

**Underwater Heritage Impact Assessment  
for the Proposed Offshore Sandwinning for Developments  
within the Port of Durban, KwaZulu-Natal**

South Africa



**UNDERWATER HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED OFFSHORE SANDWINNING FOR DEVELOPMENTS WITHIN THE PORT OF DURBAN, KWAZULU-NATAL, SOUTH AFRICA**

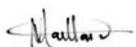
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**Declaration:**

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



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## EXECUTIVE SUMMARY

“The Port of Durban is South Africa’s premier container port (handling 65% of South Africa’s container traffic) and the principal port serving KwaZulu-Natal and the Gauteng region as well as the South African hinterland. The port handles over 4 700 commercial vessels annually, the highest number in South Africa.

Major growth areas for the port are seen to be in containers. Over the next ten years, demand along the Durban–Gauteng corridor is expected to grow from 2.6 million TEU to 4.2 million TEU. The Port of Durban has a current capacity of 3.4 million TEU, but infrastructure, land and logistics constraints hinder the alignment with the design capacity. Optimisation of the existing facilities is vital to the provision of short term capacity.

In order to prepare for the future container growth, the Port of Durban started a process for a phased container capacity expansion programme in order to improve throughput capacity by reconfiguring and rationalising the existing Durban container terminal (DCT). Pier 1 Phase 2 Project is part of the expansion programme and is seen as the key to the provision of medium and long term capacity. Other major expansion projects in the short term include deepening and lengthening of the North Quay, berth reconstruction and deepening at Island View and Maydon Wharf.

As part of these expansions, TNPA has recognized the need for sandwinning of approximately 4.5 million m<sup>3</sup> of offshore material which will be required as part of these developments.” (Transnet 2016)

The activities that could impact on the underwater cultural heritage are the following:

1. The offshore sandwinning for infill material

The aim of the survey was to attempt to locate, identify, evaluate and document potential underwater cultural heritage sites within the two offshore sandwinning areas.

Maritime Underwater Cultural Heritage (MUCH) sites are harder to find than land sites. Firstly, the survey area is covered in water. Secondly, search conditions are impacted enormously by the weather. Thirdly, underwater searches are impeded by low visibility.

The survey consisted of three sections:

1. Desktop study, consisting of a database of known and suspected wrecks in the area
2. Magnetometer survey of the designated areas
3. Diver searches on the magnetometer hits to ascertain the nature of the sites

Due to the environment of underwater cultural heritage, while potential sites can be identified through the above process, it is probable that additional sites will be uncovered during dredging. Therefore, for the project to be completed, the following measures should be implemented:

- The management measures, Section 7, should be implemented during the work. Sites uncovered during the work to be dealt with on an ad hoc basis.
- No impact on underwater heritage sites will be allowed without the appropriate South African Heritage Resources Agency (SAHRA) permit.

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## GLOSSARY OF TERMS AND ACRONYMS

### TERMS

#### Alternative 1

Quadrilateral area c. 1.2 km east of the harbour mouth, measuring approximately 1.1 km<sup>2</sup> (110 hectares), with the following coordinates (WG31) (Figure 1):

A – X 3305056.570	Y -6888.020
B – X 3305728.680	Y -6873.430
C – X 3304212.720	Y -9072.100
D – X 3303929.020	Y -8936.730

#### Alternative 2

Quadrilateral area just south of Alternative 1, measuring approximately 2.5 km<sup>2</sup> (250 hectares), with the following coordinates (WG31) (Figure 1):

01 – X 3305728.680	Y -6873.430
02 – X 3304212.720	Y -9072.100
03 – X 3306579.390	Y -6867.870
04 – X 3305151.350	Y -9526.270

**Hits**                      Magnetic Anomalies

**Mag**                        Magnetometer

### ACRONYMS

<b>ASAPA</b>	Association of Southern African Professional Archaeologists
<b>EIA</b>	Environmental Impact Assessment
<b>HIA</b>	Heritage Impact Assessment
<b>MUCH</b>	Maritime and Underwater Cultural Heritage
<b>NAS</b>	Nautical Archaeology Society
<b>NHRA</b>	National Heritage Resources Act (No. 25 of 1999)
<b>RIB</b>	Rigid Inflatable Boat
<b>SAHRA</b>	South African Heritage Resources Agency
<b>TNPA</b>	Transnet National Ports Authority
<b>UHIA</b>	Underwater Heritage Impact Assessment

## 1. INTRODUCTION

“In order to prepare for the future container growth, the Port of Durban started a process for a phased container capacity expansion programme in order to improve throughput capacity by reconfiguring and rationalising the existing Durban container terminal (DCT). Pier 1 Phase 2 Project is part of the expansion programme and is seen as the key to the provision of medium and long term capacity. Other major expansion projects in the short term include deepening and lengthening of the North Quay, berth reconstruction and deepening at Island View and Maydon Wharf.

As part of these expansions, TNPA has recognized the need for sandwinning of approximately 4.5 million m<sup>3</sup> of offshore material which will be required as part of these developments.” (Transnet 2016)

The dredging outside Durban Harbour will lower the seabed and could potentially uncover MUCH sites that have subsided in and been covered by the sand.

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 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 Underwater Heritage Impact Assessment (UHIA) to determine the potential MUCH sites, to assess their significance and to consider mitigation of negative impacts.

This UHIA 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 this UHIA 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 designated areas
- Diver searches on the magnetic anomalies (hits) to ascertain the nature of the sites

The objectives were to:

- Identify potential MUCH sites within the designated areas
- Evaluate the potential impact of dredging in the designated areas
- Recommend measures to mitigate any negative impacts on MUCH sites in the designated areas

## 3. HERITAGE RESOURCES

### 3.1. The Legislation

According to Section 32 (1) of the NHRA (No. 25 of 1999), heritage objects consist of:

“An object or collection of objects, or a type of object or list of objects, whether specific or generic, that is part of the national estate and the export of which SAHRA deems it necessary to control, may be declared a heritage object, including— (a) objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects, meteorites and rare geological specimens.”

The Act further stipulates that the term “archaeological” includes:

“wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act, 1994 (Act No. 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation.”

Section 35 of the Act states:

“(1) Subject to the provisions of section 8, the protection of archaeological and palaeontological sites and material and meteorites is the responsibility of a provincial heritage resources authority: Provided that the protection of any wreck in the territorial waters and the maritime cultural zone shall be the responsibility of SAHRA.

(2) Subject to the provisions of subsection (8)(a), all archaeological objects, palaeontological material and meteorites are the property of the State. The responsible heritage authority must, on behalf of the State, at its discretion ensure that such objects are lodged with a museum or other public institution that has a collection policy acceptable to the heritage resources authority and may in so doing establish such terms and conditions as it sees fit for the conservation of such objects.

(3) Any person who discovers archaeological or palaeontological objects or material or a meteorite in the course of development or agricultural activity must immediately report the find to the responsible heritage resources authority, or to the nearest local authority offices or museum, which must immediately notify such heritage resources authority.

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

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

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

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

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

Furthermore Section 38 of the Act states:

“(1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as—

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 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 m<sup>2</sup> in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m<sup>2</sup> 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 MUCH sites. Within the scope of this project, Section 38 of the NHRA (25 of 1999), 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. If a potential MUCH site is uncovered during the work, a maritime archaeologist needs to be contacted to assess the find. Thereafter, in conjunction with SAHRA, a decision will be made regarding the significance of the site. If it is deemed to be culturally significant, the contractor can apply to the Maritime Unit of SAHRA for a permit for removal, excavation or destruction in terms of Section 35 of the NHRA.

## 4. STUDY APPROACH AND METHODOLOGY

### 4.1. Extent of the Assessment

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

### 4.2. Methodology

#### 4.2.1. Preliminary Investigation

A shipwreck database was compiled from the available written and oral sources and is available in Section 5.3.2.

The shipwreck database highlights the large quantities of wrecks that are in the area. There are wreck trap areas; these are areas where there is a higher concentration of wrecks due to prevailing weather conditions and the limitations of historical shipping. For Durban, the two most prominent traps were Back Beach and the Bar. Today, these areas are just offshore, north of the harbour and the Harbour mouth (potentially Alternative 1 and 2) which are more likely to have a high concentration of MUCH sites.

The nature of the environment, shifting sand, 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 dredging, 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 status of the environment.

#### 4.2.2. Magnetometer Survey

This survey was undertaken in June 2012. A Marine Magnetics Explorer proton overhauser magnetometer was towed behind a 9m fibreglass rigid inflatable boat (RIB), with a layback of between 15 and twenty meters (weather and water depth dependent), at an average speed of 6 knots/hour.

The magnetometer data collected by Sealink 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, without knowledge of the environmental conditions, by Jaco Boshoff of the South African Museum. The two sets are compared and a final analysis completed.

In addition, for the offshore sandwinning sites, side scan sonar imagery collected by the Council for Geoscience in 2001 was layered under the mag hits using QGIS Open Source version 1.8.0. The mag hits were compared

to the debris fields identified by Miller and Leuci (2001).

### Limitations

- The magnetometer picks up magnetic anomalies in and below the seabed. All the hits may not be MUCH sites, in addition, diver searches may not find the cause. Their status may only be revealed during the dredging process. The process gives the dredgers an idea of where MUCH sites may be uncovered.

