2022 UNDERWATER ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED GAS TO POWER POWERSHIP PROJECT AT THE PORT OF SALDANHA BAY

Western Cape

South Africa



# 2022 UNDERWATER ARCHAEOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED GAS TO POWER POWERSHIP PROJECT AT THE PORT OF SALDANHA BAY, WESTERN CAPE

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#### **Declaration:**

I, Vanessa Maitland, declare that I have no financial or personal interest in the proposed development, norits developers or any of their subsidiaries, apart from the provision of heritage assessment and management services.

### Mailland

Vanessa Maitland Maritime Archaeologist 11-10-2022

#### **EXECUTIVE SUMMARY**

The project entails the generation of electricity from a floating mobile Powership moored in the Port of Saldanha Bay. It proposes two ships berthing during the project lifespan, a Floating Storage and Regasification Unit (FSRU) and one Powership. A Liquefied Natural Gas (LNG) carrier is to supply LNG to the FSRU on a short-term basis in a 20 to 30-day cycle. The natural gas is pumped from the FSRU to the Powership via the development and operation of a gas pipeline.

This report is an addendum to the Heritage Impact Assessment (HIA) completed by ACRM in October 2020 and updated 2022 report, it was undertaken to address shortfalls noted by the Maritime and Underwater Cultural Heritage (MUCH) Unit of the South African Heritage Resources Agency (SAHRA) (Interim Comment: Case ID 15687 12-03-2021). Additionally, it collates all the UHIA data, retrieved from two separate field surveys and addresses potential shortcomings noted in the Minister's response to the Appeal, dated 05 August 2022. It also addresses the updated project footprint which resulted from stakeholder engagements and specialist recommendations.

As part of the Environmental Impact Assessment (EIA) and HIA, an Underwater Archaeological Impact Assessment (UAIA) needed to be undertaken to identify sensitive cultural heritage sites in the affected environment. The aim of the survey was to attempt to locate, identify, evaluate and document potential underwater and cultural heritage sites within the designated 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.

|--|

Relevant section	Relevant section in this		
in GNR. 982		report	
(a)details of—	(i) the specialist who prepared the report; and	Page 2	
	<ul> <li>the expertise of that specialist to compile a specialist report including a curriculum vitae;</li> </ul>	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 4	
(cA)	an indication of the quality and age of base data used for the specialist report;	Section 6	
(cB)	a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 6	
(d)	the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 7	
(e)	a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 4	
(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 6.3	
(g)	an identification of any areas to be avoided, including buffers;	Section 10.2	
(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 10.1	
(i)	<ul> <li>a description of any assumptions made and any uncertainties or gaps in knowledge.</li> <li>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.</li> </ul>	Section 4	
(j)	a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 10.2	
(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 12	
(I)	any conditions for inclusion in the environmental authorisation;	Section 12	
(m)	any monitoring requirements for inclusion in the EMPr or environmental authorisation;	Section 12	
(n) a reasoned opinion—	<ul> <li>(i) whether the proposed activity, activities or portions thereof should be authorised;</li> </ul>	Section 13	
	(iA) regarding the acceptability of the proposed activity or activities; and	Section 13	

	(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.	Section 12 Section 13
	Note: We need to include whether these mitigation measures (excluding ongoing monitoring) can be practically implemented prior to commencement or not.	
(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 TERMS AND ACRONYMS

#### TERMS

Anomaly	A magnetic change within the earth's natural magnetic field
Impact Zone	Area that may be impacted by the pipeline development footprint
nT	Nanotesla - a unit of measure of the strength of the magnetic field
Mag	Magnetometer

#### ACRONYMS

Association of Southern African Professional Archaeologists
Environmental Impact Assessment
Floating Storage and Regasification Unit
Heritage Impact Assessment
Liquid Natural Gas
Maritime and Underwater Cultural Heritage
National Heritage Resources Act (No. 25 of 1999)
Rigid Inflatable Boat
South African Heritage Resources Agency
Underwater Archaeological Impact Assessment

## **1.** INTRODUCTION

The project entails the generation of electricity from a floating mobile Powership moored in the Port of Saldanha Bay. It proposes two ships berthing during the project lifespan, a Floating Storage and Regasification Unit (FSRU) and one Powership. A Liquefied Natural Gas (LNG) carrier is to supply LNG to the FSRU on a short-term basis in a 20 to 30-day cycle. dependent on power generation demand from the grid operator. The LNG is re-gasified on demand aboard the FSRU and natural gas is pumped from the FSRU to the Powership via the development and operation of a gas pipeline.

This report is an addendum to the Heritage Impact Assessment (HIA) completed by ACRM in October 2020 and updated 2022 report, it was undertaken to address shortfalls noted by the Maritime and Underwater Cultural Heritage (MUCH) Unit of the South African Heritage Resources Agency (SAHRA) (Interim Comment: Case ID 15687 12-03-2021). Additionally, it collates all the UHIA data, retrieved from two separate field surveys and addresses potential shortcomings noted in the Minister's response to the Appeal, dated 05 August 2022. It also addresses the updated project footprint which resulted from stakeholder engagements and specialist recommendations.

As part of the Environmental Impact Assessment (EIA) and HIA, an Underwater Archaeological Impact Assessment (UAIA) needed to be undertaken to identify sensitive cultural heritage sites in the project site, below the high-water line. The aim of the survey was to attempt to locate, identify, evaluate and document potential underwater and cultural heritage sites within the designated area.

This UAIA covers the underwater cultural heritage. The aim of the survey was to attempt to locate, identify, evaluate and document potential underwater cultural heritage sites within the designated area.

This report consists of 5 sections:

- 1. Desktop study, consisting of a database of known and/or suspected wrecks in the area through study of available written and oral resources
- 2. A magnetometer survey of the designated area to identify magnetic anomalies that may be underwater cultural heritage sites
- 3. Diver searches on identified magnetic anomalies
- 4. Site significance, assessment and mitigation of impacts
- 5. Conclusions

South Africa's heritage resources comprise a wide range of sites, features, objects and beliefs. According to Section 27(18) of the National Heritage Resources Act (No. 25 of 1999) (NHRA), no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage or archaeological site without a permit issued by the heritage resources authority responsible for the protection of such site.

Therefore, in accordance with the NHRA, an independent maritime archaeologist was appointed to conduct an UAIA to determine the potential sites, to assess their significance and to mitigate negative impacts.

This report is one section of the Environmental Impact Assessment (EIA) as required by the EIA Regulations in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and is intended for submission to SAHRA.

## 2. TERMS OF REFERENCE

The aim of the UAIA is to determine if any sites, features or objects of cultural heritage significance exist within the defined areas.

The scope of work consisted of the following:

• Desktop study, consisting of a database of known and suspected wrecks in the area ascertained through study of available written and oral resources

- Magnetometer (mag) survey of the impact zone
- Diver searches on identified magnetic anomalies

The objectives were to:

- Identify potential Maritime and Underwater Cultural Heritage (MUCH) sites within the impact zone
- Evaluate the potential impact of development in the impact zone
- Recommend measures to mitigate any negative impacts on MUCH sites in the designated area

## **3. HERITAGE RESOURCES**

#### **3.1. THE LEGISLATION**

According to Section 32 (1) of the National Heritage Resources Act (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 300m 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 m2 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 m2 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."

#### 3.2 CONCLUSION - THE LEGISLATION IN TERMS OF THE PROJECT

There is extensive national legislation covering heritage and archaeological sites. Within the scope of this project, Section 38 of the Act, states that an assessment of potential heritage resources in the development area needs to be done. This is the purpose of the desktop study and the magnetometer survey. These processes identify potential MUCH sites.

