the Landing Place (Google Earth 2020)	
29	*Mary*	Aground, wrecked	Britain	1853-02-16	Wood schooner	This vessel was built in 1847 by Simpson & Co., in Perth, Scotland. Under Captain J. Wood, this 117-ton vessel was anchored in Mossel Bay when her anchor cables parted during a south-easterly gale. One crew member was drowned. The wreck lies near the *Kate* (1849) (Turner 1988; Levine 1989; van den Bosch 2009)	On the Beach
30	*Mary*	Aground, wrecked	Britain	1824-07-09	Wood ship	This 547-ton ship was built of teak in 1814 in India by Palmer. Under the command of Captain Ardlie, the vessel was on a voyage from Calcutta and Madras to London. They put into Mossel Bay to replenish the water stock. A south-easterly gale drove them ashore near the old whaling station. The cargo consisted of indigo dye, some of which was salvaged and taken to Cape Town by the *William* (Turner 1988; Levine 1989) Van den Bosch (2009) transcribed a little publication entitled, *The Loss of the Mary, (East Indiaman) Capt. J.M. Ardlie, June 9, 1824, in Mossel Bay, South Africa. To which is added, A short description of the Country, and the kindness received by the writer, during ten weeks stay among the Inhabitants. By H.Pullen, Second Officer of the Mary.* It paints a dramatic picture of the wreck. The *Mary*, which Pullen states as being 700 tons and crewed by 60 men left Gravesend for India in 1823. The journey took six months, and he states that while rounding the Cape of Good Hope, the ship started leaking and that the pumps had to be continuously manned, even the passengers assisted. When reaching Calcutta and Madras, the vessel was caulked and loaded up with indigo and other cargo. Pullen states that the cargo "brought us down very deep in the water". Thereafter passengers embarked and the vessel set off for the return voyage. Although the journey seems to start well, it soon becomes clear that the vessel was probably not seaworthy. The winds delay the voyage, water is running low, the lower pintle of the rudder breaks and the ship starts leaking. Once again, the pumps must be manned continuously. By the time the vessel reaches Mossel Bay, some of the crew are on the verge of mutiny, water is rationed to one pint a day, food is running low and everyone is exhausted from keeping the ship afloat.	Near the old whaling station; Danger Point

#	Name	Events	Nation	Date	Type	History	Location
						When they anchor at Mossel Bay, they are relieved to see people ashore and another vessel at anchor. The passengers are taken ashore and when the gale starts, the vessel is basically wrecked before it even runs aground. Pullen is the last person to leave the ship, and when a falling mast hits him, he rejoices in the fact that the only injury is the loss of three front teeth. He states that the wreck is "stranded on a sandy beach, close to a ridge of pointed rocks.	
31	*Nancy*	Aground, wrecked		1848-04-05	Wood schooner	This 38-ton vessel under the command of Captain T. Metcalf was grounded and wrecked during a south-easterly gale. One man drowned. Most of the cargo had been unloaded (Turner; 1988; Levine 1989; van den Bosch 2009)	Mossel Bay
32	Pero de Mendonça's ship Also known as the Soares wreck	Wrecked	Portugal	1505	Wood	The information on this vessel is unclear. According to Axelson (1973), this unnamed vessel under the command of Pero de Mendonça, ran aground, seven or eight leagues (39 – 45 km) west of the "watering place at São Bras", that is between Cape Vacca and Yzervark Point. Another vessel saw the wreck but were unable to assist due to the weather. A ship under the command of Francisco de Albuquerque had also gone missing *en route* to Portugal from India. Two vessels were sent to chart the southern Cape coast and to search for survivors of the two wrecks. They anchored in Mossel Bay but could not sail back in a westerly direction. Searchers were sent overland and after three days they returned and stated they had found some wreckage and a skeleton. There is sufficient evidence that this wreck, while near Mossel Bay, is not in the bay.	West of Mossel Bay
33	*Philia*	Aground, wrecked	Britain	1880-01-11	Wood snow	This 236-ton vessel, under Captain J. Edwards, was built by Mills in Sunderland in 1862, owned by R. Joel & Co., was carrying a general cargo and building materials for the bridge over the Little Brak River. While anchored in Mossel Bay, unloading, a heavy swell, caused by a south-east gale, shifted the remaining cargo, and her anchor cable broke. She was beached and wrecked but no lives were lost. (Turner 1988; Levine 1889) Reports at the time state "she grounded on a sandy beach just beyond a spot called 'Danger Point'" (Mossel Bay Advertiser 14-01-1880 in van den Bosch 2009). In the *Wilhelmine* (1880) report, it is stated as wrecking in Erme Bay near the Philia, therefore the Philia must also be in Erme Bay (van den Bosch 2009).	On beach beyond Danger Point (De Bakke)
34	*Poseidon*	Aground, wrecked	Norway	1902-09-02	Wood barque	This 606-ton vessel was built in 1890 at Arendal. Under the command of Captain C. Clausen its cargo consisted of 1500 bags of coffee. A south-east gale was blowing, and the vessel began to drag anchor, eventually, "…the ship striking the rocks − in the bight of the Bay, inside Seal Island" (Mossel Bay Advertiser 02-09-1902 in van den Bosch 2009). Everyone aboard was saved by the rocket brigade. (Turner 1988; Levine 1989)	Dias Beach near Seal Island
35	*Rosebud*	Aground, wrecked	Britain	1888-08-30	Wood schooner	This 341-ton schooner under Captain J. Collie was built in 1876 by Carnegie at Peterhead. The vessel was on a voyage from Calcutta to London with a general cargo. She parted her anchor cable during a south-east gale and drifted onto the beach. The crew were rescued by the rocket brigade (Turner 1988; Levine 1989; van den Bosch 2009). For years this beach was known as Rosebud beach until it was renamed Pansy beach after the shells found there (Green 1969). The Mossel Bay Advertiser of 02-09-1902 (in van den Bosch 2009) while reporting on the wreck of the *Poseidon* (1902) recalls that the *Rosebud* had gone down at Holgat (Dias Beach). While Turner's co-ordinates are given here, in the Mossel Bay Advertiser (08-11-2013), Daniel Rogers states that the *Rosebud* is further away from the beach at approximately 15 m depth.	Pansy Beach 34° 09.80 S 22° 06.70 E (Turner 1988)