#### 4.2.3. Diver Searches

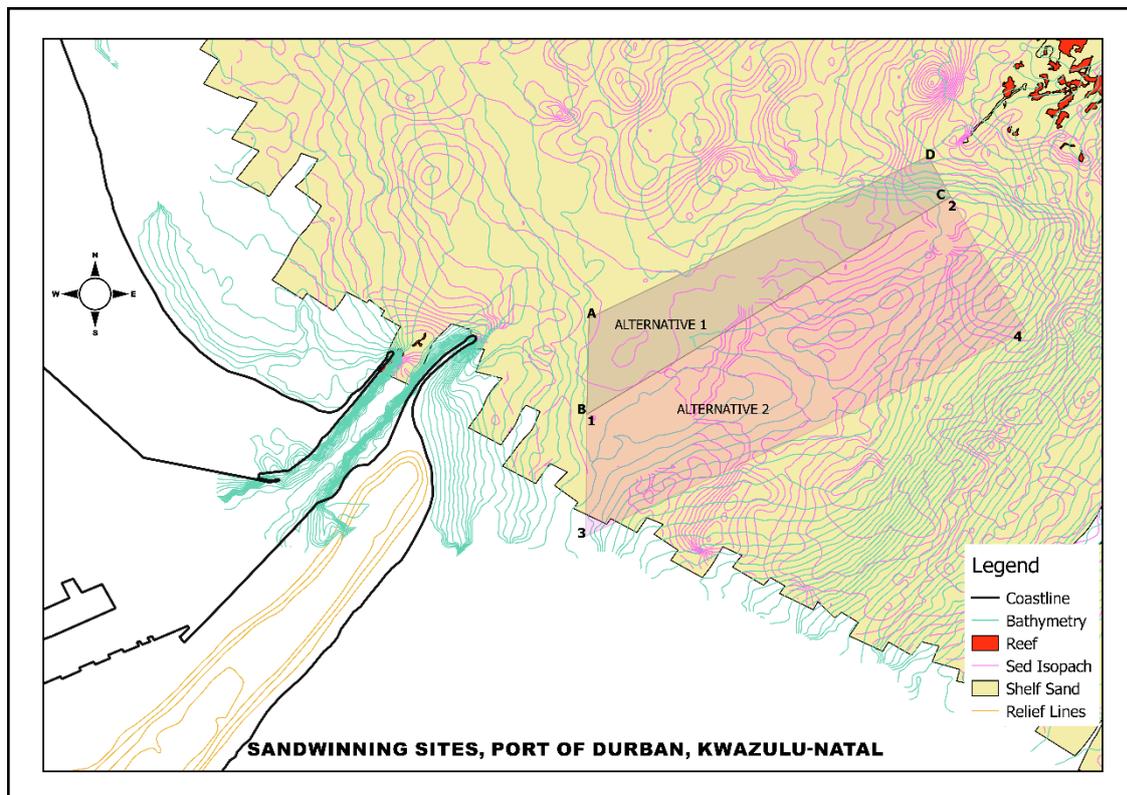
These diver searches were undertaken in June 2012 and were conducted on only 24% of mag hits in order to assess the anomalies. As the area falls outside the control of the Port Authority, we used volunteer sports divers from the Durban Undersea Club. The majority of these divers have received some training from SAHRA using the Nautical Archaeology Society (NAS) syllabus and were thus suited to the task.

### Limitations

- The weather at this period of the year can be difficult. There were very few dive days available and the torrential rainfall experienced, in the winter of 2012, meant the rivers emptied large amounts of sediment into Durban Bay. This sediment meant that underwater visibility was bad and searches could not always be undertaken.

## 5. DESCRIPTION OF THE AFFECTED ENVIRONMENT

### 5.1. Site Location and Description



**Figure 1:** Sandwinning Areas Topographical Map showing Alternatives 1 and 2

### 5.1.1. Sandwinning Site – Alternative 1

Quadrilateral area c. 1.2 km east of the harbour mouth, measuring approximately 1.1 km<sup>2</sup> (110 hectares), with the following WG31 coordinates:

A – X 3305056.570	Y -6888.020
B – X 3305728.680	Y -6873.430
C – X 3304212.720	Y -9072.100
D – X 3303929.020	Y -8936.730

This bathymetry of this area varies from a depth of 19 m to 20 m. There is a distinct sandy mound. This is the remains of the dredge dumping grounds from the turn of the 20<sup>th</sup> century (Miller and Leuci: 2001). Much of this dredge material came from the port during the 'Battle of the Bar' (Bender: 1988); sand bars formed at the entrance to the port and were responsible for at least 27% of all the area's wrecks. Thus the mound is no doubt littered with artefacts, however as these are secondary deposits, the contextual information, so important in archaeology has been altered and the any potential artefacts have a lower significance. The exception to the above, would be uncovering, during dredging of a shipwreck.

### 5.1.2. Sandwinning Site – Alternative 2

Quadrilateral area just south of Alternative 1, measuring approximately 2.5 km<sup>2</sup> (250 hectares), with the following WG31 coordinates (Figure 1):

01 – X 3305728.680	Y -6873.430
02 – X 3304212.720	Y -9072.100
03 – X 3306579.390	Y -6867.870
04 – X 3305151.350	Y -9526.270

This bathymetry of this area varies from a depth of 20 m to 32 m. This area also has a distinct sandy mound. This is the remains of the dredge dumping grounds from the turn of the 20<sup>th</sup> century (Miller and Leuci: 2001). Much of this dredge material came from the port during the 'Battle of the Bar' (Bender: 1988); sand bars formed at the entrance to the port and were responsible for at least 27% of all the area's wrecks. Thus the mound is no doubt littered with artefacts, however as these are secondary deposits, the contextual information, so important in archaeology has been altered and the any potential artefacts have a lower significance. The exception to the above, would be uncovering, during dredging of a shipwreck.

## 5.2. Overview of the Area

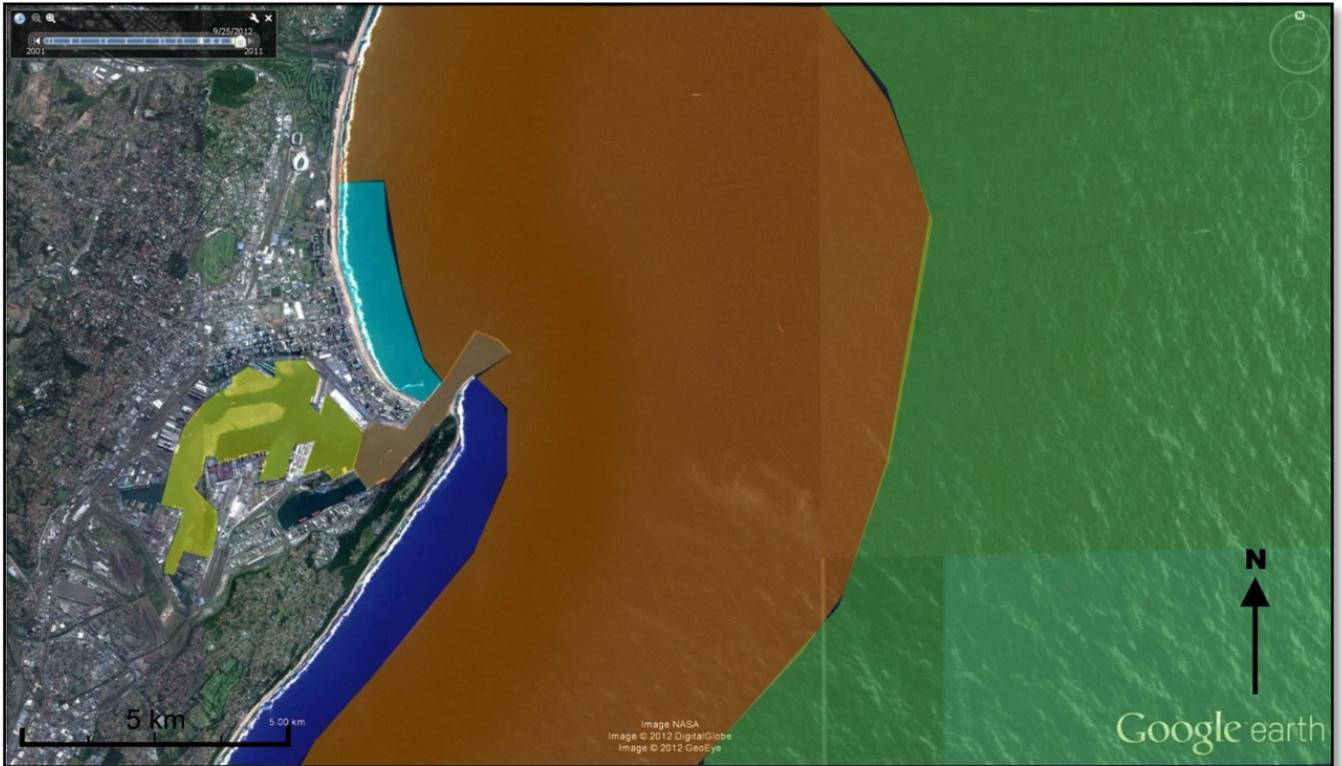
Since the British ship *Good Hope* was wrecked, in Durban, in 1685 (Turner: 1988), over 141 ships have been wrecked in or near Durban Harbour. Of these, 38 were salvaged or removed, either at the time of the event or years later, as in the case of the *Karin*. Of the 101 remaining wrecks, 14 were scuttled in the deep water either off the Bluff or about 5km away from Durban; 28 were wrecked in or near the entrance to the harbour and the remaining 61 were wrecked on the Durban Beach areas or the Outer Anchorage.

## 5.3. Shipwreck Database

The shipwreck database highlights the large quantities of wrecks that are in the area. There are wreck trap areas; these are areas where there is a higher concentration of wrecks due to prevailing weather conditions and the limitations of historical shipping. For Durban the two most prominent traps were Back Beach and the Bar. Today, these areas are just offshore, north of the harbour; and the Harbour mouth – part of Alternative 1 and 2, which are more likely to have a high concentration of MUCH sites.