## 4. STUDY APPROACH AND METHODOLOGY

A polycentric approach to the proposed project requires the holistic consideration of all relevant factors, inclusive of potential impacts that the proposed Project could have on the local as well as the broader community. Section 2(4)(b) of NEMA states that Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated, and it must take into account the effects of decisions on all aspects of the environment and all people in the environment by pursuing the selection of the best practicable environmental option. Sustainable development as per NEMA requires the integration of social, economic, and environmental factors in the planning, implementation, and evaluation of proposed projects, to ensure that development serves the needs of present and future generations.

This specialist assessment considered both the positive and negative impacts of actual and potential impacts on the geographical, physical, biological, social, economic, and cultural aspects of the environment in a polycentric and holistic approach, to ensure that all relevant aspects are weighed up against each other and to identify the risks and consequences of alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management as set out in section 2 of NEMA.

A specialist integrative workshop and weekly meetings were held during the EIA process where specialists raised matters to be considered by the specialist team and also verified technical information to prevent any discrepancies and where relevant, to co-ordinate approaches.

This approach ensured that there are no gaps contained between the various specialist reports and provides a holistic picture of the project and allows a polycentric assessment of environmental and socio-economic impacts and the

identification of appropriate mitigations and recommendations for potential negative impacts and the maximisation of positive impacts and the value of the project to society.

While underwater cultural heritage falls under the umbrella of the environmental cluster of studies, a polycentric approach is only valid if MUCH resources are present. There was collaboration with the terrestrial heritage specialist, J. Kaplan of ACRM.

### 4.1. EXTENT OF THE ASSESSMENT

This survey and impact assessment is concerned with archaeological sites and covers the area as described in Section 5.

### 4.2. METHODOLOGY

### 4.2.1. DESKTOP SURVEY

A database was compiled from the available written and oral sources and is available in Section 6.

The shipwreck database highlights the wrecks that are or may be in the area. 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 hard 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.

### LIMITATIONS

The database is a research tool that is constantly evolving as information is uncovered and added. In
addition, 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. This limitation is mitigated, to
an extent, through the magnetometer survey detailed below.

### 4.2.2. MAGNETOMETER SURVEY

A Geometrics G-882 cesium-vapor marine magnetometer was towed behind a 5.7 m fibreglass rigid inflatable boat (RIB), with a layback of 15 meters, at an average speed of 3 - 6 knots/hour, utilising 15m run-lines. The magnetometer data collected by MagLog® software was analysed twice. The first or field analysis is performed as the magnetometer is towed (Figure 1 - Figure 3). Possible sites are tabulated and analysed according to the environmental conditions in the field. The post-field analysis was interpreted with geophysical software (Surfer), with knowledge of the environmental conditions. The analyses were compared, and a final analysis completed.

### LIMITATIONS

The magnetometer picks up magnetic anomalies in and below the seabed. All the hits may not be MUCH sites, in addition, searches may not find the cause. Their status may only be revealed during the development process. The process gives the developers an idea of where MUCH sites may be uncovered. While some anomalies were discovered to be harbour debris, others will be mitigated through implementing the stipulated management (mitigation) measures.



Figure 1: Deployed magnetometer (Maitland, A 2020)



Figure 2: Magnetometer data capture (Maitland, A 2020)

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Figure 3: Field Analysis (Maitland 2020)

## 4.2.3. DIVER SEARCHES

From the analysis of the magnetic data, anomalies are plotted. These need to be investigated by divers. A marker buoy is dropped on the coordinates and a circular search is conducted from this central point (Figure 4 and Figure 5). Results are recorded. A buoy with a handheld GPS attached is held by the diver, this tracks the location of the search.

### LIMITATIONS

Some anomalies may be obvious shipwreck material while others may be covered in conglomerate and/or sand and silt. The limited visibility due to turbidity, that is suspended sediments negatively impacts diver searches.



Figure 4: An example of how a circular search is undertaken, a marker buoy and attached search reel (Maitland 2018)



Figure 5: An example of diver searches (Hookins 2018)

## 5. DESCRIPTION OF THE AFFECTED ENVIRONMENT - CHRONOLOGICALLY

The initial impact zone of March 2021 (Figure 6), was a narrow corridor and a mag survey of the area was undertaken. In June 2021 (Figure 7), the Impact Zone was expanded, and additional magnetometer data was obtained. In September 2022 (Figure 8), the Zone was amended again. No additional magnetometer data was required as the zone only extends a short distance further south and the existing magnetometer data is sufficient. There was no significant magnet build-up at the end of the survey lines.



Figure 6: March 2021 - Proposed Subsea Pipeline Impact Zone (Google Earth 2022; PRDW 2022)



Figure 7: June 2021 - Proposed Subsea Pipeline Impact Zone (Google Earth 2021)



Figure 8: September 2022 Proposed Subsea Pipeline Impact Zone (Google Earth 2022)

### 5.1. BATHYMETRY

The bathymetry of the Impact Zone has a maximum chart depth of 16.9 m Below Sea Level (BSL) sloping inshore to a depth of 1.5 m BSL. There are no indicated reefs or rocky areas, although the Roman Bank is to the east of the survey area (Figure 9).



Figure 9: Bathymetry of the Impact Zone (Garmin BlueCharts: 2018)

### 5.2. WAVES, WIND AND SEDIMENT

According to the Coastal and Estuarine Impact Assessment Report (Coastwise 2022)), although the wave heights are small, compared to coastal areas outside the protection of the Bay, the Big Bay area has high turbidity due to strong wind conditions. Currents, caused by predominant south-westerly winds in summer move in a strong anticlockwise direction, and in winter the north-westerly winds cause the currents to move in a clockwise direction. The seabed has a high mud content mixed with some sand. All the above information informs on the possible state of underwater cultural resources.

After a wreck event, the cultural materials undergo a period of deterioration/stabilisation until an equilibrium is reached with the receiving environment. However, this deterioration/stabilisation process is ongoing as the environmental factors change (Richards & McKinnon 2009).

Shipwreck material on the seabed immediately starts chemically reacting with the environment. The pH, salinity, temperature, oxygen content and chemical composition of the water all affect the rate of corrosion. Artefacts under the sea usually form conglomerate masses. As ferrous metal objects corrode, they become encrusted with layers of calcium carbonate, magnesium hydroxide, rust, sand, shells, pebbles, marine life skeletons and marine life (Hamilton 1976). This conglomerate protects the objects within as the internal environment is anaerobic.

If artefacts are buried beneath sediment, this environment is also anaerobic (the deeper it is buried, the less free oxygen in the sediment) (Cursi 2006). However, currents and wave action cause scour within the site. This scour can expose previously stable artefacts to an oxygen rich environment, this causes the deterioration/stabilisation process to start again. The scouring water is often laden with sediments. The sand can strip conglomerate off wreck material to the bare object and increase deterioration.

The information indicates that while the Impact Zone has periods of high wave energy, The Big Bay area is a "closed" environment. The current circulation reverses seasonally, and the wave action is insufficient to wash objects out to sea. The mud content of the seabed will tend to bury objects. From this we can make certain assumptions:

- Cultural resource material will likely be buried relatively rapidly
- Cultural resource material may be hard to discern as it is buried
- If cultural resources are uncovered during construction, they could be in good condition due to being buried in an anaerobic environment

## 6. DESKTOP SURVEY

### 6.1. NAVIGATIONAL AND HISTORICAL OVERVIEW OF THE AREA

The Portuguese explorer, Antonio de Saldanha was attempting to round the southern tip of Africa in 1503 when he landed in Table Bay. It was dutifully named Agoada de Saldanha (the Watering Place of Saldanha). For the next century, Table Bay was referred to by this name. In 1601, the Dutch explorer, Joris van Spilbergen "discovered" the present day Saldanha Bay, assuming it was the same bay where the Portuguese had stopped, he referred to it as Saldanha. He then sailed further south and entered Table Bay, on seeing Table Mountain with its flat top and tablecloth of clouds, he named it "Tafel Baay". Thereafter, there was confusion on the charts and in accounts as to which name to use. The Dutch naming eventually winning the battle (Burman & Levin 1974; Frere 1885; Temple 1914).