#	Name	Events	Nation	Date	Type	History	Location
						 Figure 19: The *Rosebud* ashore (Dias Museum in van den Bosch 2009)	
36	*Ruby* (ex-*Figilante*)	Aground, wrecked	Britain	1866-01-13	Wood schooner	This 82-ton vessel was previously the *Figilante* which was grounded, refloated, repaired and renamed the *Ruby* after being damaged in Table Bay in 1865. The following year, under Captain Parow, the Ruby was on a voyage from Port Elizabeth to Cape Town with a general cargo. While anchored in Mossel Bay during a south-east gale and "driven on shore at a part of the beach known as Munro's Cove" (Cape Argus 23-01-1866 in van den Bosch 2009; Turner 1988; Levine 1989)	Munro Bay
37	*Santos*	Aground, wrecked	Germany	1874-07-18	Wood schooner	This vessel of 163 tons was under Captain Thaysen. It had a cargo of skins, dried fruit and wool, bound for Cape Town. While at anchor in the bay, a heavy south-east swell caused the vessel to drag anchor. The captain was ashore, and no one was prepared to row him to his vessel. The anchor cable parted, and the crew attempted to sail the schooner out the bay. However, the vessel "grounded between two reefs" (Green 1969). The beach where the vessel was wrecked is now known as Santos Beach. No lives were lost, and the wreck was sold for £100 and the rigging and cargo for an additional £300 (Turner 1988; Levine 1989; van den Bosch 2009)	Santos Beach
38	*Seagull*	Aground, wrecked	Norway	1894-03-11	Wood schooner	This 373-ton vessel was built in 1886 and under the command of Captain C. Christensen and on a voyage from Rio de Janeiro via Table Bay with a coffee cargo. She was driven ashore below "De Bakke" during a south-easterly gale (Turner 1988), 3.2 km west of the Customs House (Levine 1989). All ten crew were rescued by the rocket brigade. Turner's (1988) co-ordinates are clearly off as then the wreck would be on the land. Turner (1988: 180) states, "She was dived on in 1983 and many timbers, copper nails and iron knees can be seen protruding from the sand. Her anchor and chain are still clearly visible".	De Bakke Beach Approximate co-ordinates 34° 10.30 S 22° 07.50 E (Turner 1988)

#	Name	Events	Nation	Date	Type	History	Location
						 Figure 20: Sales Notice and photograph of the *Seagull* (van den Bosch 2009)	
39	*Susan Pardew*	Aground, wrecked	Britain	1872-04-28	Wood barque	This vessel of 378 tons was built in 1863 by Hardie at Sunderland. Under Captain Davies, with a wool cargo, while anchored in Mossel Bay, a wind from the south-west sprang up, the barque dragged anchor, the crew tried to sail out of the bay but went aground at the mouth of the Great Brak River. No lives were lost (Turner 1988; Levine 1989; van den Bosch 2009)	Near the Great Brak River
40	*Thrasher*	Aground, wrecked	South Africa	1903-11-14	Steam trawler	A 17-ton fishing vessel drifted onto the rocks near Erme Bay (Green 1969; Levine 1989). According to van den Bosch (2009) the vessel wrecked between Danger Point and De Bakke.	Rocks between Danger Point and De Bakke
41	*Wilhelmine*	Aground, wrecked	Germany	1880-03-17	Wood schooner	This vessel under Captain Rane bound from Rio de Janeiro with 1500 bags of coffee on board, was anchored in the bay. A south-easterly gale sprang up, her anchor cables parted, and she went aground. The crew were all rescued. Her cargo was sold for £75 (Turner 1988; Levine 1989) Apparently, she went ashore near the *Philia* (1880) and the sale of the hull was at Erme Bay	De Bakke
42	*Zara*		Britain	1881-07	Wood yacht	This 152-ton vessel was built in 1853 by White of Cowes and owned by Lord Lilford. Under Captain E.C. Chippendell, she was on a voyage from London to the Fiji Islands. She stopped in Cape Town for repairs and while sailing around Cape Agulhas, she started to leak again, she made for Mossel Bay. While in Munro's Bay, she heeled over and was condemned. (Levine 1989). According to a report in the Mossel Bay Advertiser (29-05-1882) on the loss of the *Louise Dorothea* (1882), during this storm, "The remains of the yacht Zara in Munro Bay, a good portion of which was visible on Sunday morning, have been washed away, and not a vestige is now to be seen." (van den Bosch 2009)	Munro Bay

There are 42 wrecks in the Mossel Bay database, they can be divided as follows:

- 2 wrecks are modern (wrecked within the last 60 years) and not protected by the NHRA
- 6 wrecks removed from Mossel Bay database
- 22 wrecks have well recorded positions, well outside of the Impact Zone
- 12 wrecks may fall within the Impact Zone

7.4. Impact Zone Shipwreck Database

The remaining 12 shipwrecks from the original database are assessed as to the probability of occurring in the Impact Zone according to the impact assessment methodology, below.

RATING	DESCRIPTION
1	improbable (some possibility, but low likelihood)
2	probable (distinct possibility)
3	highly probable (most likely)
4	definite (impact will occur regardless of any prevention measures)

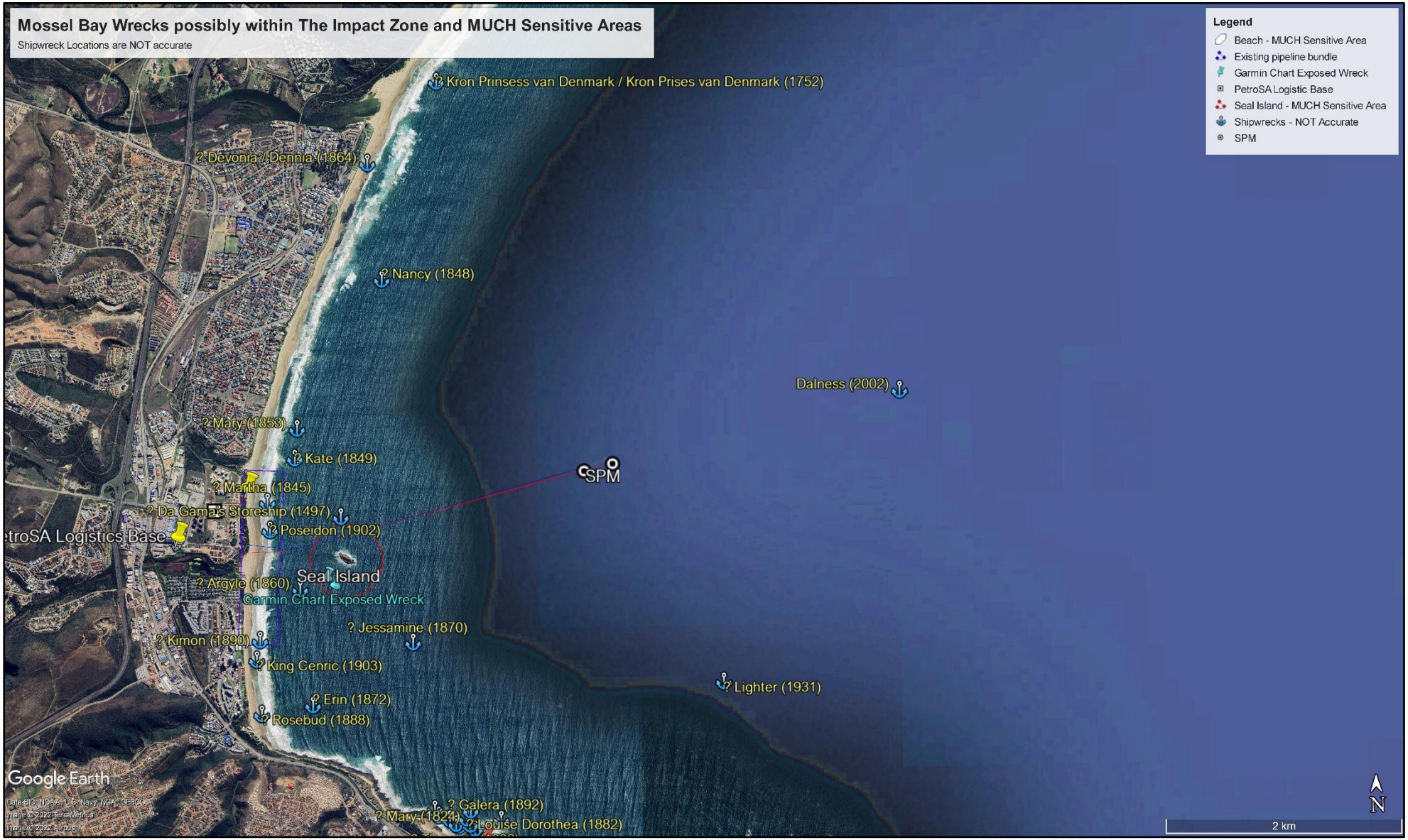


Figure 10: Shipwrecks that may be in the Impact Zone (Google Earth 2020; Turner 1988; Levine 1989; van den Bosch 2009; SAHRIS 2017; Maitland 2022)