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.

### Database Zones



**Figure 2:** Durban Harbour area showing Shipwreck Database Zones. (Photo: Google Earth 2011)

**Table 1:** Database Zones

	Wrecked on Lee or Annabella Bank, the Bar or Harbour Entrance
	Damaged or wrecked but refloated or removed
	Umgeni River, Anchorage or "off" Durban
	Bluff
	Beaches to the north of Durban Harbour
	Harbour or not enough information to assess
	Offshore, a generic term that could be anywhere off Durban but generally thought to be about 5km offshore in deep water

## 5.3.1. Shipwreck Database (Compiled from: Levine 1986; Turner 1988; Maitland 2008)

#	Name	Events	Home Port	Date	History	Area may be found
1	<i>Actaea</i>	Aground – Refloated – Repaired – Sailed	Britain	20 November 1865	<b>Lee/Annabella Bank.</b>	N/A
2	<i>Adelaide</i>	Aground – Wrecked – Hull Sold	Britain	3/8 February 1866	<b>Back Beach?</b> Anchored off Durban on 1 February 1866. Two days later the barque was in the Outer Anchorage when an easterly gale swept the coast. Her anchor cables broke and she went aground. No lives were lost, (or several men drowned). Her hull was sold for £310 on 16 February 1866.	N/A
3	<i>African Adventurer</i>	Aground – Wrecked	Portugal	January 1830	<b>Near Umgeni River.</b> For 3 weeks a storm blew her out to sea. Some slaves were thrown overboard to conserve drinking water; others died of thirst. The rest had been 8 days without water and were too weak to throw the dead overboard. The ship was run aground at Durban near the Umgeni River. 130 slaves had died. The Portuguese captain, his wife and the few remaining slaves apparently walked to Delagoa Bay.	N/A
4	<i>Altcar</i>	Marooned – Refloated	Britain - Australia	31 August 1880	<b>Off the Bluff.</b> On 19-04-1880 it put into Durban with the lower deck beams broken while on passage from London to New South Wales with machinery and railway plant. On 31-08-1880, it was stranded off the Bluff at Durban, report described vessel as a 'floating coffin'. It was refloated because it continued to be listed in Lloyd's Register of Shipping until 1909.	Alt. 1/2
5	<i>Amelia Mulholland</i>	Aground – Refloated	Britain	16 February 1850	<b>North of the Bar.</b>	N/A
6	<i>Ann</i>	Wrecked		1826	<b>Entrance to Durban Harbour.</b> One of the crew, Charles Rawdon MacLean changed his name to John Ross.	Alt. 1/2
7	<i>Ann White</i>	Ashore – Refloated – Repaired	Britain	22 November 1858	<b>Back Beach.</b> The vessel was entering Durban Harbour by the North Channel when the wind dropped. She struck on the 'shoal ground' and went onto the Back Beach.	N/A
8	<i>Annabella</i>	Aground – Wrecked – Hull sold	Britain	21 January 1856 / 26 February 1856	<b>Lee/Annabella Bank.</b> The vessel was entering Durban Harbour when she lost steerage way. She struck the Bar, drifted onto the Lee Bank and became a total wreck. No lives were lost. Her hull was sold by auction for £200 by Mr Acutt. Captain Paul subsequently established a ships' chandlers at the Port and that notorious Bar, since vanished, was renamed the Annabella Bank.	N/A
9	<i>Ariosto</i>	Aground – Wrecked – Possibly removed in 1936	America	31 July 1854	<b>Back Beach, at the end of Smith Street.</b> False reckoning and hazy weather caused the barque to run aground on Back Beach. Her crew landed in their own boat, convinced that they were marooned in "Caffreland". No lives were lost. 100 tons of pepper was salvaged and was bought by William Hartley. This may be the wreck that was removed from South Beach in September 1936.	N/A
10	<i>Blink</i>	Scuttled		22 January 1940	<b>Scuttled 6km from Durban.</b> The <i>Blink</i> once worked with the <i>Skarpjeden</i> , the <i>Hogni</i> and the <i>Norman II</i> . The <i>Norman II</i> sank off Zululand in 1925. The <i>Hogni</i> was scuttled in 1936 and the <i>Skarpjeden</i> had been scrapped. The <i>Blink</i> , stripped of her machinery, gear and funnel was taken 6 km from Durban and scuttled. This may be the Cooper Light Wreck.	Alt. 1/2
11	<i>Breidablik</i> (1872)	Ashore – Refloated – Possibly repaired	Norway	31 July 1872	<b>Back Beach, at the foot of West Street – 29° 51.20S 31° 02.50E.</b> The vessel driven aground during a north-east gale. The hull was sold for £105 and the vessel may have been refloated and repaired.	N/A
12	<i>Bridgetown</i>	Ashore – Wrecked	Britain	28 June 1882	<b>Back Beach, just north of Vetch's Pier – 29° 51.20S 31° 02.50E.</b> The vessel ran aground on the Bar Ridge during an easterly or north-easterly breeze. It drifted ashore onto the beach. The crew was brought ashore by the port lifeboat. No lives were lost.	N/A
13	<i>British Tar</i>	Ashore – Wrecked	Britain	21/29 Sept 1850	<b>Back Beach – 29° 51.80 S 31° 03.00 E.</b> Emigrant ship. Eighty three of the new colonists had already gone ashore. Anchored	N/A

					at the outer roadstead in an east-north-east gale, her cables parted, the rudder broke and it was driven ashore. The bow was embedded in the dunes of the Back Beach and the survivors waded ashore.	
14	<i>Burnham</i>	Aground – Wrecked	Britain	29 May 1840	<b>Harbour?</b> The vessels cable parted at the port, during a north-west gale and went aground. Part of cargo was saved and no lives were lost.	<b>N/A</b>
15	<i>Cetus</i>	Aground – Refloated	South Africa	2 April 1912	<b>Southern Breakwater.</b> The vessel was returning to Durban Harbour when she was driven onto the Southern Breakwater by heavy seas.	<b>Alt. 1/2</b>
16	<i>Charles Jackson</i>	Ashore – Wrecked	Britain	26 August 1884	<b>Back Beach – 29° 51.20 S 31° 02.50 E.</b> It was driven aground in an easterly breeze. No lives were lost.	<b>N/A</b>
17	<i>Churchill</i>	Collision – Repaired		January 1895	<b>Off Durban Lighthouse.</b> The steam tug <i>Churchill</i> and the steam ship <i>Venice</i> collided off Durban Lighthouse. The stern of the <i>Churchill</i> was damaged.	<b>N/A</b>
18	<i>City of Lima</i>	Sank – Wrecked	Britain	21 July 1883	<b>Sank 1km from shore on the Durban Bar Ridge</b> during an east-north-east wind. The crew and working party of 22 were saved by life boat and the barque capsized 45 minutes later. No lives were lost. The Court of Inquiry censured the Mate for a "general lax state of affairs" and the Master "for being on shore every night".	<b>Alt. 1/2</b>
19	<i>Colombo</i>	Foundered – Wrecked	Dutch	24 September 1822	<b>Off Port Natal.</b>	<b>Alt. 1/2</b>
20	<i>Congune (ex Natalia)</i>	Sank – Wreck removed		16 October 1872	<b>Harbour?</b> This vessel foundered at its anchorage in Durban. No lives were lost and the wreck was sold on 6 December 1872 for £3. The wreck was declared a hazard to navigation and removed.	<b>N/A</b>
21	<i>Courier</i>	Aground – Wrecked	Britain	27 August 1846	<b>The Bar.</b> After loading cargo, to return to Mauritius, she struck the Bar at the entrance to the Port, during a westerly wind, and became a total wreck. No lives were lost.	<b>N/A</b>
22	<i>Dabulamanzi</i>	Damaged – Sailed		13 May 1889	Damaged in a collision in Durban. In 1900 the vessel was sold to Compagnie Franco-Tunisienne de Nav., Marseilles, France renamed Ville de Sfax. In 1906 it was sold to Compagnie Générale Transatlantique and not renamed; in 1913 sold to Unione Austriaca and renamed <i>Anna</i> . In 1914 it was laid up and in 1917 was seized by U.S. Government. In 1926 it was renamed <i>Maule</i> and finally in 1928 was lost by grounding in South America.	<b>N/A</b>
23	<i>Denton Grange</i>	Aground – Refloated	Britain	30 August 1898	<b>Lee/Annabella Bank.</b> Arrived at the Durban Anchorage and then stranded on the Lee bank during an east-north-east gale. She was eventually refloated and towed into the harbour.	<b>N/A</b>
24	<i>Devon</i>	Disabled –?	Britain	29 July 1911	The vessel struck a submerged object 5km off the Bluff and was disabled.	<b>N/A</b>
25	<i>Dora P. (ex Pro-Patria, ex Steamer, ex Calshot)</i>	Scuttled		18 April 1950	<b>Offshore?</b> The vessel burned 160 km off Durban when an engine room fire ignited her cargo. The 7 200-ton British steamer <i>Avismere</i> , the British tanker <i>Prestige</i> and the Durban Harbour tug <i>T. Erikson</i> responded to her SOS. The crew were taken aboard the <i>Avismere</i> and the gutted vessel was taken to port by the <i>H.M.S.A.S. Bloemfontein</i> . Afterwards she was sunk by gunfire from the <i>Jan Van Riebeeck</i> .	<b>Alt. 1/2</b>
26	<i>Douglas</i>	Aground – Refloated		5 September 1849	<b>Lee/Annabella Bank.</b> The vessel was returning to Table Bay, when she was wrecked on the Lee Bank at Durban. Records indicate that she was refloated.	<b>N/A</b>
27	<i>Draga</i>	Beached – Wrecked	Austro-Hungarian	01 November 1880	<b>Back Beach – 29° 51.20 S 31° 02.50 E.</b> During a north-east gale She sprang a serious leak and ran aground on the Back Beach. She was a total wreck but no lives were lost.	<b>N/A</b>
28	<i>Dunkeld</i>	Aground – Refloated		5 August 1880	<b>Lee/Annabella Bank.</b> The vessel was entering the harbour when she ran aground on the Annabella Bank. Three tugs assisted in refloating her.	<b>N/A</b>
29	<i>Earl of Hardwick</i>	Ashore – Wrecked	Britain	27/26 September 1863	<b>Back Beach – 29° 51.80 S 31° 03.00 E.</b> This vessel was one of the first regular East India traders to be fitted with steam power. The small engine drove a small paddle wheel which could be unshipped as desired. In time, however, she was fully converted to a sailing vessel. While anchored at the Outer Roadstead, a north-east gale arose. She lost her anchors and	<b>N/A</b>