According to historical records, Saldanha Bay was unexplored by Europeans until 1612 when an Englishman, Samuel Castleton entered the bay, went ashore, and bartered for cattle with the local Khoen people. It is recorded that there was very little fresh water, and it was this lack of potable water that stopped the bay from developing as an early port (Theal 1897). The French used the bay for whaling and sealing operations more in the early 1600s than any other European nation. In 1666, the French ship, *Saumacque* installed a pillar at the entrance to Saldanha, it was carved with the French royal arms and served as a territorial claim (Boucher 1985). Although there is very little written about the use of the bay in the French records, other European traders mention finding several items in Saldanha that imply that the French were utilising the bay extensively. The Dutch and French were enemies at this time, and it seems that the French were attempting to keep the knowledge of Saldanha to themselves (Burman & Levin 1974; Frere 1885).

After the Dutch refreshment station was started in Table Bay in 1652, the Dutch began sealing operations in Saldanha. The earliest map here is a Dutch map from 1665 (Figure 10), cartography improves and the French map of 1747 (Figure 11) is more accurate. The 1750 Italian map (Figure 12) interestingly shows a French fort on the peninsula. The last map was drawn by the South African Surveyor-General in 1915 (Figure 13). All these maps have different names for the same locations. These were correlated together and placed on the Google Earth image (Figure 14), this process facilitates the process of attempting to locate shipwrecks in the database.

Prior to WW2, the port facilities consisted of small fishing and military quays in Hoetjes Bay. The first major development of the port was spurred on by the increased use of the Cape sea route during WW2. Water was piped in from the Berg River in 1943 and this led to an increase in fish canning and whaling in the area. However, port infrastructure was dramatically improved in the 1970s when Iscor expanded their mining operations at Sishen, using the port to export their product. The building of the breakwater and iron ore jetty. Additionally, the harbour was heavily dredged. (Burman & Levin 1974). The port was first dredged in 1974 and has been dredged extensively since. Over 27.5 million m<sup>3</sup> of sediment has been removed from different parts of the port (Clark et al. 2021).

These developments have all had an impact on MUCH resources. Most of these impacts are a result of development prior to the introduction of the NHRA (No. 25 of 1999). This legislation has alleviated the impact of these resources as developers are required to undertake HIAs. These impacts cannot be quantified as we have no historical baseline survey data of MUCH resources in these areas.



Figure 10: 1665 Dutch map of Saldanha Bay (Vingboons)



Figure 11: 1747 French map of Saldanha Bay (Bellin)



Figure 12: 1750 Italian map of Saldanha (L'Isle)



Figure 13: 1915 South African map of Saldanha (Surveyor-General)



Figure 14: Saldanha historical place names

### 6.2. SHIPWRECK DATABASE

The shipwreck database highlights the quantities of wrecks that may be in the area. 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 hard 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. Where possible, wreck information has been independently verified.

Some of the wrecks, particularly from the early 19<sup>th</sup> century, are easier to allocate to a specific area within the bay as there was an official maritime presence in the area by then. Before the first settlers, the accounts of wrecks were often passed along by word of mouth and the information becomes less reliable. Additionally, it seems that the bay was used for decades with little archival presence, particularly by the French, therefore it is entirely possible there are unknown wrecks.

Points to bear in mind when reading the below database.

**Abandoned** – This term means, generally, that the vessel was further out to sea. Older ships were sometimes badly maintained. A lifetime of rough seas had a heavy toll on the old vessels. Through storms and possibly bad maintenance, ships could become death traps. If the vessel was leaking badly and running repairs and continuous pumping had little to no effect, the captain would decide to abandon ship. However, sometimes these vessels would not sink but float along in the currents and could end up thousands of miles from where they were abandoned. There are numerous accounts of such derelicts being spotted. Figure 15 is an example of such a sighting. This vessel was spotted off the Cape south coast, it was on fire and had been abandoned. The whaler that spotted it could not read the name.

ST HELENA 26th July
A black aligner bergue apparently
A black enper barque, apparently
abandoned, was seen on the cape of
Good Hope 4th July, by the Beejo-
pore. M'Clay, arrived here.
A ship on fire was seen 6th July, in
lat. 35 S. lon. 24 E., by the Benjamin
Morgan (whaler), arrived here, which
vessel lowered a hoat and went along.
aida but aculd accortain has name has l
side out could ascertain her name, her
stern being burnt away; saw the

Figure 15: London Lloyd's List 13-09-1856

**Condemned** – In the modern era condemned ships are broken up and at least partially recycled. Historically, condemned vessels were often left on the beach or where they were moored until they were covered by sand or sank.

**Sold** – Although numerous shipwrecks were auctioned off and recorded in the newspapers as sold, this did not necessarily mean that they were completely salvaged. Figure 16 is an example of a wreck that was sold. However, wrecks were often sold and never removed. There are also numerous historical references to old wreckage being navigational hazards as well as hampering rescue efforts (Maitland 2009)



Figure 16: An example of a wreck sale notice (Turner 1988)



Figure 17: Saldanha Bay Shipwrecks (Google Earth 2018; Turner 1988; Levine 1989; Morris 2005; Urquhart 2007; van den Bosch 2009; SAHRIS 2016; Reocities 2017; Maitland 2020)

			CON Databas				
#	Name	Events	Date	Туре	History	Area may be found	Probability
1	Atlantic Pride II	Abandoned, scuttled	Post-1972	Fishing Trawler	This 175-ton South African fishing trawler was abandoned at its mooring and deteriorated. It was sunk just outside the harbour (van den Bosch 2009)	33 01.24S 17 56.90E (approx.)	None
2	Barge	Stranded, abandoned	1972	Barge	This diamond mining barge was stranded, and the remains were still visible in 1992 (van den Bosch 2009)	33 04.17S 18 02.33E	None
3	Barge 1	Stranded, abandoned	N.D.	Barge	Stranded, the remains were still visible in 1992 (van den Bosch 2009)	33 03.74S 18 02.45E	None
4	Barge 2	Stranded, abandoned	N.D.	Barge	Stranded, the remains were still visible in 1992 (van den Bosch 2009)	33 06.31S 18 02.00E	None
5	Barge 3	Stranded, abandoned	N.D.	Barge	Stranded, the remains were still visible in 1992 (van den Bosch 2009)	33 09.00S 18 04.22E	None
6	Brazil	Burning, scuttled	1966-03-29	Fishing vessel	This fishing vessel was built in 1960 and had oil engines. While welders were working on the engine of this fishing boat, waste in the bilge caught on fire. The fire rage for fourteen hours. The boat was then towed to the middle of Saldanha Bay, 2.5 kilometres from the shore and sunk.	Middleof Saldanha Bay	Medium
7	Bruydegom	Stranded, refloated, abandoned	1674-04-09	Sloop	This small ship registered in the Cape, was used by the Saldanha traders to harvest seals, seabird eggs and shells. On a trip to the watering place, it ran aground during a squall. Although carpenters were sent from Table Bay to repair the vessel, it was deemed too dangerous as relations with the local Khoen people were precarious and the vessel was abandoned (Burman and Levin 1974). According to Leibbrandt (1902) the ship ran aground on either Meeuw or Skaap Islands and was lightened and refloated but as it was leaking badly, it was beached to be repaired. Unable to repair the vessel, it was abandoned. They had on- board a cargo of shells and limestone. According to van den Bosch (2009) it drifted into the lagoon and sank near Kraal Bay.	Near Kraal Bay	None
8	City of Hankow	Aground, wrecked	1942-12-18	Steel cargo ship	This 7 360-ton British cargo ship ran aground just north of the Saldanha Bay entrance. Its back was broken and could not be refloated.	33 01.80S 17 53.40E	None
9	Cleopatra	Burning, sank	1968-05-1	Fishing vessel	This 75-ton fishing vessel caught fire and burned at its slip in Saldanha Bay.	33 01.04S 17 56.87E (Approx.)	None
10	Dauphin	Aground, wrecked	1830-03-05	Whaler	This 273-ton American whaler under Capt. Hussey. While anchored at Saldanha Bay, the anchor cable parted, it drifted ashore and became a wreck. The cargo was saved. No lives were lost. Although van den Bosch (2009) states this vessel is in Hoetjes Bay, I could find no corroborating evidence and as the prevailing winds are from the south-west at this time of year, one would assume it was blown across the bay.	Saldan ha Bay	Low - Medium
11	Forget-Me- Not	Abandoned, Converted to jetty	N.D.	Ketch	Apparently, this vessel lies near the Whaling Station jetty and next to the H.C. Richards (van den Bosch 2009)	33 04.45S 17 59.78E Donkergat Whaling Station	None
12	H.C. Richards (ex-Emily Faithful, ex- Iron Queen)	Abandoned, converted to jetty	1893-11-02	Barque	Built in 1863, this 806-ton Norwegian barque was built originally as a clipper but later converted. Carrying a cargo of deals when it struck a rock off Aliwal Shoal. After filling with water, it was run aground near the Illovo River and patched up. It	33 04.93S 18 00.17E Salamander Whaling Station	None