7.4.1. IMPROBABLE (1) SHIPWRECKS

#	Name	Events	Nation	Date	Type	History	Location	Heritage Significance	Heritage Extent
1	*Argyle*	Aground; refloated; condemned	Britain	1860-07	Wood barque	Under Captain E. Smith, this vessel, damaged and leaking, put into Mossel Bay. She went ashore at Vaarken's Bay. However, she was refloated and condemned (Levine 1989). It is therefore possible that she was beached and broken up, or sank at the anchorage, or that she was sold, refitted and renamed.	Unknown	Low	International
2	*Erin*	Aground, wrecked	Britain	1872-11-27	Wood barque	In the East Province Herald of 29-11-1872, the *Erin* is referred to as the *Erme.* She was built at Salcombe in 1863, and owned by Messrs. Balkwell & Co. This 306-ton vessel, under Captain King, was loading her cargo for London, which included, 40 bales wool, 120 bundles of skins, 250 cases of aloes, gum and horns. The vessel was beached and wrecked during a south-easterly gale, and apparently lies "on the beach beyond Danger Point" (Figure 12) (The Mossel Bay Advertiser 28-11-1872 in van den Bosch 2009; Turner 1988; Levine 1989)	Beach west of Danger Point	Medium	International
3	*Jessamine*	Wrecked, abandoned, offered for sale	Britain	1870	Wood ship	This 1089-ton ship built in New Brunswick in 1858 was wrecked and abandoned. The vessel and its damaged rice cargo were offered for sale in Mossel Bay. Although I could find no record of where this wreck occurred. I found the ship in the Lloyd's Register of Shipping in 1869 and 1870, the 1870 Register records the vessel as wrecked (Figure 14) and the Eastern Province Herald of 16-08-1873 offers her for sale in Mossel Bay (Figure 15). It is possible that she was beached and broken up, or sank at the anchorage, or that she was sold, refitted and renamed.	Unknown	Low	International
4	*King Cenric*	Aground, wrecked	Norway	1903-11-14	Wood sailing ship	This vessel of 1519 tons, was built in 1874 by Dunlop & Co, St Johns, Canada. Under the command of Capt. A. Paulsen, the vessel was on a voyage from Frederikstad with Baltic timber. A terrible storm was raging, houses were flooding, and this vessel parted both her anchor cables and she ran aground. The rocket brigade saved all the crew. She apparently lies near the *Rosebud* (1888) (Green 1969; Turner 1988). An article in the Mossel Bay Advertiser (08-11-2013), using information from Daniel Rogers states that a wreck that was uncovered is that of the *King Cenric*. Using their photograph from the beach, I was able to find it on Google Earth and the wreck was still visible on 24-06-2020. The location is about 50 m from van den Bosch's (2009) stated location of the wreck. Although this is not definitely the *King Cenric*, it is probable.	Dias Beach	Medium	International
5	*Kron Prinsess van Denmark / Kron Prises van Denmark*	Beached, wrecked	Denmark	1752-06-10	Wood	This vessel was homeward bound from Tranquebar (India) with a cargo of rice, cotton, pepper, sandalwood. In May 1752, a gale damaged the ship severely and the captain decided to sail north until they found land. Eventually on 10 June 1752, they reached Mossel Bay and anchored. After an inspection of the vessel, it was discovered that the bow planks below the waterline were rotten. The	Mossel Bay Possibly near the Hartenbos River	High	International

#	Name	Events	Nation	Date	Type	History	Location	Heritage Significance	Heritage Extent
						rice was spoiled and thrown overboard. The crew then removed ammunition, cotton, pepper, supplies and the sails to construct a tent to house the cargo. A rider was sent to Cape Town to report the wreck and return with inspectors, to survey the damage. In the meantime, bad weather forced the captain to bring the stricken vessel closer to shore, where it was eventually beached. At the end of October, most of the crew travelled to Cape Town, to travel back to Denmark. 28 crew were left guarding the cargo. It was only in the beginning of October 1753, that a Danish vessel arrived to collect the cargo and remaining crew members (van den Bosch 2009). Sparrman (1786) stated that when he visited Mossel Bay in September 1775 he saw: “On a stone hereabouts is engraved an inscription as follows: Captain Swenfinger, of the Danish ship *Kron-Prinsess*, 1752.” He then recounts the story but does not state the exact location of the wreck. There is a Wikipedia page for this wreck that states the wreck is near the Hartenbos River, however I was unable to independently verify this. (https://af.wikipedia.org/wiki/Kroonprinses_van_Denemarke)			

7.4.2. PROBABLE (2) SHIPWRECKS

#	Name	Events	Nation	Date	Type	History	Location	Heritage Significance	Heritage Extent
1	*Kate*	Aground, wrecked	Britain	1849-07-16	Wood schooner	This vessel is called the *Kale* on the Shipwrecks of Mossel Bay poster. This is incorrect. The *Kate* of 271 tons was built by Hutchinson in 1849 at Peterhead. Under Captain Kirby, on a voyage from London, she was wrecked at night during a south-easterly gale. No lives were lost and reportedly lies next to the *Mary* (1853) (Turner 1988; Levine 1989). The wreck and stores were sold on the beach by public auction (van den Bosch 2009)	On the beach	Medium	International
2	*Kimon*	Abandoned, towed, beached	Norway	1890-01	Wood brig	The *Kimon* was on a voyage from Natal to Grimstad, when she was abandoned 75 miles (c. 120 km) south-west of Port Elizabeth, she had a cargo of deals (timber). The crew were rescued by the *Robert* and taken to Cape Town. In the meantime, the *Hawarden Castle* found the abandoned vessel and towed it to Mossel Bay. There, after an inspection, the vessel was beached at Holgat (now Dias Beach) and the cargo salvaged. The hull was reportedly sold for £27 (van den Bosch 2009)	Dias Beach	Low	International
3	*Mary*	Aground, wrecked	Britain	1853-02-16	Wood schooner	This vessel was built in 1847 by Simpson & Co., in Perth, Scotland. Under Captain J. Wood, this 117-ton vessel was anchored in Mossel Bay when her anchor cables parted during a south-easterly gale. One crew member was drowned. The wreck lies near the *Kate* (1849) (Turner 1988; Levine 1989; van den Bosch 2009)	On the Beach	Medium	International
4	*Nancy*	Aground, wrecked		1848-04-05	Wood schooner	This 38-ton vessel under the command of Captain T. Metcalf was grounded and wrecked during a south-easterly gale. One man drowned. Most of the cargo had been unloaded (Turner; 1988; Levine 1989; van den Bosch 2009)	Mossel Bay	Medium	International