					went ashore on Back Beach. No lives were lost and she was sold on 8 October 1863.	
30	<i>Eastern Star</i>	Ashore – Wrecked	Britain	25 August 1880	<b>Addington Beach / North side of the breakwater.</b> While anchored on the north side of the Durban breakwater during an easterly gale, the anchor cables parted and the vessel went aground. No lives were lost.	N/A
31	<i>Eleanor</i>	Aground – Wrecked		28 July 1839	<b>Lee/Annabella Bank.</b> Lost through the carelessness of her Master, she ran aground, but no lives were lost.	N/A
32	<i>Elizabeth</i>	Sank		11 January 1878	<b>Anchorage.</b> The <i>Ocean Ranger</i> , under Capt. Priddles was lying in Port. The cargo boat <i>Elizabeth</i> was sent to unload machinery. The barometer began falling and the crew of the <i>Elizabeth</i> protested that the cargo boat was being overloaded. When she was finally released, she was deeply laden. She took on water and sank. Capt. Priddles claimed the cargo boat was unseaworthy but her owner Mr. Hooper sued the captain for damages and won.	Alt. 1/2
33	<i>Elizabeth Anne</i>	Wrecked		October 1863	<b>Unknown</b>	Alt. 1/2
34	<i>Elvira</i>	Aground – Refloated	Britain	5 July 1882	<b>Bar Ridge.</b> The vessel was being towed into Durban Harbour when she ran aground. On the next high tide she was towed off by the <i>Koodoo</i> .	N/A
35	<i>Enfant Nantais / Enfants Nantais</i>	Ashore – Wrecked	France	14 September 1876	<b>Back Beach, 1 km above West Street - 29° 51.20 S 31° 02.50 E.</b> The vessel's anchors parted in a north-east / east-north-east gale and drove aground. No lives were lost.	N/A
36	<i>Erwood</i>	Aground – Condemned – Sold – Rebuilt as lighter	Britain	3 August 1882	<b>Lee/Annabella Bank.</b> The <i>Erwood</i> was being towed into the harbour by the <i>Koodoo</i> , when the vessel grounded on a sand spit. The spit had been recently formed and ran from the Bar Ridge to the Annabella Bank. The <i>Erwood</i> was refloated on the morning of 5 August. After being towed inside, it was surveyed, condemned and sold. Some time it was rebuilt as lighter.	N/A
37	<i>F. Todenskjold</i>	Sank	South Africa	30 May 1915	<b>Entrance to Harbour.</b>	Alt. 1/2
38	<i>Fleur de Maurice</i>	Aground	Britain	April 1894	<b>Unknown</b>	Alt. 1/2
39	<i>Forerunner</i>	Aground – Refloated		21 July 1883	<b>Lee/Annabella Bank - Milne's Pier Extension.</b> At 11:45, this tug left the Port to attend a lifeboat that was helping the stranded barque <i>City of Lima</i> . The tug grounded on the Annabella Bank and was washed further onto the bank until 04:00 on 22 July, when she struck the end of Milne's Pier Extension and stranded alongside.	N/A
40	<i>Fratelli Arecco</i>	Ashore – Wrecked – Sold	Italy	22 August 1883	<b>Back Beach, abreast of the Rocket House at the foot of West Street – 29° 51.21 S 31° 02.55 E.</b> This vessel ran aground at night when her cables parted during an east-north-east wind. No lives were lost. It is thanks to this wreck that Durban has its infamous population of cockroaches. The hull was sold by the Municipality to defray the expense of getting rid of the rotting rice.	N/A
41	<i>Frey</i>	Aground – Repaired – Sailed		September 1879	<b>The Bar.</b> While under tow into the harbour by the <i>Forerunner</i> , she struck the Bar and lost her false keel. The Harbour Authorities were exonerated and the vessel was repaired and sailed for London on 13 February 1880.	N/A
42	<i>Fusileer / Fusilier (ex Crimea)</i>	Aground – Wrecked	Britain	25 May 1865	<b>The rocks of the side of the foot of Bluff.</b> During the voyage to Port Natal, 189 people died of fever and many more were ill. The vessel parted from her anchors at the Outer Roadstead, during a north-east wind; it struck the rocks of the side of the foot of the Bluff. All but 20 immigrants were rescued and placed in quarantine at the Point. Soldiers of the 99th Regiment, stationed in Durban at the Old Fort, guarded the survivors, "in order that no one should come near enough out of curiosity to spread the disease, whatever it was, to the town." The Natal Mercury reported that the hulk was "lying about north and south (bow pointed northward) broadside to the sea".	Alt. 1/2
43	<i>Gazelle</i>	Ashore – Wrecked	America	13 March 1879	<b>Back Beach – 29° 51.15 S 31°02.50 E.</b> The vessel was stranded during a north-east gale. No lives were lost. While the vessel uninsured, 600 bags of maize were recovered. The brig was sold on 20 March, but by the end of the month, she was a total wreck. It is reported to lie close to the wreck of the <i>Theresina</i> (1878).	N/A

44	<i>Good Hope</i>	Ashore – Wrecked	Britain	17 May 1685	<b>Inside the Bar, the point of the Bay of Natal.</b> The <i>Good Hope</i> stopped for supplies at the Islands of Moy and St. Jago; it passed the Cape of Good Hope and arrived at Port Natal. The crew, preoccupied with the ketch anchor, were attempting to haul the vessel over the Bar when the vessel was driven ashore by a sudden squall from the north. Later, ten of her crew sailed on a slaving expedition to Madagascar via Delagoa Bay in a boat they had built from the remains of the <i>Good Hope</i> .	N/A
45	<i>Grace Peile</i>	Ashore – Wrecked	Britain	30 July 1872	<b>Back Beach, opposite West Street – 29° 51.80 S 31° 03.00 E.</b> The vessel parted anchors during a spring north-east gale and drove aground. Mules were driven onto the beach 'to decoy' mules from the wreck ashore and of the 32 mules released, only 2 drowned. The following day, the other 48 mules were taken off the wreck. She was condemned and abandoned. The hull was auctioned for £450.	N/A
46	<i>Graf Wedell</i>	Ashore – Wrecked	Sweden	24 October 1880	<b>Bar Ridge, then washed aground on Durban Beach – 29° 51.20 S 31°02.51 E.</b> At night during an easterly wind, the vessel lost her anchor and drove aground. Four lives were lost.	N/A
47	<i>Grampus</i>	Collision – Repaired		25 September 1903	<b>The Bar.</b> The <i>Grampus</i> collided with the <i>Nautilus</i> on the Bar	N/A
48	<i>H.D. Stover / H.D. Storer</i>	Ashore – Wrecked	America	4 August 1878 / 2	<b>Back Beach – 29° 51.22 S 31° 02.51 E.</b> Both cables broke in an easterly or east-north-easterly gale and she went aground. Her crew were saved with the Rocket Apparatus. The barque, exclusive of cable, was auctioned for £475.	N/A
49	<i>H.M.S.A.S. Sydostlandet (T33)</i>	Ashore – Wrecked	South Africa	6 April 1942	<b>11 km NW of the Umgeni River / 8km south of Umhlanga Rocks.</b> At night, during a gale, the vessel drifted into the breakers, went on her beam ends and went aground. A former whaler owned by Kerguelen Sealing & Whaling Co. Cape Town, it was converted to an anti-submarine vessel by the Navy. Only the 12-pounder gun and some of her auxiliary machinery was saved. The ship was virtually a total loss but no lives were lost.	N/A
50	<i>Hawthorn</i>	Ashore – Wrecked	Britain	19 August 1889	<b>Back Beach, 200m south of West Street, between the Point and the Rocket House – 29° 51.50 S 31°03.70 E.</b> The vessel parted its anchor cables during a north-east gale and was driven ashore. Her crew were saved by the Rocket Apparatus. The Master and mate were exonerated.	N/A
51	<i>Hero</i>	Aground – Wrecked		17 November 1843	<b>The Bar.</b> The vessel was entering the Port when she struck the Bar, lost her rudder and drove inshore. The ship was condemned on 17 November, sold and scrapped.	N/A
52	<i>Hogni</i>	Scuttled		8 September 1936	<b>Offshore?</b>	Alt. 1/2
53	<i>Hydra</i>	Aground – Wrecked	Germany	13 December 1867	<b>The Bar.</b> After the cables parted, the vessel struck the Bar during a north-east or south-west gale. The brig went to pieces and either eight or seven people died. Two men survived when they lashed themselves to planks and were washed ashore. The wreck was auctioned for £80.	N/A
54	<i>Inyati</i>	Collision – Refloated	Britain	26 July 1911	<b>The Bar.</b> The <i>Inyati</i> was leaving Durban for London. At the entrance to the harbour, the transfer of the pilot to the harbour tug, <i>Richard King</i> was being prepared when the two vessels collided. No lives were lost. The vessels returned to the Port. In 1911 it sold to the Charente Steamship Co. (T. & J. Harrison); in 1912 it was sold to Spain and renamed <i>M. Benlliure</i> and finally in 1915 the vessel disappeared at sea.	N/A
55	<i>Inyoni</i>	Aground – Refloated – Repaired	Britain	7 September 1895	<b>The Bar.</b> This vessel struck the Bar, slewed around and stuck between two piers. In 1911, it was sold to Administration de Navigation a Vapore Ottomane, Istanbul, Turkey and renamed <i>Kizilirmak</i> and on 13 September 1915 it was shelled and sunk by Russian warships.	N/A
56	<i>Istar (ex Nahma)</i>	Scuttled		28 March 1931	<b>7 km off Durban Harbour.</b> This vessel began her career as a millionaire's yacht. In World War I, she served as a submarine chaser. In the 1920's, during prohibition, she was one of the most notorious rum-runners along the eastern seaboard of the United States. She then came to South Africa, where she served as the floating factory shop of a shark fishing venture.	Alt. 1/2