Table 2: Port of Saldanha Shipwreck Database

#	Name	Events	Date	Туре	History	Area may be found	Probability
					was towed to Durban, and then to Cape Town where it was condemned. It was eventually scuttled at the Salamander Whaling Station to form a jetty.		
13	Hamlet	Wrecked	1927-04-07	Steam coaster	An Irvin & Johnson steam coaster of 328 tons. Under Capt. Dumares it serviced the Kerguelen sealing fleet. It had a cargo of provisions and coal from Table Bay when it was wrecked near South Head, Saldanha.	South Head	None
14	Herlille	Wrecked	1978-01-17	Fishing vessel	This 82-ton purse seiner was according to Levine (1987) wrecked at Saldanha Bay. Van den Bosch (2009) states that this vessel was wrecked at Kommetjie and the newspapers (The Argus in van den Bosch 2009) confirm this.	Notat Saldanha	Removed from database
15	Hoogland	Sank	1998-03-04	Fishing vessel	The South African fishing vessel sank just outside Saldanha Bay (van den Bosch 2009; Levine 1987).	33 02.24S 17 52.30E	None
16	John Saxon	Wrecked	1970-02-13	Wood ship	This vessel dragged its anchor and sank near North Head (van den Bosch 2009; Levine 1987)	33 02.69S 17 55.88E (Approx.)	None
17	Kamfjord	Hulk – Fate unknown	1914-07-31	Wood barque	This Norwegian barque was used as a hulk in Saldanha Bay (van den Bosch 2009). There is no record of its fate after it was no longer able to be used as a hulk. Sometimes hulks were dismantled, sometimes they were left to sink at their moorings.	Unknown	Low- Medium
18	Karatara	Fire, converted to jetty	1921-05-16	Steam coaster	This vessel was built for the sealing trade. While in Table Bay, it caught on fire. Although the fire was put out, the vessel was scuttled at the Donkergat Whaling Station, as part of the jetty (van den Bosch 2009).	Donkergat Whaling Station	None
19	Kildalkey		1936-11-18		This steamship was built during WWI and was built with its stern and bow identical. This was in order to confuse enemy submarines. After the war it was converted into a tanker and used in the sealing trade. Later it transported whale oil. The vessel had a cargo of whale oil when, during a heavy fog, it hit the rocks known as the Seven Blinders. The wreck may have been removed in 1974 (van den Bosch 2009; Levine 1987). Although if one looks at the Google Earth image, in the reported vicinity of the wreck, a wreck may be visible (Figure 18).	West of Iron Ore Jetty	None
20	Kilfenora	Aground, wrecked	1940-04-28	Tanker	This 610-ton vessel managed by Irvin & Johnson ran aground on the easterly point of the north side of Schaapen Island. The wreck may have been removed in 1974 (van den Bosch 2009; Levine 1987).	Schaapen Island/ Removed/ Partially removed	None

#	Name	Events	Date	Туре	History	Area may be found	Probability
21	Livily	Aground, possibly refloated	1866-08		Although this vessel is reported as a wreck in Saldanha Bay (van den Bosch 2009; Levine 1987), it is only reported as grounded. Therefore, it may have been refloated	Unknown	Low
22	Luna	Wrecked	1880-07-29	Wood Schooner	This 41-ton schooner was carrying a cargo of skins between Hondeklip Bay and Cape Town when it began to leak. The crew abandoned it half a kilometre from shore in Saldanha Bay. Apparently near Salamander Point. It sank but no lives were lost (van den Bosch 2009; Levine 1987).	Near Salamander Point	Low
23	Mabel	Aground, capsized, sank	1909-05-23	Wood Cutter	A sailing cutter of 8 tons and a crew of four, sailed from Langebaan for Cape Town with a cargo of wheat. It was sailing between Marcus Island and the mainland when it struck a rock. Thereafter it capsized and sank. Only one crew member survived by swimming ashore.	Between North and South Points	Low
24	Matilde	Converted to jetty	1909	Whaler	One of the whalers operating out of Donkergat, it became part of the jetty when it was no longer seaworthy (Burman and Levin 1974).	Donkergat Whaling Station	None
25	Merestein	Wrecked, sank, salvaged	1702-04-03	East Indiaman	This Dutch pinnace of 826 tons was built in 1693 at the Amsterdam Yard for the V.O.C. Under the command of Capt. Subbing, it was wrecked on the south-west corner of Jutten Island at the entrance to Saldanha Bay. It was on the outward-bound voyage from Texel with a large cargo of coins. One hundred and one people died in the wreck. Mostof the coins, cannon and lead bars were salvaged in 1971. The wreck lies in the harbour area of Saldanha Bay at a depth of between 3 and 6 metres.	Jutten Island	None
26	Middelburg	Burnt, sank, salvaged, buried	1781-07-21	VOC Ship	This Dutch East-Indiaman of 1150 tons was built in 1775 for the Zeeland Yard. It was on the homeward bound voyage with a cargo of porcelain, tea, silk, aniseed, and tin under Capt. Van Gennep. The crew set it on fire to avoid its capture by the British. It eventually sank near Hoetjes Point. The wreck has been worked on by various salvors over the years, but now lies buried under the Saldanha Breakwater (van den Bosch 2009; Turner 1986; Levine 1987)	Saldan ha Bay Breakwater	None
27	Nagel	Burning, scuttled	1709-05-27	VOC galiot	This boat was in Saldanha netting fish when the crew got very drunk. A candle fell over and the vessel caught on fire. The crew tried to sink the vessel to put out the fire, but the water was too shallow, and fire destroyed the vessel (Burman and Levin 1974)	Oude Post	None
28	Neptune	Converted to jetty	N.D.	Whaler	One of the whalers operating out of Donkergat, it became part of the jetty when it was no longer seaworthy (Burman and Levin 1974).	Donkergat Whaling Station	None
29	Noguerosa II	Aground, abandoned	1997	Fishing vessel	An Old fishing vessel that was bought to convert into a restaurant. It was eventually aban doned.	33 04 20.9 S 18 02 19.7 E	None
30	Olive	Sank	1900	Small sailing coaster	Sank near the entrance to Saldanha in heavy seas (van den Bosch 2009).	Entrance Channel	Low
31	Ovombo Coast	Aground, wrecked	1958-07-23	Steel coaster	This South African coaster of 217 tons was built in 1939 and owned by Thesens. Commanded by Capt. Baird it was wrecked on Marcus Island, during a fog. It was carrying a cargo of fish oil for Cape Town (van den Bosch 2009; Levine 1987).	Marcus Island	None