7.4.3. HIGHLY PROBABLE (3) SHIPWRECKS

#	Name	Events	Nation	Date	Type	History	Location	Heritage Significance	Heritage Extent
1	*Da Gama's Supply Ship*	Abandoned, burnt	Portugal	1497	Wood supply ship	On 8 July 1497, Vasco da Gama left Portugal. He was in command of four vessels. One of these vessels was a supply ship. In November 1497, the vessel entered the bay. The flotilla stayed in the bay for 13 days. During this time, they unloaded the supply ship, loading the contents onto the other three vessels. They filled their casks with fresh water and managed to barter for some livestock. However, the Khoe were apparently unhappy with the Portuguese taking water without permission and a fight ensued. The seamen fired their cannon at the herders and onto Seal Island amongst the seals. During their stay, they killed penguins on the island and erected a stone padrão and wood cross. They set fire to the abandoned supply ship and left the bay. It is probable that they anchored near Seal Island as it offered some protection from the wind, had a steady supply of food and allowed them to stay aboard, protecting them from the Khoe.	Possibly near Seal Island	Very High	International
2	*Martha*	Aground, wrecked	Britain	1845-08-30	Wood brig	This vessel, built in Devon, England in 1835 was under the command of Captain Boustead. was on her way from Sydney to Table Bay with 20 immigrants and the mail. They were putting into Mossel Bay to stock up on provisions during a south-easterly gale. Apparently wrecked between 3 and 5 km of the landing place, depending on the database (Levine 1989; van den Bosch 2009; Turner 1988).	On the beach	Medium	International
3	*Poseidon*	Aground, wrecked	Norway	1902-09-02	Wood barque	This 606-ton vessel was built in 1890 at Arendal. Under the command of Captain C. Clausen its cargo consisted of 1500 bags of coffee. A south-east gale was blowing, and the vessel began to drag anchor, eventually, "…the ship striking the rocks − in the bight of the Bay, inside Seal Island" (Mossel Bay Advertiser 02-09-1902 in van den Bosch 2009). Everyone aboard was saved by the rocket brigade. (Turner 1988; Levine 1989)	Dias Beach near Seal Island	Medium	International

7.5. Shipwreck Summary in Proposed Pipeline Repair Impact Zone

In the area under consideration there may be 12 shipwrecks, dating from 1497 to 1903.

Table 4: Shipwreck Summary

Number of shipwrecks	Probability
5	Improbable
4	Probable
3	Highly Probable

8. Impact Assessment

8.1. Description of impact

Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon them is permanent and non-reversible. Those resources that cannot be avoided and that are directly impacted by the proposed development can be excavated / recorded and a management plan can be developed for future action. Those sites that are not impacted on can be written into the management plan, whence they can be avoided or cared for in the future.

There is the possibility that MUCH resources may be found and impacted during this project. There are two areas for consideration with regards to this project that require different mitigation measures, as outlined in Section 9 (Figure 21).

8.1.1. Damage to MUCH resources on the seabed as a result of the installation of the bypass pipeline and associated infrastructure on the seabed

- The bypass section is ~1.4 km offshore and ~ 750 m from Seal Island. As mentioned previously, wrecks are usually found close to the shore.
- There are existing pipelines in this area, but an Impact assessment was not undertaken before development in the early 1990s by Mossgas, as the NHRA was only enacted in 1999.
- There may be MUCH resources next to or under the existing pipeline. Due to the proximity of the pipeline, a magnetometer survey is unlikely to find them.
- They are most likely to be uncovered during hydrographic surveys or by the divers.

8.1.2. Damage to MUCH resources on and near the beach as a result of the construction of the launchway from the Onshore Fabrication Yard

- According to the Mossgas L.A.D. Project drawing No. 279/DWG/5102, the launchway will be constructed into the beach and underwater
- As wrecks are usually found close to the shore and several wrecks are reported as “being on the beach”. This is the area where MUCH resources are most likely to be found.

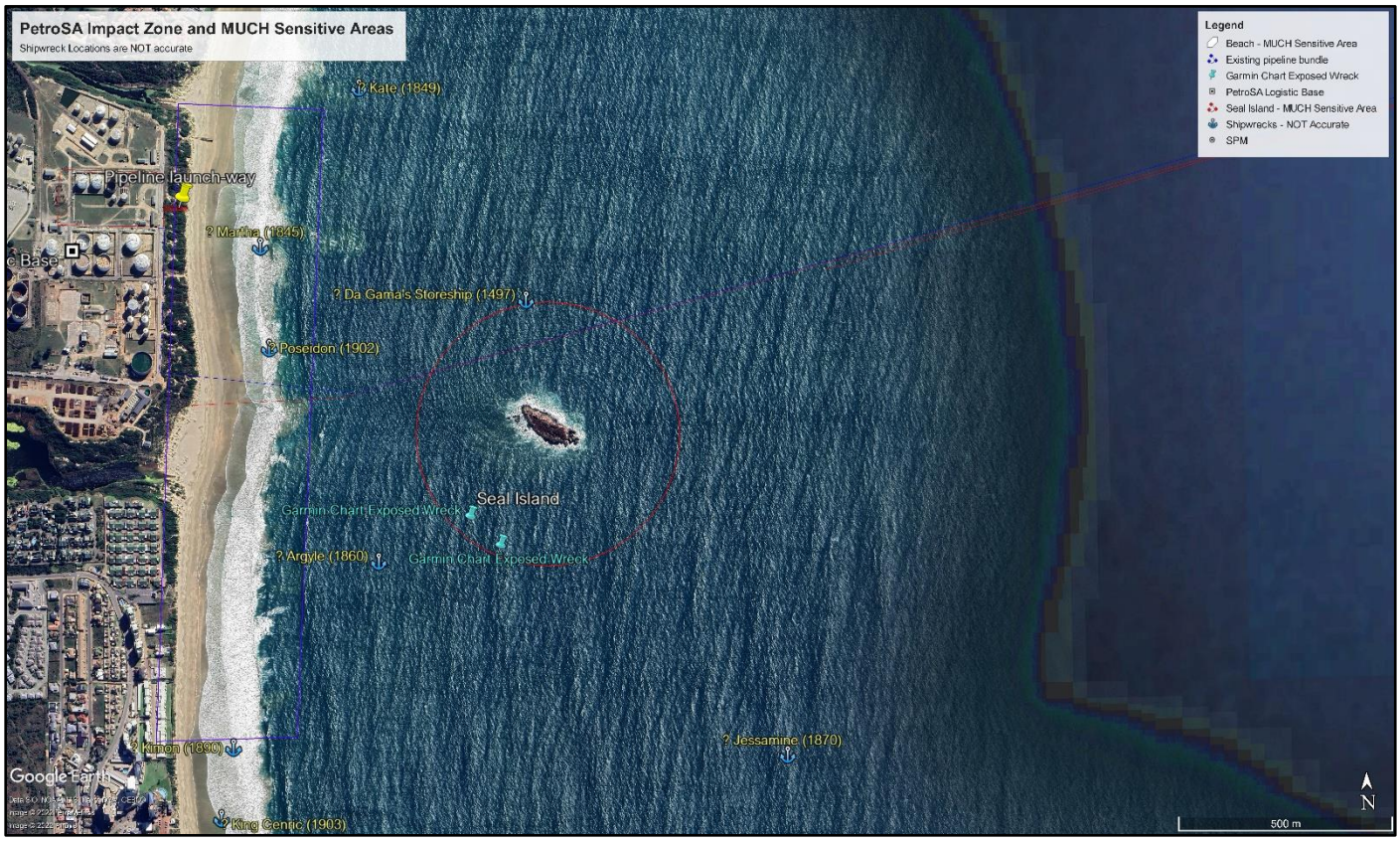


Figure 21: PetroSA Pipeline with possible shipwrecks and MUCH Sensitive Areas (Google Maps 2022)

8.2. IMPACT ASSESSMENT PROCESS

MUCH resources may occur in the Impact Zone.