					In 1929, she was serving fourteen boats, each with ten nets, and was capable of processing 500 sharks per day. In March 1931, she was bought for scrap and her bronze propeller was removed. Thousands of spectators lined the beachfront to bid farewell as the <i>Istar</i> as she was towed by the tugs <i>Sir John Robinson</i> and <i>Sir William Hoy</i> . The vessel was taken 7 km from the entrance to Durban Harbour and scuttled.	
57	<i>James Gaddam / James Goddern</i>	Ashore – Wrecked	Britain	27 January 1882	<b>Back Beach – 29° 51.20 S 31° 02.50 E.</b> The vessel had offloaded her cargo of timber and had taken on ballast when she parted her cables in an east-north-east gale and drove aground. No lives were lost.	N/A
58	<i>Jessie</i>	Aground	Britain	14 September 1880	<b>Lee/Annabella Bank.</b> The vessel was coming in from the <i>Brocklesby</i> when she ran aground. The crew of the <i>Jessie</i> , and the captain of the <i>Roanole</i> , who was onboard, took to the rigging and were rescued.	N/A
59	<i>Just</i>	Aground – Wrecked	Britain	24 October 1882	<b>Back Beach.</b> No one was aboard when this vessel parted her cables during an easterly gale and drove aground.	N/A
60	<i>Kabinga</i>	Aground – Refloated without damage		2 October 1913	<b>North side of harbour entrance.</b> While approaching the Port, she went aground. No lives were lost.	N/A
61	<i>Kaffir Chief (ex Dr. C. Tupper)</i>	Aground – Wrecked	Britain	7 January 1876	<b>Aground on the Bar, part washed up on Back Beach, at the foot of West street.</b> During an east-north-easterly gale, she parted from her anchors and drove aground on the Bar, 300 metres from shore. The vessel became a total wreck but no lives were lost. Thereafter, part of the wreckage drifted ashore at the foot of West Street. Her hull was sold for £620 on 13 January 1876.	N/A
62	<i>Karin (ex Maggie O'Reagan, ex Maastad, ex Leksveer)</i>	Sank – 90% Removed by Port Authorities in 2009	South Africa	10 November 1927	<b>Shipping channel outside Port.</b> This vessel sank in 18 m of water outside Durban because she was badly loaded. Attempts were made to refloat her and when these were unsuccessful, she was flattened using explosives. Most of her remains were removed in 2009 as part of the Durban Harbour Widening.	N/A
63	<i>Kate</i>	Scuttled		18 March 1931	<b>Scuttled 5 km from Durban Harbour.</b> It is said that she was the first dredger built only for South African ports. In 1919 she was sold to C.G. Smith Co. Ltd., reconditioned as an 1154 ton coaster. The vessel plied between Durban, East London, Port Elizabeth and Mauritius. She had gone to the rescue of the <i>Istar</i> when she stranded at Madagascar and was used as a support boat during a salvage operation on the wreck of the <i>Cariboo</i> (1928). The former dredger was scuttled 5 km from Durban Harbour and lies in 60 fathoms of water.	N/A
64	<i>Kayle</i>				<b>Unknown</b>	Alt. 1/2
65	<i>Lady May</i>	Scuttled		Pre-1939	<b>Offshore?</b>	Alt. 1/2
66	<i>Langton Grange</i>	Aground – Refloated	Britain	16 December 1902	<b>South Breakwater.</b> When the vessel was caught by a swell, she grounded on the South Breakwater but was apparently refloated.	N/A
67	<i>Liba</i>			1879	<b>Back Beach.</b>	N/A
68	Licensed Lighter No. 18	Sank		18 July 1889	<b>Outer Anchorage.</b> This lighter was removing cargo from the steamship <i>Dunbar Castle</i> in the Outer Anchorage, when a loose telegraph pole fell into her hold. The lighter sprang a leak and foundered shortly after dusk.	Alt. 1/2
69	Lighter No. 20	Sank – Refloated		6 September 1901	<b>Outer Anchorage.</b> When this lighter sank, four lives were lost. It was refloated and towed into port.	Alt. 1/2
70	Lighter No. 8	Foundered – Sank		20 November 1899	<b>Outside the Bar.</b> This lighter was being towed outside the Bar by the <i>Lion</i> when a heavy cross sea caused her bulkheads to burst and she foundered. No lives were lost.	N/A
71	<i>Lily</i>	Sank		15 May 1879	<b>Harbour Channel.</b> This vessel was apparently old and heavily laden; she heeled over and sank in the channel. The crew were rescued by the men of the cargo boat <i>Phoebe</i> .	Alt. 1/2
72	<i>Lion</i>	Collision – Sank	Britain	21 July 1904	<b>North Pier / Struck the outer end of North Pier and sank.</b> The <i>Lion</i> had taken lighters to the Outer Anchorage. On her return, it was attempting to cross the Bar but was carried onto the concrete blocks of the North Pier by heavy seas. Seven lives were lost. In 1944, a dredger purchased her boiler. Parts of her remains may have been found in 2009 during the Harbour Widening. These were dredged up where the sand	N/A

					trap was meant to be. In order to leave the remains in-situ, the location of the sand trap was moved. See the <i>Karin Wreck Report</i> (2010).	
73	<i>Little Bess</i>	Aground – Capsized – Sank		13 November 1884	<b>Inside the Bar.</b> The tug <i>Lion</i> was towing three lighters, one of which was the <i>Little Bess</i> , out to the <i>Taymouth Castle</i> when the <i>Lion</i> stranded on the Bar. Two of the lighters drifted free on the incoming tide but the <i>Little Bess</i> capsized and sank.	N/A
74	<i>Lola</i>	Ashore – Wrecked	Sweden	30 March 1879	<b>Back Beach, 300 m to the Point side of West Street – 29° 51.20S 31° 02.50E.</b> During the night a moderate NE breeze arose. She parted her cables and went aground. Her back broke.	N/A
75	<i>Lord George Bentinck</i>	Ashore – Wrecked	Britain	3 January 1861	<b>Back Beach, close to the Queen – 29° 51.80 S 31° 03.00 E.</b> The captain had gone ashore and left the ship in the hands of the First Mate. An easterly gale swung to the north-east. The vessel parted from her anchors at the Outer Roadstead and as the crew were attempting to get out to sea, she struck the Bar. Seventeen men, still onboard were taken off by the <i>Pioneer</i> . No lives were lost. The vessel drifted on to Back Beach and broke apart. Her hulk was auctioned off.	N/A
76	<i>Luna</i>	Ashore – Wrecked	Germany / Britain	2 September 1880	<b>Back Beach – 29° 51.22 S 31° 02.50 E.</b> The vessel parted from her cables in a south-east gale and drove aground. The crew were saved by means of the Rocket Apparatus and no lives were lost.	N/A
77	<i>M. Smith Peterson</i>	Abandoned – Towed – Converted to hulk	Norway	23 March 1903	<b>Durban as a hulk.</b> After the vessel was disabled in a gale, the crew were rescued by the fishing steamer, <i>Hansa</i> and brought to Durban. The barque was abandoned near Port Shepstone and towed to Durban by the tug <i>Ingane</i> . She was converted into a hulk.	Alt. 1/2
78	<i>Mabel</i>	Ashore – Wrecked	Britain	26 October 1877	<b>Back Beach, foot of West Street – 29° 51.20 S 31° 02.50 E.</b> The vessel parted from her anchors during an east-north-east gale and drove aground. The mate had trained a pair of rats to perform tricks and the rodents were well known amongst seamen. The next morning the rats were found alive on the beach, but the mate, captain and two or three crew members had died. Offered for sale were four ship's long boats, ship's pump, galvanised wire rigging, galvanised iron, ship timbers and deep sea diving apparatus.	N/A
79	<i>Mary</i>	Ashore – Wrecked – Vessel <i>Chaka</i> built from her wreckage.	Britain	1 October 1825	<b>The Point, Durban Harbour – 29° 52.20 S 31° 03.15 E.</b> Lieutenant James Saunders King drew one of the first charts of Durban Harbour. He was a former Royal Navy officer and brought the brig, <i>Mary</i> , from England, intending to use her in 'native' trade between Cape Town and Port Natal. In the <i>Mary</i> , he brought Nathaniel Isaacs from St. Helena to Natal. The vessel left Table Bay on 2 September 1825 and sailed from Algoa Bay on 17 September for Port Natal. Anchored off the entrance to Port Natal in a heavy sea, she attempted to cross the Bar under the command of the mate, John Hatton. However, she grounded on an inner bank, was driven inshore, lost her rudder and went aground. No lives were lost but, King, Isaacs and most of the crew stayed at Port Natal. Hatton made it to Algoa Bay on a long boat. On his arrival in Cape Town, he asked for assistance for the men left behind. The stranded seamen constructed the <i>Chaka</i> from the wreckage.	N/A
80	<i>Mary Emily</i>	Aground – Wrecked	Germany	29 August 1889	<b>Back Beach, opposite the Rocket Station, at the foot of West Street, 12m of water – 29° 51.20 S 31° 02.52 E.</b> The vessel put to sea as a south-east or easterly gale swept the coast. The tug <i>Churchill</i> went to her aid, but turned back when she was told that assistance was not needed. She went to pieces and lost all hands. Three weeks later, her wreckage was found in 12m of water by divers who were working off the tug <i>Forerunner</i> .	N/A
81	<i>Medway</i> (ex <i>Umtata</i> )	Grounded – Towed out – Foundered at Outer Anchorage	Britain	15 October 1883	<b>Outer Anchorage.</b> The <i>Medway</i> was under tow by the <i>Fox</i> when she struck the Bar. She was taken back to the Outer Anchorage but foundered soon afterwards. Several unsuccessful attempts were made to raise the hull.	Alt. 1/2
82	<i>Minerva</i>	Aground – Wrecked	Britain	4 July 1850	<b>Reef running out from the Bluff, the point of the Bluff.</b> This was the largest vessel chartered by J.C. Byrne in his	Alt. 1/2