#	Name	Events	Date	Туре	History	Area may be found	Probability
32	Penguin	Converted to jetty	1937	Watership	This vessel was used as a watership in Saldanha. When it was no longer seaworthy, the hull was incorporated into the Langebaan Yacht Club Jetty (van den Bosch 2009)	Jetty at Langebaan Yacht Club	None
33	Perelberg	Aground, wrecked, abandoned	1954-05-18	Whaler	This whaler went aground on Meeuw Island and was abandoned (van den Bosch 2009; Levine 1987).	Meeuw Island	None
34	Pescadore	Aground, wrecked	1839-01-04	Schooner	This Portuguese vessel owned by the Lisbon Fishing Company was wrecked on a reef near the entrance to Saldanha Bay. No lives were lost (van den Bosch 2009; Levine 1987).	Entrance Channel	Low
35	Petronella Alida	Abandoned	1737-9	VOC Ship	This 550-ton Dutch East-Indiaman was built in 1722 for the Chamber of Enkhuizen and was on an outward-bound trip from the Netherlands to Batavia when the hull was damaged in the Cape Verde Island in 1737. The ship managed to get to the Cape where it was abandoned and "scrapped" at Saldanha Bay as unseaworthy (De VOC website). This ship was probably not broken up as there was no manpower in Saldanha at this time. The ship may have been scuttled or left to drift ashore. The local Khoen could have salvaged the wreck for iron. This wreck is not in any of the main South African shipwreck databases, possibly as it was not an actual wreck event but rather abandoned. However, for researchers interested in ship construction, the vessel is a significant resource.	Unknown	Medium
36	Pistorius	Abandoned	N.D.	Watership	This vessel was used as a watership in Saldanha. When it was no longer seaworthy, the hull was abandoned near the Langebaan Yacht Club (van den Bosch 2009). The hull is still visible in Google Earth (2021).	Langebaan Yacht Club	None
37	Präsident	Converted into jetty	Between the two world wars	Steamer	This 3385-ton German steamer masqueraded at a hospital ship during WWI. It served as a supplyship for the German raider, <i>Konigsberg.</i> However, in 1914, the <i>Präsident</i> was spotted by a British patrol vessel and sunk near the Lindi River in East Africa. Later it was raised by Irvin & Johnson and served as a coal depot for the Donkergat Whaling Station. After the whaling station was shut down, the vessel was stripped and served as a hulk at Hoetjes Point. Years after this, it was finally filled with stone and sunk to form a jetty. When WWII broke out, the jetty became known as President Jetty.	Hoetjes Bay President Jetty	None
38	Rambok	Sank, refloated, scuttled	1979	Lifting and Mooring vessel	This vessel sank at its moorings, was refloated, and disposed of later (van den Bosch 2009; Levine 1987).	33 04.42S 18 00.42E (Approx.)	None
39	Rooiberg	Aground, wrecked	1936-08-11	Whaler	This Irvin & Johnson, 200-ton whaler struck the rocks near North Head and was a total wreck. The crew of twelve were rescued (van den Bosch 2009; Levine 1987).	North Head	None
40	Roode Vos boat	Wrecked	1654-12-17	Ship's boat	While on a sealing trip in Saldanha, two Dutch seamen mutinied. They stole the ship's boat and sailed off to the mainland. The boat was stoved in by the rocks and sank, and one of the mutineers drowned. The other mutineer was killed by the Khoen (Burman and Levin 1974)	Unknown	Low - Medium

#	Name	Events	Date	Туре	History	Area may be found	Probability
41	Tijgerberg	Aground, wrecked	1937-08-01	Whaler	This 314-ton, Irvin & Johnson whaler ran aground near Eland's Point, Saldanha Bay. Two of the crew died (van den Bosch 2009; Levine 1987).	Near Eland's Point	None
42	Samelia	Aground, wrecked	1866-08	Cutter	This vessel is reported as wrecked at Saldanha Bay (van den Bosch 2009; Levine 1987).	Unknown	Medium
43	St Clair	Wrecked	1838-03-14	Ship	This British ship was wrecked in the vicinity of Saldanha Bay, during a south-east gale, several people lost their lives.	Unknown	Medium
44	Unidentified Ferry	Abandoned	N.D.	Ferry	This small ferry is recorded as being a little north of the Langebaan Yacht Club by van den Bosch (2009)	North of Langebaan Yacht Club	None
45	Unidentified Trawler	Burning, sank	1967-06-24	Trawler	A trawler, an chored 200m from Joffa's Jetty caught on fire. Two local men boarded the vessel where they found a man fast asleep in the bows. After waking him and returning to shore, the vessel sank.	33° 1.208'S 17° 57.588'E (Approx.)	None
46	Vale	Converted to jetty	N.D.	Whaler	Donkergat's first whaling ship. When it was no longer seaworthy, it was incorporated into the breakwater at the factory (Burman and Levin 1974).	Donkergat Whaling Station	None

#### 6.3. SHIPWRECK SUMMARY

Probability of Presence in Impact Zone	Shipwreck Count
Removed from Database	1
None	33
Low	5
Low to Medium	3
Medium	4
Medium - High	0
TOTAL	46

There are 46 wrecks, in various databases, in the Saldanha Bay area. However, deeper investigation of the wrecks showed that one was actually wrecked at Kommetjie, and one was in all probability refloated after grounding. Thirty-three were given a zero probability, as their locations were able to be narrowed down to specific sites. Five wrecks had a low probability based on the recorded history, three had a low to medium probability and four had a medium probability, alregly due to a paucity of information on the wreck events. It is these twelve wrecks that have a possibility, albeit unlikely, of being uncovered during construction.

Of these twelve wrecks, the *Petronella Alida* of 1738, would be of high significance, due to its age and the insights it could offer on VOC ship building.

## 7. MAGNETOMETER SURVEY

The closer the magnetometer is to the seabed, the better the data. In shallow areas, the mag is generally towed from the nose, this tows the mag about 0.5 m below the surface. As the depth increases, one should switch to a top tow, which drops the mag to about 3 m below the surface. After -12 m, one should add a lead wing to the mag, this allows the mag to be towed at 7-8 m below the surface. However, from a time perspective, as well as the narrow Impact Zone perpendicular to the coast, it was decided to use a top tow and vary the speed of the survey in order to allow the seafloor. I am satisfied that all possible MUCH anomalies were detected, as we were able to detect small anomalies in all areas.

As mentioned in Section 5.1, the bathymetry of the Impact Zone is -1.5 near the shore to -17 at the end of the Impact Zone. Big Bay has a tidal range of approximately 2 m, and we went as close to the shore as safety dictated (Figure 19). Page 28 of 53



Figure 19: Saldanha Big Bay Pipeline All Survey Routes (Google Earth 2021)

A Geometrics G-882 caesium-vapor marine magnetometer was towed behind a 5.7 m fibreglass RIB, with a layback of 15 meters, at an average speed of 3-6 knots/hour, utilising 15m run-lines.

The magnetometer data collected by MagLog® software was analysed twice. The first or field analysis is performed as the magnetometer is towed. Possible sites are tabulated and analysed according to the environmental conditions in the field. The post-field analysis was interpreted with geophysical software (Surfer), with knowledge of the environmental conditions. The analyses were compared, and a final analysis completed.