Scientific disciplines have different approaches to assigning significance and generating an impact assessment. While the final Impact Assessment summaries are homogenised, the methodology to achieve this differs. The key approaches to cultural impact assessments are explained below. The conventions used to assess the impact of projects on cultural heritage resources are detailed in Appendix I.

The shipwrecks represent several nationalities and several historical events, from exploration to trade, military engagements, immigration, and industry.

The wrecks listed in the Shipwreck Database date from the late 1400s to the present day. Wrecks older than 60 years are protected in terms of the NHRA (Section 4).

The shipwreck database (Section 7) gives a brief history of each wreck. The specific significance of an individual shipwreck is calculated on two levels, these are described in the following section.

8.2.1. SIGNIFICANCE VALUES

HISTORIC VALUE

All archaeological sites have a high historic value. They speak for the people that have little to no written record of their past, the disenfranchised and the everyday people who are not included in the written historic record.
Wrecks have a high historic value. As a collective, they represent South Africa's role in the context of global expansion, trade and migration and military conflicts. As individual shipwrecks, the area may contain some of the earlier European shipwrecks on the South African coast. Wrecks from military conflicts are considered to be War Graves and as such are strictly protected by both SAHRA's Burial Unit, the UNESCO Convention on the Protection of Underwater Cultural Heritage (2001) and the Commonwealth War Graves Commission.

AESTHETIC VALUE

Terrestrial sites can have a high aesthetic value, in that tourists from all over come to particularly beautiful sites, specifically the coastal cave sites.
The wrecks have little aesthetic value, other than to recreational divers. These will be the wrecks within the 30 – 40m depth range. The development methodologies can have a significant impact. Experience of wreck sites in South African waters indicates that most of the sites will have little visible structure and are often buried beneath the sea floor sediments. The bathymetry, geology and seabed geomorphology will affect the integrity of the sites.

SCIENTIFIC VALUE

Little is known about the lives of the pre-colonial people, the disenfranchised and the everyday people. Most of what we know today about these historic populations come from the archaeological record.
The vessels may provide high scientific value. The concentration of mid- to late-19th century ships provide a good comparative sample for sites along the South African coast. The 16th, 17th and 18th century wreck sites individually present excellent scientific potential. The results of scientific examination of wrecks of these periods are grossly underrepresented in the South African archaeological record.

SOCIAL VALUE

Archaeological sites create social bonds with the past and return the past to the disenfranchised. The protection and value placed on the past can create social cohesion.
The social value of shipwrecks off the South African coast varies between communities both locally and internationally. It is prudent to set the social value as high in that the cultural heritage markers and artefacts contained within the shipwreck sites have significance in the national identities of countries whose historical development is strongly linked to maritime trade and seafaring. South Africa's historical development is linked inextricably with seafaring and the influx of people from across the globe. Shipwrecks represent a common, shared cultural heritage that highlights South Africa's role in globalisation.

RARITY

Compared to other archaeological sub-disciplines, little academic work has been done in maritime archaeology. Wrecks such as the *Nossa Senhora da Boa Viagem* (1636) are unique. Having been constructed from the timbers of a shipwreck by non- shipwrights, their construction features would provide an exceptional example for archaeological excavation and ship engineering.

REPRESENTIVITY

Shipwreck sites are representative of a myriad of seafaring and maritime nations. They are also representative of exploration, expansion, globalisation and the development of South Africa.

8.2.2. SIGNIFICANCE EXTENT/SPATIAL SCALE

INTERNATIONAL
Wrecks that have an international significance. Due to the global nature of shipping, the majority of shipwrecks fall within this category. Examples include the *Birkenhead* (1852), this vessel was important for South Africa, but also internationally as it witnessed the birth of the "women and children first" tradition.

NATIONAL
These are ships that may have a low international significance but are important on a national level. Examples include the *SS Mendi* (1917). While it may have a medium international significance, it has a high national significance.

PROVINCIAL
These are vessels with provincial significance and include the first Cape coasters. Examples include the *Elizabeth Mary* (1861).

REGIONAL
These are vessels with a regional significance, specifically those that served the east coast trade. Examples include the *Amatola* (1852).

LOCAL
These are vessels that had crew members from the local communities on the east coast. These probably include most of the coasters and fishing vessels. Examples are the *Caledonia* (1905) and the three "*Petrol Launches"* (1905).

SPECIFIC COMMUNITY
The loss of certain vessels may be significant to a specific community. For example, the three *"Petrol Launches"* (1905). These were local vessel used to move supplies and people between the shore and vessels in the anchorage.

Of the possible 12 wrecks in the Impact Zone, all of them are protected under the NHRA as they are older than 60 years.

8.2.3. PROBABILITY OF IMPACTS OCCURRING

In general, shipwrecks are found close to the shore and near ports and harbours, whether natural or man-made. Wrecks were assigned to an area based on the available history of each wreck. If the information was inadequate, it was included into the Impact Zone Shipwreck Database and thereafter assigned a probability rating.

8.3. POSSIBLE MITIGATION MEASURES

The below table lists possible mitigation measures and their feasibility within the different areas. It is included in order to elucidate choices for the impact Tables in Section 9

TABLE 5: MITIGATION MEASURES

Standard Mitigation Measures	**Existing Pipeline**		**Launchway Site**	
Magnetometer Survey	No	The pipeline will create magnetic noise which will hide any MUCH resources	No	The site is too close to the shore, the magnetometer survey is done from a RIB
Hydrographic Surveys: Multibeam Side scan Sub-bottom profile	Yes	These surveys are already being undertaken (Consub 2020) , ergo the hydrographic survey contractors must note any MUCH resources seen and share that information with	Yes	If hydrographic surveys are undertaken along the launchway site, the surveyors must note any MUCH resources seen and share that information with the maritime

		the maritime archaeologist, prior to work being undertaken.		archaeologist, prior to work being undertaken.
ROV Surveys	Yes	If ROV surveys are undertaken on the pipeline, and the pilot notes unexpected objects, this must be shared with the archaeologist for assessment.		
Archaeological Induction	Yes	The contractors must be inducted to understand the significance of MUCH and be able to identify possible MUCH resources. **Contractors:** Hydrographic Surveyors Divers	Yes	The contractors must be inducted to understand the significance of MUCH and be able to identify possible MUCH resources. **Contractors:** Hydrographic Surveyors Divers Construction crew

- Archaeological materials are often buried. In order to mitigate against this, an archaeological component must be a part of the Environmental Awareness Programme that contractors attend. This is to sensitise contractors and plant operators to the archaeological importance of the region; it should include specific training on artefact identification and management. This would involve input from a maritime archaeologist.
- After an archaeological induction, if artefacts are found, a maritime archaeologist must be contacted to assess the find. Under no circumstances shall any artefacts and/or archaeological material be removed, destroyed, or interfered with by anyone on the site, unless under a permit issued by SAHRA; and
- If MUCH sites are uncovered during the project, a maritime archaeologist needs to be contacted to assess the site. Thereafter, in conjunction with SAHRA, a decision will be made regarding the significance of the site. If it is deemed to be significant, a permit would be required for its removal, excavation, or destruction in terms of Section 35 of the NHRA.
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, or archaeological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).