					immigration scheme by which he despatched thousands of settlers from Britain to Natal between 1849 and 1851. The <i>Minerva</i> was anchored at the outer roads of Durban on the morning of 3 July 1850. Towards dusk, the wind freshened. It was thought that a shackle bolt fell out and caused a cable to part. At 23:00, the tide and current swept the ship onto a reef running out from the Bluff. The vessel broke apart the following night. No lives were lost but the 276 passengers lost most of their possessions. A valuable racehorse managed to swim ashore. George Potter's Saddlery shop on Smith Street, Durban, was made out of fittings from the wreck.	
83	<i>Namaqua</i> (ex <i>Umzimvubu</i> )	Scuttled		11 November 1932	<b>Scuttled 6.4 km east-south-east of Durban.</b> This vessel lies next to the hulks of the <i>Kate</i> (1931), <i>Istar</i> (1931), <i>Emma</i> and <i>Garthforce</i> . She spent most of her life as a coaster. Owned by Sir Charles George Smith of Natal who named her <i>Umzimvubu</i> , she was initially used to transport sugar cane. Based in Durban, she carried freight and passengers between Durban, Port Shepstone, Port St. Johns and East London. Commanded by the Government during the South African War, she carried mail from Durban to East London and Port Elizabeth. After Sir Winston Churchill, who had been taken prisoner by the Boers near Chieverly, Natal, managed to escape, he sailed from Durban to East London aboard the coaster. He wrote, "My trip on the <i>Umzimvubu</i> to East London, was the worst that I have ever experienced, as the beastly little boat rolled and pitched at the same time." The vessel was also involved in a salvage attempt to recover the treasure of the <i>Grosvenor</i> and for a while diver, George Folley, and two Pondo assistants lived onboard. Purchased by a Port St. Johns shipping company, she repaid her purchase price in less than 5 years. When Rinderpest swept through the Eastern Cape and Transkei, killing all the cattle, the vessel carried the hides and skins to market. After she ran aground on 28 October 1917 at the mouth of the Umgeni River during a storm, all her crew were landed with the basket apparatus and she was refloated. In 1920, with 107 pigs, she was refused entry to Durban Harbour because of the high seas. As she headed out to sea she once again grounded near the mouth of the Umgeni River. Her cargo was salvaged by a butcher. The vessel was refloated and sold. Renamed the <i>Namaqua</i> , she was placed on the Cape Town - Port Nolloth run. In March 1931, she began work as the only catch boat for Ocean Industries, a shark fishing company located on Durban's Bluff. In the first 10 months of operation, she caught and processed 6 681 sharks.	N/A
84	<i>Natal</i>	Grounded – Towed off – Disappeared in 1888.	Britain	25 July 1880	<b>Lee/Annabella Bank.</b> This vessel was stranded on the Annabella Bank during a gale. After part of the cargo was unloaded, she was towed into deep water by the tug <i>Forerunner</i> . On 16 August 1888, she left Calcutta and disappeared at sea.	N/A
85	<i>Nautilus</i>	Collision – Refloated		25 September 1903	<b>The Bar.</b> Collided with the <i>Grampus</i> on the Bar.	N/A
86	<i>Noorden</i> (ex <i>Bombay</i> , ex <i>City of Bombay</i> )	Aground – Refloated	Norway	10 December 1904	<b>Umgeni River Mouth.</b> This vessel was stranded near the mouth of the Umgeni River in thick weather.	N/A
87	<i>Northern Isles</i>	Aground – Wrecked		19 January 1945	<b>Bluff Rocks.</b> This vessel put to sea with the Patrol Service at the outbreak of World war II. First assigned to the Northern Patrol and later performing escort and patrol duty off the U.S.A. Coast. By January 1945, she had served two years in South African waters. As the war was nearing its end, work for the vessel was becoming routine. Although the trawler was still under the direction of the SA Navy, her crew often fished to augment their wages. "The more fish we caught, the less food we had to buy and the more beer money for the lads at the end of the month." said telegraph operator James Brown. So intent on following the fish inshore, were the crew, that they ran the vessel onto the rocks at the Bluff and the vessel became a total	N/A

					wreck. The captain and the officer of the watch were found guilty of negligence in the court martial. The site of this wreck is known to local divers.	
88	<i>Northwester / North-Wester</i>	Wrecked?		31 May 1939/1839	<b>Unknown.</b> No lives lost.	<b>Alt. 1/2</b>
89	<i>Odd</i>	Aground – Wrecked		1949	<b>Between North Pier and Vetch's Pier.</b> Situated about 20m north of North Pier.	<b>N/A</b>
90	<i>Onaway</i>	Aground – Wrecked		2 / 3 February 1892	<b>Under the lighthouse against the South breakwater – 29°52.40 S, 31°03.70 E.</b> It was thought that the <i>Onaway's</i> captain, who had not called at Durban since the South Pier was built, mistook it for the North pier. Thinking he was entering the channel, he came in to the south of it at 22:00. No lives were lost. A south-west gale blew for a week and the vessel became a total wreck. Cargo was washed ashore. The master's certificate was suspended for 6 months by the Court of Inquiry.	<b>Alt. 1/2</b>
91	<i>HMS Otis</i>	Scuttled	Britain	September 1946	<b>Off Durban.</b> Served in the East Indies, in 1940 going on to the Mediterranean, in 1942 to Home Waters, in 1943 to the South Atlantic for anti-submarine training purposes. The last submarine of this type to be taken out of service in April 1946. Scuttled in September 1946 off the coast of Durban.	<b>Alt. 1/2</b>
92	<i>Pacquet Bordelais / Le Paquebot Bordelais</i>	Aground – Wrecked	France	28 June 1847	<b>The Bar.</b> George Archer piloted the vessel over the Bar. After discharging 4-5 tons of cargo, she loaded 103 head of cattle for Reunion. She weighed anchor at 15:00 on 28 June on the flood tide. When she reached the Bar, the wind died. When the tide ebbed, she drifted onto the Bar, bilged and became a total wreck. No lives were lost.	<b>N/A</b>
93	<i>Pensamento / Peusamento</i>	Aground – Wrecked	Portugal	20/19 October 1879	<b>The Bar?</b> This vessel lay at the Donald Currie Moorings (Bluff Channel?) waiting to proceed to Mocambique. However, a sand spit formed during the night. The vessel took the ground on the ebb tide and was subsequently condemned and broken up. Malcolm Turner says she developed a leak, and broke her back after grounding on the Bar. No lives were lost and the cargo was saved.	<b>Alt. 1/2</b>
94	<i>Pharamound</i>	Aground – Wrecked??		10 January 1863	<b>Reported wrecked on Durban Beach.</b> The depth of water over the Bar was 13 feet and the barque drew 15 feet; ergo she was unable to enter the harbour. The press stated that she sustained little damage, discharged her passengers and continued. However the Natal Harbour Board reported her as wrecked.	<b>N/A</b>
95	<i>Phoebe</i>	Aground – Wrecked	Britain	14 September 1880	<b>The Bar.</b>	<b>N/A</b>
96	<i>Pioneer</i>	Ashore – Wrecked	Britain	23 October 1862	<b>Back Beach, between the New Harbour Works and the old stone jetty, near Annabella Bank – 29°51.80 S 31° 03.00 E.</b> While in the Outer Roadstead, the vessel lost her anchors during a north-east gale. It drifted onto Back Beach, between the New Harbour Works and the old stone jetty. No lives were lost.	<b>N/A</b>
97	<i>Pondo Chief</i>	Ashore – Refloated – Repaired	Britain	3 March 1878	<b>Back Beach.</b> Her anchor cables parted during an easterly gale and she drove aground. No lives were lost and most of her cargo was saved.	<b>N/A</b>
98	<i>Princess Alice</i>	Ashore – Refloated – Repaired	Britain	31 July 1872	<b>Back Beach.</b> This vessel was driven aground just a few metres from the wreck of the <i>Saint Clare</i> (1871) by a north-east gale. No lives were lost.	<b>N/A</b>
99	<i>Princeza</i>	Aground – Refloated – Repaired	Britain	23 September 1854	<b>Lee/Annabella Bank.</b> On reaching Durban, the weather was so bad that the Port boat could not be launched. The captain of the <i>Princeza</i> brought her across the Bar without a pilot, but she drifted onto the Lee Bank. Her cargo was unloaded. Although badly damaged, the brig was refloated six days later and repaired.	<b>N/A</b>
100	<i>Queen</i>	Ashore – Wrecked	Britain	16 August 1863	<b>Back Beach, near Vetch's Pier – 29° 51.80 S 31° 03.00 E.</b> This vessel lies close to the <i>Lord George Bentinck</i> (1861). She parted from her anchors at the Outer Roadstead during a north-east gale. She drifted onto Back Beach and no lives were lost.	<b>N/A</b>
101	<i>Queen of Ceylon</i>	Ashore – Wrecked	Britain	3 March 1882	<b>Back Beach – 29° 51.20 S 31° 002.50 E.</b> This vessel parted her cables in a north-east gale and was driven over the	<b>N/A</b>