The first magnetometer survey was conducted on 28 March 2021. A second survey was started on 16 June 2021, 378 km of survey lines were run over 64 hours. As Saldanha Bay is largely protected from the elements, there were no seasonality issues with regards to the field survey

### 7.1. IMPACT ZONE - MARCH 2021 SURVEY RESULTS

The magnetometer data collected by MagLog software was analysed twice. The first or field analysis is performed as the magnetometer is towed (Figure 3). This analysis observes real time spikes within the magnetic field. Possible sites are tabulated and analysed according to the environmental conditions in the field. These conditions include:

- Shipping
- Weather / Sea conditions
- Channel marker buoys and markers
- Other metal objects in the vicinity

The post-field analysis was interpreted with Surfer geophysical software (Figure 20).



Figure 20: Zone 1: Surfer Survey Plot using contour intervals of 5 nT



Figure 21: Magnetic map of Impact Zone with anomalies plotted

### 7.2. IMPACT ZONE – MARCH SURVEY CONCLUSIONS

All shipwrecks, even wooden shipwrecks have a large magnetic signature. The field survey revealed several anomalies (Figure 21). Anomalies 1 - 4 are in a fairly straight line and there is a line of smaller anomalies connecting Anomalies 1 - 3. However, Anomalies 1 - 3 were much bigger than the connecting magnetic signature. Anomalies 5 - 7 were off the old pipeline. Diver searches were necessary to verify that the anomalies were not MUCH.

Anomaly Number	Co-ordinates	
1	33° 2.328'S	17° 59.936'E
2	33° 2.048'S	18° 0.033'E
3	33° 1.934'S	18° 0.075'E
4	33° 0.916'S	18° 0.500'E
5	33° 1.951'S	18° 0.002'E
6	33° 1.930'S	18° 0.221'E
7	33° 2.736'S	17° 59.859'E

Table 3: March 2021 Anomaly Co-ordinates

## 8. DIVER SEARCHES - MARCH 2021

Seven dives were planned (Table 3). On arrival at the site on Monday 29 March 2021, the LPG vessel was being moored by the tugs.

We decided to dive on Anomaly 6 first as it was further away from the vessels. The visibility was hampered by the turbidity with a visibility of 0.5 m (Figure 22). A circular search was conducted, and some ferrous objects were found (Figure 23).

Thereafter, we decided to dive on Anomaly 1, this was the higher magnetic signature possibly on the old pipeline. A circular search was conducted. If this is the old pipeline, it is buried in silt. We found a large rock-like object that may be responsible for the anomaly. There were no reefs or other rocks visible. The object was not obviously from a shipwreck, and it was covered in sea life.





Figure 23: Ferrous objects from Anomaly 6

Figure 22: Silt seabed and low visibility

### 8.1. DIVER SEARCHES CONCLUSION - MARCH 2021

Only two dives were undertaken. The high turbidity and zero visibility severely hampered the searches. No visible underwater cultural heritage resources were found. As the old pipeline was not visible, it is believed that the thick silt in Page 31 of 53

this area buries objects and therefore further searches would likely achieve similar results.

#### 8.2. FIELD SURVEY CONCLUSION - MARCH 2021

Several magnetic anomalies were identified during the magnetometer survey. The majority of these are probably along the old pipeline. These anomalies have been recorded above and care should be taken during the construction phase. If shipwreck material is uncovered, a maritime archaeologist should be contacted to assess the finds.

While there is a low probability that shipwrecks will be found underwater, there exists a chance that shipwreck material and/or pre-colonial sites (shell middens and stone tools) may be found in the dunes and on the beach during construction. If such materials are found, the steps in Section 10 must be followed.

### 9. JUNE 2021 MAGNETOMETER SURVEY

Two new subsea pipeline routes were proposed (Figure 7). The first is north of the March 2021 Impact Zone and the second, to the south. The south route overlaps slightly the initial impact zone and thus only a smaller block was surveyed to cover the extended area.



#### 9.1. IMPACT ZONE - JUNE 2021 SURVEY RESULTS

Figure 24: East Block (Small) Surfer Survey Plot using contour intervals of 2 nT



Figure 25: East Block 1 (east of LPG) Surfer Survey Plot using contour intervals of 5 nT



Figure 26: North Block (north of LPG) Surfer Survey Plot using contour intervals of 2 nT



Figure 27: South Block (south of LPG) Surfer Survey Plot using contour intervals of 2 nT



Figure 28: West Block (west of LPG) Surfer Survey Plot using contour intervals of 2 nT



Figure 29: All Impact Zones Combined Surfer Survey Plot using contour intervals of 5 nT

While there appear to be gaps between the blocks (Figure 29 and Figure 21), this is an artefact of the geophysical software processing. All the areas were surveyed as thoroughly as possible. The magnetic anomaly co-ordinates are supplied in Table 4. All shipwrecks, even wooden shipwrecks have a large magnetic signature. The field survey revealed a few anomalies (Figure 21)

### East Block (Small)

This block is truncated on the south-east edge (Figure 20), due to the mussel aquaculture zone (Figure 30). There were three magnetic anomalies in this area, MA07, MA09 and MA10. MA 07 was also hinted at in the March survey, it is such a small anomaly, that it is probably harbour debris. MA09 correlates with a channel marker (Figure 31). MA10 is also a small anomaly and is probably harbour debris or the result of debris from the aquaculture area.



Figure 30: Mussel Aquaculture Zone (Maitland 2021)



Figure 31: Channel Marker Buoy (Maitland 2021)

#### East Block (east of LPG)

This block (Figure 25) picked up the LPG pipeline very nicely, I have not numbered this anomaly as it is very obviously the pipeline.

In view of this, I am revising my opinion as to the possible pipeline noted in the March 2021 report. I previously stated "Anomalies 1 - 4 are in a fairly straight line and there is a line of smaller anomalies connecting Anomalies 1 - 3. However, Anomalies 1 - 3 were much bigger than the connecting magnetic signature. Anomalies 5 - 7 were off the old pipeline." In between the two surveys, I received the .kmz file of the LPG mooring and four anomalies lie directly under the mooring blocks mapped, i.e., MA05, MA11, MA12 and MA13. Ergo, I assumed MA 1 - 3 with the connecting anomalies represented an old pipeline. However, given their proximity to MA05, these may be old chain from the mooring blocks. The other anomaly in this block is MA18 which correlates with the LPG buoys (Figure 32)



Figure 32: LPG Marker Buoys (Maitland 2021)

#### North Block (north of LPG)

This block (Figure 26) was surveyed as close as possible to the LPG mooring. This block has one major anomaly, MA13 which correlates with the LPG mooring block. There is a small anomaly on the extreme eastern edge, but I believe it is a result of the pumphouse on the wall of the beach well, this water is processed and used for iron ore dust dampening (Figure 33)



Figure 33: Pumphouse of the beach well wall (Maitland 2021)

#### South Block (south of LPG)

This block (Figure 27) had only one major anomaly, MA11 which correlates with the LPG mooring block.

#### West Block (west of LPG)

This block (Figure 28) is truncated at the southern edge as it went into the shipping channel and that will always remain unobstructed by construction. MA12 correlates with the LPG mooring block and MA14 is the build -up of the magnetic signature of the vessel moored at the Iron Ore Jetty (Figure 34).

MA16, further north is 288 m from the jetty and may be jetty debris, although it may be MUCH. The anomaly to look out for during construction is further north. MA15, it is a fairly large anomaly, not near to the jetty and far away from where ships dock. It is also close to the shoreline where one usually finds wrecks. It is directly under the proposed pipeline and must be investigated prior to construction (see Section 12).