9. IMPACT ASSESSMENT TABLES: DESIGN AND CONSTRUCTION (INSTALLATION PHASE)

9.1. BYPASS PIPELINE - IMPACT ASSESSMENT TABLES

These tables must be consulted in conjunction with the Impact Zone Shipwreck Database.

9.1.1. IMPROBABLE SHIPWRECKS

TABLE 6: BYPASS PIPELINE - IMPROBABLE SHIPWRECKS: IMPACT ASSESSMENT WITH MITIGATION

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local - International	Local - International
Duration	Permanent	Permanent if not avoided
Intensity	High	Low
Probability	Improbable	Improbable
Confidence	High	Low
Consequence	**High**	**Low**
Significance	**Medium -ve**	**Low +ve**
Mitigation	• Undertake Hydrographic Surveys (to confirm MUCH resources / foreign objects) of the site proposed for the bypass pipeline and associated infrastructure prior to installation of the infrastructure – If potential MUCH resources are found, appoint a maritime archaeologist to assess the find, prior to work being undertaken. • Do not remove or destroy cultural, historical, or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA. • A heritage section must be included by the ECO in the Environmental Awareness training to the contractors – see Section 11.	

9.1.2. PROBABLE SHIPWRECKS

TABLE 7: BYPASS PIPELINE - PROBABLE SHIPWRECKS: IMPACT ASSESSMENT WITH MITIGATION

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local - International	Local - International
Duration	Permanent	Permanent if not avoided
Intensity	High	Low
Probability	Probable	Improbable
Confidence	High	Low
Consequence	**High**	**Low**
Significance	**Medium -ve**	**Low +ve**
Mitigation	• Undertake Hydrographic Surveys (to confirm MUCH resources / foreign objects) of the site proposed for the bypass pipeline and associated infrastructure prior to installation of the infrastructure – If potential MUCH resources are found, appoint a maritime archaeologist to assess the find, prior to work being undertaken. • Do not remove or destroy cultural, historical, or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA. • A heritage section must be included by the ECO in the Environmental Awareness training to the contractors – see Section 11.	

9.1.3. HIGHLY PROBABLE SHIPWRECKS

TABLE 8: BYPASS PIPELINE - HIGHLY PROBABLE SHIPWRECKS: IMPACT ASSESSMENT WITH MITIGATION

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local - International	Local - International
Duration	Permanent	Permanent if not avoided
Intensity	High	Low
Probability	Highly Probable	Improbable
Confidence	High	Low
Consequence	**High**	**Low**
Significance	**Medium -ve**	**Low +ve**
Mitigation	• Undertake Hydrographic Surveys (to confirm MUCH resources / foreign objects) of the site proposed for the bypass pipeline and associated infrastructure prior to installation of the infrastructure – If potential MUCH resources are found, appoint a maritime archaeologist to assess the find, prior to work being undertaken. • Do not remove or destroy cultural, historical, or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA. • A heritage section must be included by the ECO in the Environmental Awareness training to the contractors – see Section 11.	

9.2. BEACH LAUNCHWAY - IMPACT ASSESSMENT TABLE

These tables must be consulted in conjunction with the Impact Zone Shipwreck Database.

9.2.1. IMPROBABLE SHIPWRECKS

TABLE 9: BEACH LAUNCHWAY - IMPROBABLE SHIPWRECKS: IMPACT ASSESSMENT WITH MITIGATION

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local - International	Local - International
Duration	Permanent	Permanent if not avoided
Intensity	High	Low
Probability	Improbable	Improbable
Confidence	High	Low
Consequence	**High**	**Low**
Significance	**Medium -ve**	**Low +ve**
Mitigation	• Do not remove or destroy cultural, historical, or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA.	

	• A heritage section must be included by the ECO in the Environmental Awareness training to the contractors – see Section 11.

9.2.2. PROBABLE SHIPWRECKS

TABLE 10: BEACH LAUNCHWAY - PROBABLE SHIPWRECKS: IMPACT ASSESSMENT WITH MITIGATION

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local - International	Local - International
Duration	Permanent	Permanent if not avoided
Intensity	High	Low
Probability	Probable	Improbable
Confidence	High	Low
Consequence	**High**	**Low**
Significance	**Medium -ve**	**Low +ve**
Mitigation	• Do not remove or destroy cultural, historical, or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA. • A heritage section must be included by the ECO in the Environmental Awareness training to the contractors – see Section 11.	

9.2.3. HIGHLY PROBABLE SHIPWRECKS

TABLE 11: BEACH LAUNCHWAY - HIGHLY PROBABLE SHIPWRECKS: IMPACT ASSESSMENT WITH MITIGATION

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local - International	Local - International
Duration	Permanent	Permanent if not avoided
Intensity	High	Low
Probability	Highly Probable	Improbable
Confidence	High	Low
Consequence	**High**	**Low**
Significance	**Medium -ve**	**Low +ve**
Mitigation	• Do not remove or destroy cultural, historical, or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA. • A heritage section must be included by the ECO in the Environmental Awareness training to the contractors – see Section 11.	

10. CONCLUSIONS

This specialist study has found that there is a possibility that impacts to underwater heritage resources could occur through the repair of the undersea pipeline. The present report finds that the project is feasible, so long as the aforementioned mitigation measures are applied. With mitigation there is the possibility of a benefit to heritage through the discovery and recording of previously unknown underwater heritage.

11. RECOMMENDATIONS

It is recommended from the perspective of underwater cultural heritage that the project can be authorised, but the following requirement must be included in the conditions of authorisation:

- Undertake Hydrographic Surveys (to confirm MUCH resources / foreign objects) of the site proposed for the bypass pipeline and associated infrastructure prior to installation of the infrastructure. If potential MUCH resources are found, appoint a maritime archaeologist to assess the find, prior to work being undertaken.
- Do not remove or destroy cultural, historical, or archaeological artefacts from the seabed without the necessary permit in terms of Section 35 of NHRA.
- A heritage section must be included by the ECO in the Environmental Awareness training to the contractors – see Section 11.

Objectives

- Protection of heritage sites within the project boundary against vandalism, destruction and theft.
- The preservation and appropriate management of new discoveries in accordance with the NHRA, should these be discovered during development activities.

Through:

- The contractors and workers should be given a short induction, by the ECO, on archaeological site and artefact recognition, the importance of heritage sites and heritage sensitivity of the area, and procedures to follow in the event of finding heritage resources.

Consequently:

- This will sensitise them to the possibility that archaeological sites / objects might be exposed during the construction activities, and;
- That should any heritage artefacts be exposed during construction, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1) – Appendix II.

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APPENDIX I: CONVENTIONS USED TO ASSESS THE IMPACT OF PROJECTS ON HERITAGE RESOURCES

Significance
According to the NHRA, Section 2(vi) the **significance** of heritage sites and artefacts is determined by it aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these.

Matrix used for assessing the significance of each identified site/feature

1. **Historic value**
   - Is it important in the community, or pattern of history
   - Does it have strong or special association with the life or work of a person, group or organisation of importance in history
   - Does it have significance relating to the history of slavery
2. **Aesthetic value**
   - It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group
3. **Scientific value**
   - Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage
   - Is it important in demonstrating a high degree of creative or technical achievement at a particular period
4. **Social value**
   - Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
5. **Rarity**
   - Does it possess uncommon, rare or endangered aspects of natural or cultural heritage
6. **Representivity**
   - Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects
   - Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class
   - Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.