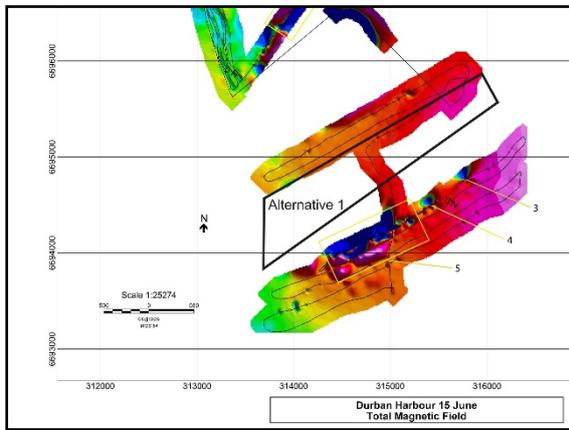
					wreckage of the <i>Kaffir Chief</i> (1876) and then aground. No lives were lost.	
102	<i>Rialto</i>	Collision – Wrecked??	Germany	2 February 1904	<b>Opposite the signal station.</b> This vessel was entering Durban Harbour under tow when she collided with the anchored dredger <i>Nautilus</i> and was wrecked opposite the signal station.	N/A
103	<i>Richard Pearce / Richard Pearse</i>	Unknown	Britain	March 1880 / 18 May 1880	<b>Unknown.</b> This vessel was being towed by the <i>Forerunner</i> , when she stuck on the Annabella Bank. Refloated and towed into the harbour. On 18 May 1880, it was again reported that she had stranded at Durban. We do not know if this refers to the earlier incident or a second more serious incident. However, she is never mentioned on the 1881 Shipping Registers.	Alt. 1/2
104	<i>Rietfontein</i> (ex <i>Maristo</i> , ex <i>Taiyu Maru</i> )	Towed in from sea –??	Dutch	14 November 1928	This vessel lost her screws while at sea. She was saved by her sister ship and towed to Durban.	N/A
105	<i>Roe</i> (1879)	Aground – Refloated		16 May 1879	<b>Back Beach.</b> This vessel was returning from the <i>Caroline</i> , laden, when she went aground.	N/A
106	<i>Roe</i> (1883)	Aground – Capsized		25 July 1883	<b>The Bar.</b> Presumably the same lighter as mentioned above, she was stranded on the Bar and capsized. Three of the crew drowned but eight others were picked up by the Harbour lifeboat.	N/A
107	<i>S.S. Ovington Court</i> (ex <i>Amblestone / Ambestone</i> )	Aground – Wrecked	Britain	25 November 1940	<b>Off South Beach. She lies a little to the west of the West Street groin – 29° 51.50 S 31° 02.70 E.</b> This vessel dragged anchor in a north-east storm and was wrecked. Four of the crew died when a lifeboat capsized. Her wreckage is still visible at low tide (2010).	N/A
108	<i>Saint Clare</i>	Ashore – Wrecked	Britain	20 October 1871	<b>Back Beach – 29° 51.80 S 31° 03.00 E.</b> This vessel had discharged part of cargo when a cable broke and she ran aground, during a north-east gale. One life was lost.	N/A
109	<i>Salamis</i>	Aground – Refloated – Repaired?	Britain	7 August 1912	The <i>Salamis</i> went aground at the Anchorage, 500m from shore during a gale. No lives were lost and the master was exonerated. Taken to Shed E for repairs.	N/A
110	<i>Sarah Smith</i>	Grounded – Refloated – Condemned – Sold	Britain	7 February 1874	<b>Lee/Annabella Bank.</b> This vessel was leaving Durban when she neared the Annabella Bank, the light south-west breeze died and she stranded on the Bank. Her cargo was unloaded and sold. Some days later she was refloated but was condemned and sold as a wreck by auction.	Alt. 1/2
111	<i>Sebastian</i>	Ashore – Wrecked	Britain	26 September 1863	<b>Back Beach – 29° 51.80 S 31° 03.00 E near the North Pier.</b> This vessel was anchored in the Outer Roadstead when her cables parted during a north-east gale. The vessel struck the North Pier (carrying away much of its wooden framework) and drifted high onto Back Beach. No lives were lost.	N/A
112	<i>See Nymph / Seenymphe</i>	Aground – Wrecked	Germany	12 December 1885	<b>Outer Bar Ridge, north of Vetch's Pier – 29° 51.80 S 31° 03.00 E.</b> When her anchors failed to hold, she was dragged aground at 24:00 during a fresh easterly wind. No lives were lost and the vessel went to pieces within four hours	N/A
113	<i>Shepherdess</i>	Grounded – Towed off	Britain	20 April 1879	<b>Channel between Annabella Bank and the Bar.</b> This vessel was in tow of the <i>Somtseu</i> when she grounded. She was towed off the next day.	N/A
114	<i>Sir Gordon</i>	Scuttled		1945	<b>Offshore?</b> This vessel arrived in East London in 1890. She was in service as a rock breaker, then a grab-dredger. Later she was sold to a treasure syndicate. After 55 years of service, she was scuttled off Durban.	Alt. 1/2
115	<i>Southport</i>	Ashore – Wrecked	Britain	23 August 1878	<b>Back Beach, 150m from the H.D. Stover – 29° 51.80 S 31° 03.00 E.</b> After this vessel was damaged off Cape Agulhas, she put into East London. The captain was still ashore when she drifted from her anchorage and was carried northwards by an east-north-east wind and current. The unexpected voyage ended in Durban during a severe gale. She stranded on the beach. All the crew survived when they were rescued by Capt. Airth and the lifesavers.	Alt. 1/2
116	<i>Star of Wales</i>	Wrecked	Britain	7 December 1874	<b>Near the Umgeni River Mouth / 2.5 km south of the Umgeni River, near the Transvaal (1874).</b> This vessel lost her anchors during a southerly gale. Three men died and two survived. The captain was ashore at the time as well as the two crew members that survived.	N/A

117	<i>Stockport</i>	Aground – Wrecked		1885	<b>Back Beach, near Kenilworth Tearoom.</b>	N/A
118	<i>Strathclyde</i>	Scuttled		1933	<b>Offshore?</b> <i>Modwena</i> O.N.128209.312 gross ton auxiliary barque, length 135.7ft x beam 26.1ft, fitted with paraffin powered engine. Completed July 1908 by J. Reid & Co, Glasgow (Yard No.343) as a yacht for Edgar Thornton, Glasgow (Ryde). 1910 sold to Mrs Marian G. Thornton, Glasgow. 1912 sold to Adam Mortimer Singer, Glasgow, first listed as a Merchant ship in 1919. 1919 owned by Natal Shipping & Trading Co, Glasgow & Durban. 1923 renamed <i>Strathclyde</i> for Mrs B. Davidson (M. Davidson), Durban, converted to a diesel powered fishing vessel and transferred to South African flag. 3rd quarter 1933 dismantled and sunk.	N/A
119	<i>Suffren</i>	Aground – Wrecked	France	17 December 1845	<b>The Bar.</b> The vessel was outside the Bar, loading cattle for Reunion when a north-east gale hit the coast. Her anchor cables broke and she drifted aground, becoming a total wreck. No lives were lost.	N/A
120	<i>Surprise</i>	Ashore – Wrecked	Norway	25 August 1880	<b>Back Beach – 29° 51.80 S 31° 03.00 E.</b> During an easterly gale, her cables parted and she ran aground. No lives were lost. A notation in the Wreck Master's register lists "drunkenness" as the cause of the wreck. Offered for sale was spare rigging, sails, stores and fittings, the vessel's chronometer, four boats, the top and top gallant masts made from the best pitch pine, 4 Swedish walnut chifferons and 20 bolts best Swedish canvas.	N/A
121	<i>Sweetie Sandra</i>	Aground		1991	<b>North Pier.</b>	N/A
122	<i>Tancred</i>	Aground – Wrecked	Britain	2 May/July 1879	<b>Grounded between Annabella Bank and the Bar eventually drove onto the beach near the Point offices.</b> During an easterly wind, she entered Durban in the tow of the <i>Somtseu</i> and grounded. No lives were lost. The wreck was sold 6 August 1879 for £100.	N/A
123	<i>Tasmanian Transport</i>	Aground – Refloated – Repaired		22 April 1915	<b>200m from the shore, north of the Harbour entrance.</b> This vessel was stranded. A Court of Inquiry held that her master was guilty of negligence. However, as Tasmania was desperate for the cargo, she was allowed to proceed and the captain retained his master's certificate.	N/A
124	<i>Theresina</i>	Aground – Buried in quicksand – May have been removed in 1936	Britain	10 / 9 April 1878	<b>Back Beach, Point Quicksand – 29° 51.80 S 31°03.00 E.</b> This vessel parted her anchors during an east-north-east gale. She grounded at the Point in a patch of quicksand and was rapidly engulfed to her main deck; her cargo could not be offloaded. The crew were saved by means of the Rocket Apparatus. Her masts withstood the seas and marked her position at high tide. During the Zulu War of 1879, some soldiers in the government hospital (Addington) sallied forth one night at low tide with digging tools and explored the wreck. Their beds were found empty the next morning and one soldier was discovered, very drunk, in the brush covered dunes outside the hospital. The wreck was uncovered in 1914 and it may have been the one demolished in 1936, although no discoveries of gin or whiskey were reported.	N/A
125	<i>Transvaal</i>	Wrecked – Split in half	Britain	8 December 1874	<b>Near the Bluff / 2.5 km south of the Umgeni River Mouth, close to the <i>Star of Wales</i> (1874).</b> The reports of the location varied in the different databases. Apparently she was anchored near the Umgeni River Mouth when her anchors parted during a southerly gale. She went aground stern first and then swung broadside to the coast. A great sea struck her and she split in half from bow to stern. The starboard side was washed inshore and the port side out to sea. As her masts fell, her crew, who had climbed into the rigging, perished before the eyes of the onlookers on the shore. No one was allowed on the beach opposite the wreck until the bodies were washed ashore. The Captain was ashore at the time. The twelve crew members were buried in a mass grave in the West Street Cemetery.	Alt. 1/2
126	<i>Trincula</i>	Ashore – Refloated – Repaired	Britain	31 July 1872	A north-east gale hit the coast. The vessel was anchored 2.5 km off the lee shore, her cables parted and she was in the breakers. The barque was sold for £150, refloated and repaired on 30 August 1872.	N/A