Figure 34: Vessel moored at Iron Ore Jetty (Maitland 2021)

Magnetic Anomaly #	Co-ordinates		Survey #	Cause
MA01	33° 2.328'S	17° 59.936'E	1	Unknown
MA02	33° 2.048'S	18° 0.033'E	1	Unknown
MA17	Blue Line			Possible length of chain between MA1 and MA2
MA03	33° 1.934'S	18° 0.075'E	1	Unknown
MA04	33° 0.916'S	18° 0.500'E	1	Unknown
MA05	33° 1.951'S	18° 0.002'E	1	LPG Mooring Block
MA06	33° 1.930'S	18° 0.221'E	1	Unknown – only in field analysis – possible build-
				up to item further south
MA07	33° 2.736'S	17° 59.859'E	1	Unknown
MA08	33° 0.948'S	18° 0.491'E	1	Unknown
MA09	33° 2.256'S	18° 0.101'E	2	Channel Marker (Figure 31)
MA10	33° 2.529'S	18° 0.159'E	2	Probably harbour debris
MA11	33° 2.112'S	17° 59.599'E	2	LPG Mooring Block
MA12	33° 1.986'S	17° 59.495'E	2	LPG Mooring Block
MA13	33° 1.691'S	17° 59.742'E	2	LPG Mooring Block
MA14			2	Build-up of anomaly – Moored Vessel (Figure 34)
MA15	33° 0.895'S	17° 59.890'E	2	Unknown
MA16	33° 1.388'S	17° 59.522'E	2	Unknown
MA18	33° 1.925'S	17° 59.775'E	2	Buoys for LPG Mooring (Figure 32)

Table 4:	June	2021	Anomaly	Co-ordinates
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## 9.2. IMPACT ZONE – JUNE 2021 SURVEY CONCLUSIONS

A few magnetic anomalies were identified during the magnetometer survey. The majority of these are probably harbour debris. These anomalies have been recorded above and care should be taken during the construction phase. If shipwreck material is uncovered, a maritime archaeologist should be contacted to assess the finds. The anomalies of concern are MA04 and MA08 (these are near each other); and MA15 and MA 16 should be investigated, if the area is impacted (See Section 12).

While there is a low probability that shipwrecks will be found underwater, there exists a chance that shipwreck material and/or pre-colonial sites (shell middens and stone tools) may be found in the dunes and on the beach during construction. If such materials are found, the steps in Section 12 must be followed.

## 10. SEPTEMBER 2022 - REANALYSIS OF ALL MAGNETOMETER DATA

The updated Impact Zone (2022) only extends a short distance further south and the existing magnetometer survey is sufficient. There was no significant magnet build-up at the end of the survey lines.

Since these magnetometer surveys were undertaken, I have received a 3-point gradient spreadsheet from a Dr Conlin of the US National Park Service Submerged Resources Center. This tool assists in removing geological changes and diurnal variation. The ferrous articles are no longer "lost" in the magnetic noise.

### 10.1. IMPACT ZONE – 2022 REANALYSIS RESULTS

As can be seen in Figure 35, the magnetic contour lines are more distinct, while several anomalies are still visible, it is easier to interpret.



Figure 35: 3-point Gradient Magnetometer Map of the Impact zone



Figure 36: Revised magnetometer survey with features and relevant anomalies

#### 10.2. IMPACT ZONE – 2022 FINAL SURVEY CONCLUSION

Magnetic Anomaly #	c Co-ordinates y		Survey #	Cause	Final Notes after 3-point Gradient Applied
MA01	33° 2.328'S	17° 59.936'E	1	Unknown	Removed – N/A
MA02	33° 2.048'S	18° 0.033'E	1	Unknown	Removed – N/A
MA17	Blue Line			Possible length of chain between MA1 and MA2	Removed – N/A
MA03	33° 1.934'S	18° 0.075'E	1	Unknown	Removed – N/A
MA04	33° 0.894'S	18° 0.539'E	1	Unknown	To be investigated, if impacted
MA05	33° 1.951'S	18° 0.002'E	1	LPG Mooring Block	Removed – N/A
MA06	33° 1.944'S	18° 0.215'E	1	Possible build-up to object further East	To be investigated, if impacted
MA07	33° 2.736'S	17° 59.859'E	1	Unknown	Removed – N/A
MA08	33° 0.938'S	18° 0.502'E	1	Unknown	To be investigated, if impacted
MA09	33° 2.256'S	18° 0.101'E	2	Channel Marker (Figure 31)	Removed – N/A
MA10	33° 2.529'S	18° 0.159'E	2	Probably harbour debris	Removed – N/A
MA11	33° 2.112'S	17° 59.599'E	2	LPG Mooring Block	Removed – N/A
MA12	33° 1.986'S	17° 59.495'E	2	LPG Mooring Block	Removed – N/A
MA13	33° 1.691'S	17° 59.742'E	2	LPG Mooring Block	Removed – N/A
MA14			2	Build-up of anomaly – Moored Vessel (Figure 34)	Removed – N/A
MA15	33° 0.809'S	17° 59.971'E	2	Unknown	To be investigated, if impacted
MA16	33° 1.388'S	17° 59.522'E	2	Unknown – could be jetsam from moored vessels	To be investigated, if impacted
MA18	33° 1 925'S	17° 59 775'F	2	Buoys for LPG Mooring (Figure 32)	Removed – N/A

Table 5: 2022 - Revised Anomaly Coordinates

The previous tables have been revised using the data from the 3-point gradient tool. Table 5 summarises the anomalies and the last column expresses the results of that process.

MA 04 and MA 08 are near the shoreline, east of the LNG pipeline. MA 06 is on the edge of the survey zone. It may be a bigger anomaly; however, it is unlikely to be impacted by the development. It is also near the aquaculture zone and may be debris from its construction. MA16, on the western edge of the survey area is 288 m from the jetty and may be jetsam, if this area is going to be impacted, it should be investigated.

The anomaly to look out for during construction is to the north of the aforementioned anomaly. MA15, it is a fairly large anomaly, not near to the jetty and far away from where ships dock. It is also close to the shoreline where one usually finds wrecks, and although it is not large enough to be a shipwreck, it may be part of a wreck debris field. The magnetometer survey cannot get close to the shoreline. It is directly under the proposed pipeline and must be investigated after EIA authorisation is received and prior construction commencing. The appointed archaeologist must verify this anomaly during construction of the gas pipeline (see Section 12 for Management Measures).

The only study that was considered under a polycentric approach was the ACRM (2022) report on potential pre-colonial terrestrial sites and our conclusions and recommendations are aligned. While there is a low probability that shipwrecks will be found underwater, there exists a chance that shipwreck material and/or pre-colonial sites (shell middens and stone tools) may be found in the dunes and on the beach during construction and if that is the case, Section 12 Management Measures must be followed.

## 11. SITE SIGNIFICANCE AND ASSESSMENT

#### HERITAGE ASSESSMENT CRITERIA AND GRADING

According to the NHRA, No. 25 of 1999, 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.

The NHRA stipulates the assessment criteria and grading of archaeological sites. The following categories are distinguished in Section 7 of the Act:

- Grade I: Heritage resources with qualities so exceptional that they are of special national significance.
- **Grade II**: Heritage resources which, although forming part of the national estate, can be considered to have special qualities which make them significant within the context of a province or a region; and
- Grade III: Other heritage resources worthy of conservation, on a local authority level.

The occurrence of sites with a Grade I significance will demand that the development activities be drastically altered in order to retain these sites in their original state. For Grade II and Grade III sites, the application of mitigation measures would allow the development activities to continue.

A matrix exists whereby the above criteria, as set out in Sections 3(3) and 7 of the NHRA, No. 25 of 1999, can be applied for identified sites. This allows some form of control over the application of similar values for similar sites. This matrix will be applied if any sites are uncovered (Appendix I).

## 12. RECOMMENDED MANAGEMENT MEASURES

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.

### 12.1. OBJECTIVES

- Protection of heritage sites within the marine servitude project boundary, this includes coastal zone 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.