7. Sphere of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			
Specific community			

8. **Significance rating of feature**
   1. Low
   2. Medium
   3. High

Significance of impact:
- low: where the impact will not have an influence on or require to be significantly accommodated in the project design
- medium: where the impact could have an influence which will require modification of the project design or alternative mitigation
- high: where it would have a “no-go” implication on the project regardless of any mitigation

Certainty of prediction:
- Definite: More than 90% sure of a particular fact. Substantial supportive data to verify assessment
- Probable: More than 70% sure of a particular fact, or of the likelihood of that impact occurring
- Possible: Only more than 40% sure of a particular fact, or of the likelihood of an impact occurring
- Unsure: Less than 40% sure of a particular fact, or the likelihood of an impact occurring

Recommended management action:
For each impact, the recommended practically attainable mitigation actions which would result in a measurable reduction of the impact, must be identified. This is expressed according to the following:

1 = no further investigation/action necessary
2 = controlled sampling and/or mapping of the site necessary
3 = preserve site if possible, otherwise extensive salvage excavation and/or mapping necessary
4 = preserve site at all costs
5 = retain graves

Legal requirements:
Identify and list the specific legislation and permit requirements which potentially could be infringed upon by the proposed project, if mitigation is necessary.

APPENDIX II: PENALTIES ASSOCIATED WITH CONTRAVENING THE NHRA (NO. 25 OF 1999)

Any person who fails to protect any heritage object or contravenes the NHRA is guilty of an offence and liable to a **fine** or **imprisonment** or both a **fine and imprisonment** for a period of up to **five years**.

Any person who fails to protect any structures, archaeology, palaeontology, meteorites, burial grounds or graves or who exports or imports objects protected in terms of laws of foreign states is guilty of an offence and liable to a **fine** or **imprisonment** or both such **fine and imprisonment** for a period of up to **three years**.

Any person who fails to protect any heritage area or structures is guilty of an offence and liable to a **fine** or **imprisonment** or both such **fine and imprisonment** for a period of up to **two years**.

Any person who fails to comply with any notice in connection with a national heritage site or provincial heritage site, heritage object, structures, archaeology, palaeontology, meteorites, burial ground or grave is guilty of an offence and liable to a **fine** or **imprisonment** or both such **fine and imprisonment** for a period of up to **one year.**

Admission of guilt fines and daily fines for not complying with permit conditions

The Minister or the MEC may make regulations in terms of which the magistrate of the district concerned may– levy admission of guilt fines up to a maximum amount of **R10 000** for infringement of the Act for which such heritage resources authority is responsible; and serve a notice upon a person who is contravening a specified provision of the Act or has not complied with the terms of a permit issued by such authority, imposing a daily fine of R50 for the duration of the contravention, subject to a maximum period of 365 days.

Damages

When any person has been convicted of any contravention of the Act which has resulted in damage to or alteration of a protected heritage resource, the court may order such person to remedy the result of the act of which he or she was found guilty in a specified manner and time.

In addition to other penalties, if the owner of a place has been convicted of an offence in terms of the NHRA involving the destruction of or damage to a place, the Minister on the advice of SAHRA or the MEC on the advice of a provincial heritage resources authority may order the owner that **no development** of such place may be undertaken, except to fix the damage and maintain the cultural value of the place, for a period of up to 10 years.

The Minister, on the advice of SAHRA, may reconsider an order of no development and may amend or repeal such order.

Vandalism

In any case involving vandalism, and whenever else a court deems it appropriate, **community service** involving conservation of heritage resources may be substituted for or instituted in addition to a **fine or imprisonment**.

Forfeiture order

Where a court convicts a person of an offence in terms of the NHRA, it may order the **forfeiture** of a vehicle, craft, equipment or any other thing used or otherwise involved in the committing of the offence to SAHRA or the provincial heritage resources authority concerned. Such object may be **sold** or otherwise disposed of as the heritage resources authority concerned deems fit.

APPENDIX III: CURRICULUM VITAE OF SPECIALIST

VANESSA MAITLAND
MARITIME ARCHAEOLOGIST

Elandskraal, Western Cape
Cell: 082 490-4066
E-mail: vanessa@cocojams.co.za
ASAPA (Association of Southern African Professional Archaeologists) Member No: 326

EDUCATION

1986 Hill College Port Elizabeth
- Matriculated

1987-1988 University of Cape Town Cape Town
- BA – First & Second Year

1992-1993 University of Witwatersrand Johannesburg
- Completed BA, majored in Archaeology and Jewish Studies
- Other subjects studied include: Anthropology, Geology, Classical Civilizations, Hebrew, History, Biblical Archaeology

1996 University of Witwatersrand Johannesburg
- BA Honours – Archaeology

2010 - 2012 NAS/SAHRA/IZIKO Cape Town
- NAS I, II & III: Underwater Survey and Fieldwork Courses
- Iziko Waterlogged Artefact Conservation Course

2010 University of Witwatersrand Johannesburg
- ARCGIS Course

2011 University of Witwatersrand Johannesburg
- GRASS & QGIS Course

2013-2015; 2019-2022 University of South Africa Pretoria
- Masters Degree in Maritime Archaeology

ARCHAEOLOGICAL EXPERIENCE

Archaeological excavations at:
- Border Cave, KZN (Stone Age Archaeology)
- The Castle, C.T. (Historical Archaeology)
- Roosfontein Shelter, F.S. (Stone Age Archaeology)
- Rose Cottage Cave, F.S. (Stone Age Archaeology)
- de Hoop, Mpumalanga (Stone Age Archaeology)
- Nettleton Dump, JHB (Historical Archaeology)
- Modderfontein Railway Dump, JHB (Historical Archaeology)
- Stone Age Site near Maun, Botswana. (Stone Age Archaeology)
- Bulhoek, Eastern Cape (Historical Archaeology)
- Site Archaeologist on the *County of Pembroke* wreck (Maritime Archaeology)
- Site Archaeologist on the *Karin* wreck site (Maritime Archaeology)
- Survey of Robben Island wrecks (Maritime Archaeology)
- Survey of “The Barrel Wreck”, Table Bay (Maritime Archaeology)
- Survey of *Odd* wreck site, Durban (Maritime Archaeology)
- Scoping Report, Berths 203-5 & Salisbury Island, Durban Harbour

- Underwater HIA, Berths 203-5 & Sand Winning Sites, Durban Harbour
- Underwater HIA and Land HIA, Pier 1, Durban Harbour
- Platberg Mission Station (Historical Archaeology)
- Inhambane (Mozambique) Slave Wreck Project Magnetometer Survey
- Bloubergstrand, Cape Town Slave Wreck Project Magnetometer Survey
- Senegal, African Slave Wreck Project Magnetometer Survey & Training
- Ilha de Mozambique Slave Wreck Project Magnetometer Survey & Training
- Durban, SAPREF Pipeline Desktop & Magnetometer Survey
- Cape Recife, Port Elizabeth WWTW Desktop, Magnetometer Survey & diver searches
- Cape Recife, Port Elizabeth Wreck Mapping
- False Bay, Cape Town Desalination Desktop, Magnetometer Survey & diver searches
- Hermanus, Western Cape; Magnetometer Survey and diver searches for Neptune Divers
- Port of Ngqura, Port Elizabeth; Magnetometer Survey
- Algoa Bay, Lost Anchor Survey
- Port of Saldanha, Western Cape Magnetometer Survey and diver searches
- Port of Richards Bay, Magnetometer Survey
- Port of Dar es Salaam, Tanzania, Magnetometer Survey
- Table Bay Lost Anchor Survey
- East London, Lost Dredger Head Survey
- Algoa Bay, Lost Anchor Survey