The following shall apply:

- An archaeologist must be appointed for the duration of the construction phase of the project, specifically for the beach/dune area.
- The appointed archaeologist must have the requisite experience and knowledge to recognise maritime cultural heritage that may be found in the beach/dune area.
- The appointed archaeologist must do a short induction to familiarise the contractors and workers, including divers, to the potential heritage material artefacts that may be exposed during work. This includes Stone Age, Early Farming communities, colonial and shipwreck artefacts and human burials.

- Should any heritage artefacts be exposed during marine/terrestrial excavations, work in the immediate area where the artefacts are discovered, shall cease immediately and the appointed archaeologist shall be notified as soon as possible.
- All discoveries shall be reported immediately to the appointed archaeologist so that an investigation and evaluation of the finds can be made. The archaeologist will advise the necessary actions to be taken, including notifying SAHRA and if the artefacts are below the high-water mark, SAHRA's MUCH Unit must be contacted.
  - 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), see Appendix II.

## 13. CONCLUSION

This specialist study has found that there is a low possibility that impacts to underwater heritage could occur through the proposed development. The present report finds that the project is feasible, so long as the stipulated management (mitigation) measures are applied. With mitigation there is the possibility of a benefit to our heritage knowledge base through the discovery and recording of previously unknown underwater heritage.

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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

5.

8.

- Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons Rarity
- Does it possess un common, rare or en dangered 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			

#### 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: <u>vanessa@cocojams.co.za</u> ASAPA (Association of Southern African Professional Archaeologists) Member No: 326

#### EDUCATION

1986	Hill College	Port Elizabeth
<ul> <li>Matriculated</li> </ul>	l	
1987-1988	University of Cape Town	Cape Town
<ul> <li>BA – First &amp;</li> </ul>	Second Year	
1992-1993	University of Witwatersrand	Johannesburg
<ul> <li>Completed</li> </ul>	BA, majored in Archaeology and Jewi	sh Studies
<ul> <li>Other subj</li> </ul>	ects studied include: Anthropology	, Geology, Classical
Civilizations	, Hebrew, History, Biblical Archaeolog	ЭУ
1996	University of Witwatersrand	Johannesburg
BA Honours	s – Archaeology	
2010 - 2012	NAS/SAHRA/IZIKO	Cape Town
NAS I, II & I	II: Underwater Survey and Fieldwork	Courses
<ul> <li>Iziko Waterle</li> </ul>	ogged Artefact Conservation Course	
2010	University of Witwatersrand	Johannesburg
<ul> <li>ARCGIS Co</li> </ul>	ourse	-
2011	University of Witwatersrand	Johannesburg
GRASS & C	QGIS Course	
2013-2015; 20	19-2022	University of South
Africa	Pretoria	
<ul> <li>Masters De</li> </ul>	gree 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 & Marin	e Port Elizabeth
Admin Assistant & Archaeological Adv	visor
<ul> <li>Research on unknown wreck site</li> </ul>	
<ul> <li>Compiling interim reports on County of</li> </ul>	of Pembroke wreck site
2007-2008 Site Archaeologist	Port Elizabeth
• Diving and collecting data on <i>County</i>	of Pembroke wreck site
<ul> <li>Liaising with Bayworld re curation of a</li> </ul>	artefacts
<ul> <li>Research</li> </ul>	
<ul> <li>Archaeological reports</li> </ul>	
2009 Independent Contractor	Durban
<ul> <li>Diving and collecting data on "Anoma</li> </ul>	ly 27" wreck site
<ul> <li>Liaising with SAHRA regarding site</li> </ul>	
2010 Independent Contractor	Durban
<ul> <li>Fieldwork and research on the Karin</li> </ul>	("Anomaly 27") wreck
<ul> <li>Archaeological report on the Karin</li> </ul>	
<ul> <li>NAS (Nautical Archaeology Society) I</li> </ul>	course on Robben Island
<ul> <li>NAS II course on Robben Island</li> </ul>	
<ul> <li>NAS III (1<sup>st</sup> &amp; 2<sup>nd</sup> Module) course on F</li> </ul>	Robben Island
<ul> <li>Editing and co-authoring NAS II group</li> </ul>	p report
<ul> <li>Organising and training at NAS I (Dur</li> </ul>	ban) Course
2011 Independent Contractor	Durban
<ul> <li>Fieldwork and tutor on NAS II Robber</li> </ul>	n Island Course
<ul> <li>Fieldwork and tutor on NAS II Durban</li> </ul>	Course
<ul> <li>Heritage Scoping Report for the I</li> </ul>	Proposed Developments at the
Container Terminal at the Port of Dur	ban for CSIR
2012 Independent Contractor	Durban

Durban

Durban

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

2014 ACHA

- 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 . Durban

2015 ACHA

- 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

ACHA

2016

- 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 Knvsna
- 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 INTEREST**



environmental affairs Department:

Environmental Affairs REPUBLIC OF SOUTH AFRICA

DETAILS OF THE SPECIALIST, DECLARATION OF INTEREST AND UNDERTAKING UNDER OATH

File Reference Number: NEAS Reference Number: Date Received:

NEW STREET

Application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

**PROJECT TITLE** 

PROPOSED GAS TO POWER POWERSHIP PROJECT AT THE PORT OF SALDANHA BAY

#### Kindly note the following:

- 1. This form must always be used for applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting where this Department is the Competent Authority.
- This form is current as of 01 September 2018. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.environment.gov.za/documents/forms.
- 3. A copy of this form containing original signatures must be appended to all Draft and Final Reports submitted to the department for consideration.
- All documentation delivered to the physical address contained in this form must be delivered during the official Departmental Officer Hours which is visible on the Departmental gate.
- All EIA related documents (includes application forms, reports or any EIA related submissions) that are faxed; emailed; delivered to Security or placed in the Departmental Tender Box will not be accepted, only hardcopy submissions are accepted.

#### **Departmental Details**

Postal address: Department of Environmental Affairs Attention: Chief Director: Integrated Environmental Authorisations Private Bag X447 Pretoria 0001

Physical address: Department of Environmental Affairs Attention: Chief Director: Integrated Environmental Authorisations Environment House 473 Steve Biko Road Arcadia

Queries must be directed to the Directorate: Coordination, Strategic Planning and Support at: Email: EIAAdmin@environment.gov.za

Details of Specialist, Declaration and Undertaking Under Oath

Page 1 of 3

#### 1. SPECIALIST INFORMATION

Specialist Company Name:	Contract Maritime Archaeologist				
B-BBEE	Contribution level (indicate 1	4	Percenta	ige	
	to 8 or non-compliant)		Procurer recogniti	nent on	
Specialist name:	Vanessa Maitland				
Specialist Qualifications:	BA (Hons)				
Professional	ASAPA # 326				
affiliation/registration:					
Physical address:	203/71 Elandskraal, Sedgefield Rural, 6573				
Postal address:			100000000		
Postal code:		Cell		082 490 4066	
Telephone:	082 490 4066	Fax			
E-mail:	vanessa@cocojams.co.za				

#### 2. DECLARATION BY THE SPECIALIST

I, Vanessa Maitland

, declare that -

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

Signature of the Specialist

Contract Maritime Archaeologist

27-09-2022 01.10-2022

Name of Company:

Date

Details of Specialist, Declaration and Undertaking Under Oath

Page 2 of 3

#### 3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, Vanessa Maitland, swear under oath / affirm that all the information submitted or to be submitted for the purposes of

this application is true and correct. allu

Signature of the Specialist

Contract Maritime Archaeologist

Name of Company 01.10.2022 27-09-2022

Date

Date 2012 - 10 - 01

Signature of the Commissioner of Oaths



Details of Specialist, Declaration and Undertaking Under Oath