ARCHAEOLOGICAL WORK EXPERIENCE

2004 Subtech Diving & Marine Port Elizabeth
Admin Assistant & Archaeological Advisor
- Research on unknown wreck site
- Compiling interim reports on *County of Pembroke* wreck site

2007-2008 Site Archaeologist Port Elizabeth
- Diving and collecting data on *County of Pembroke* wreck site
- Liaising with Bayworld re curation of artefacts
- Research
- Archaeological reports

2009 Independent Contractor Durban
- Diving and collecting data on “Anomaly 27” wreck site
- Liaising with SAHRA regarding site

2010 Independent Contractor Durban
- Fieldwork and research on the *Karin* (“Anomaly 27”) wreck
- Archaeological report on the *Karin*
- NAS (Nautical Archaeology Society) I course on Robben Island
- NAS II course on Robben Island
- NAS III (1st & 2nd Module) course on Robben Island
- Editing and co-authoring NAS II group report
- Organising and training at NAS I (Durban) Course

2011 Independent Contractor Durban
- Fieldwork and tutor on NAS II Robben Island Course
- Fieldwork and tutor on NAS II Durban Course
- Heritage Scoping Report for the Proposed Developments at the Container Terminal at the Port of Durban for CSIR

2012 Independent Contractor Durban
- Fieldwork and tutor on NAS II Robben Island Course
- Fieldwork on “The Barrel Wreck” for Masters degree

- Underwater HIA for Berth 203-5 & Sand Winning Areas at Durban Harbour for Nemai Consulting

2013 Independent Contractor/ACHA Durban
- Underwater HIA and Land HIA, Pier 1, Durban Harbour
- Registered for Masters at UNISA
- Fieldwork at Bulhoek – Free State

2014 ACHA Durban
- Fieldwork at Platberg Mission Station – Free State
- Inhambane (Mozambique) Slave Wreck Project Magnetometer Survey
- Underwater HIA for Pier 1 at Durban Harbour for Jeffares & Green

2015 ACHA Durban
- Bloubergstrand, Cape Town Slave Wreck Project Magnetometer Survey
- HIA for Pier 1 at Durban Harbour for Jeffares & Green
- Tutor WITS MUCH Field School - Durban
- Fieldwork at Platberg Mission Station – Free State
- Site Archaeologist at KZN Children's Hospital – Durban
- Project Director Transnet MUCH Project

2016 ACHA Durban
- Senegal, African Slave Wreck Project Magnetometer Survey and Training
- Ilha de Mozambique, African Slave Wreck Project Magnetometer Survey and Training
- Fieldwork at Platberg Mission Station – Free State
- Saldanha Bay shipwreck research for Dr Jonathan Sharfman
- Site Archaeologist at KZN Children's Hospital – Durban
- Maritime Heritage Desktop Survey for Umgeni Water Amanzi's proposed construction of desalination plants at: Lovu River & Tongaat – KZN
- Maritime Heritage Desktop Survey for Ibhubesi Gas Project
- MUCH Heritage Display for Transnet's Maritime School of Excellence Graduation
- Project Director Transnet MUCH Project

2017 ACHA/Independent Consultant Cape Town
- Project Director Transnet MUCH Project
- Ilha de Mozambique, African Slave Wreck Project Magnetometer Survey
- UHIA and Magnetometer Survey, Richard's Bay Floating Dock
- UHIA and Magnetometer Survey, Hitachi Water Remix Project
- Statement on Maritime Structures, Gansbaai and Still Bay
- SAPREF UHIA and Assessment of ROV Survey
- UHIA, De Beers, West Coast Concessions

2018 ACHA/Independent Consultant Cape Town
- SAPREF Magnetometer Survey, Durban
- Magnetometer and Diver Survey for CoCT on Monwabisi and Strandfontein Desalination Sites, Cape Town
- UHIA, Magnetometer and Diver Survey for NMBM Outfall Pipes, Cape Recife, Algoa Bay
- UHIA, Alexkor, West Coast Concessions
- Wreck Mapping for for NMBM Outfall Pipes, Cape Recife, Algoa Bay
- Ilha de Mozambique, African Slave Wreck Project Magnetometer Survey

2019 ACHA/Independent Consultant Knysna
- SAPREF Magnetometer Survey, Durban
- Wreck Mapping for NMBM Outfall Pipes, Cape Recife, Algoa Bay
- HIA for Buccara-Africa's Noetzie Helipad and Walkway Development

2020 ACHA/Independent Consultant Knysna
- Hermanus, Western Cape Magnetometer Survey and Diver Searches for local dive company, Neptune Divers
- Port of Ngqura Desktop Assessment, Magnetometer Survey and Diver Searches

2021 ACHA/Independent Consultant Knysna

- Mossel Bay. WC, Desktop Assessment for the Proposed Undersea Gas Pipeline, ASHA Consulting
- Port of Saldanha, Desktop Assessment, Magnetometer Survey and Diver Searches for Gas to Power Powership, Triplo4 Sustainable Solutions
- Port of Dar es Salaam, Tanzania, Magnetometer Survey with Tritan Survey for CHC
- Port of Richards Bay Magnetometer Survey with Tritan Survey for Gas to Power Powership Project
- Table Bay Lost Anchor Magnetometer Survey

2022 ACHA/Independent Consultant Knysna

- Mossel Bay. WC, Desktop Assessment for the PetroSA
- East London, Lost Dredger Head Magnetometer Survey
- Algoa Bay Lost Anchor Magnetometer Survey
- UHIA, West Coast Concessions

OTHER QUALIFICATIONS & INFORMATION

- NAUI Dive Master
- Commercial Diver Class IV
- CRM Field Director – ASAPA
- CRM Accreditation – Amafa
- South African and British Passports
- Fully Vaccinated with Pfizer for Covid-19

APPENDIX IV: DECLARATION OF INDEPENDANCE

UNDERWATER HERITAGE IMPACT ASSESSMENT – DESKTOP STUDY
PETROSA - PROPOSED BYPASS PIPELINES AND REPOSITIONING OF SINGLE-POINT MOORING (SPM) BUOY
MOSSEL BAY, SOUTH AFRICA

Terms of Reference

This assessment is the Underwater Heritage Impact Assessment, and it assesses the overall cultural heritage potential within area in terms of the proposed development.

Declaration

I …**Vanessa Maitland**……, as the appointed independent specialist hereby declare that I:

- act/ed as the independent specialist in the compilation of the above report;
- regard the information contained in this report as it relates to my specialist input/study to be true and correct, and
- do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- have and will not have any vested interest in the proposed activity proceeding;
- have disclosed to the EAP any material information that has or may have the potential to influence the decision of the competent authority or the objectivity of any report, plan or document required in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management act;
- have provided the EAP with access to all information at my disposal regarding the application, whether such information is favourable to the applicant or not; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.

Signature of the specialist
- Maritime Archaeologist

Date: 19 October 2022