127	<i>Tugela</i>	Ashore – Wrecked	Britain	3 February 1868	<b>Opposite West Street on Back Beach, off Scotsman's Pool? – 29° 51.20 S 31° 02.50 E.</b> This wreck occurred at night, in fine weather. The pin came out of a shackle and the vessel drove aground. No lives were lost. The Natal Mercury, 6 June 1935 states that her remains were visible off Scotsman's Pool.	N/A
128	Unknown	Scuttled		Pre-1939	<b>Offshore.</b>	Alt. 1/2
129	Unknown	Scuttled		Pre-1939	<b>Offshore.</b>	Alt. 1/2
130	Unknown	Scuttled		Pre-1939	<b>Offshore.</b>	Alt. 1/2
131	<i>Urania</i>	Aground – Refloated – Condemned – floating warehouse	Britain	26 August 1851	<b>Lee/Annabella Bank.</b> Stranded but refloated and then condemned. Her hull was sold by auction for £172 to Mr Smerdon who converted her into a floating warehouse.	N/A
132	<i>Venice</i>	Collision – Repaired	Britain	January 1895	<b>Off Durban Lighthouse.</b> The steam tug, <i>Churchill</i> and the steam ship, <i>Venice</i> collided off Durban Lighthouse. The bow of the Venice was damaged and she was sent to Cape town for repairs.	N/A
133	<i>Vigor</i>	Ashore	Norway	9 June 1884	<b>Back Beach, north-west of Vetch's Pier – 29° 51.20 S 31° 02.50 E.</b> During an easterly wind, the <i>Vigor</i> was being towed by the <i>Forerunner</i> , when she grounded inside the Bar. She drifted onto the Lee bank and beached herself. No lives were lost as the crew were saved by lifeboat.	N/A
134	<i>Viking</i>	Capsized – Wrecked	Britain	25 February 1898	<b>The Bar.</b> This vessel was crossing the Bar during a south-west gale when she was capsized by a heavy sea. Eight lives were lost.	N/A
135	<i>Wagrien</i>	Wrecked or Never Wrecked – Put out to sea	Germany	8 December 1874	<b>Near the Umgeni River Mouth.</b> This vessel was reported to have foundered, with the loss of the entire crew, during a southerly gale. Marie Levine states that she actually put to sea and a few days later reappeared at Durban, battered but afloat. After minor repairs, she sailed on 9 February 1875 for Adelaide in ballast. However, Malcolm Turner states that she was wrecked. A New Zealand Newspaper, The Otago Times agrees with Marie Levine.	N/A
136	<i>Walter Reichel</i> (ex <i>Wilhelm</i> , ex <i>Grimgerde</i> , ex <i>Armourer</i> , ex <i>Engineer</i> )	Scuttled	Germany	29 December 1933	<b>Offshore.</b>	Alt. 1/2
137	<i>Wladimir Sawin</i>	Aground – Refloated	Denmark	14 August 1901	<b>The Bar.</b> Stranded but refloated.	N/A
138	<i>Woodlark</i>	Aground – Refloated	Britain	30 July 1859	<b>Lee/Annabella Bank.</b> The vessel entered the Harbour without a pilot and contrary to signals, took the wrong channel; she grounded on the Lee Bank.	N/A
139	<i>Zambesi</i>	Ashore – Wrecked	Dutch	10 December 1882	<b>Back Beach – 29° 51.20 S 31° 02.50 E.</b> This vessel lost her anchors in a strong easterly breeze and was driven aground. No lives were lost. She was in quarantine at the time of the wrecking.	N/A
140	<i>Zennia</i>	Ashore – Wrecked	Ireland	21 July 1880	<b>Back Beach – 29° 51.80 S 31° 03.00 E, Annabella Bank.</b> This vessel parted her cables in a southerly gale and drove aground on the Annabella Bank. She later drifted onto the Back Beach. No lives were lost.	N/A
141	<i>Ziba</i>	Ashore – Wrecked	Britain / America	13 March 1879	<b>Back Beach – 29° 51.70S 31° 03.00E - Near Milne's Ground (part of present day North Pier/By 2009 part of the widened Harbour entrance).</b> This vessel parted her cables in a north-east gale and drove onto the Bar Ridge. The Natal Colonist reported that she was got off the Bar and was taken alongside the breakwater, close to the beach. She was soon aground on the Back Beach and complaints were made about the stench from the rotting maize. No lives were lost. The wreck was still visible off the beach in "1822" (probably 1922).	N/A



Figure 4 shows incomplete secondary analysis of the data by Boshoff of the South African Museum, Cape Town. The middle section is missing from this image as there were no mag hits here. The data that was analysed correlated well with the field data and no further anomalies were noted.



**Figure 4:** Alternative 1 – Post Fieldwork Analysed Magnetic Anomalies; the blue zones indicate magnetic anomalies (Boshoff: 2012).

#### 5.4.2. Alternative 2 – Survey Results

The magnetometer data collected by Sealink 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. These conditions include:

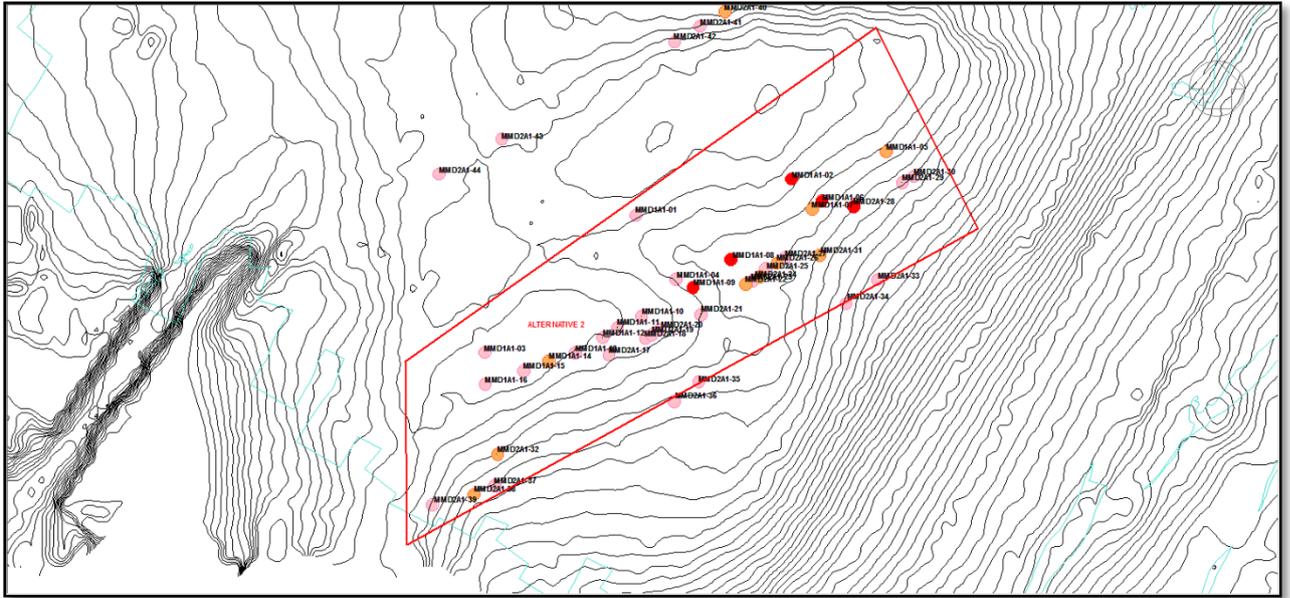
- Weather
- Identifiable objects that may cause data distortion e.g. buoys, ships, etc.

The post-field analysis was interpreted with geophysical software, without knowledge of the environmental conditions, by Jaco Boshoff of the South African Museum. The two sets are compared and a final analysis completed.

This area was surveyed on Thursday 14-06-2012 and Friday 15-06-2012. The magnetometer survey was difficult due to deteriorating weather conditions. The survey window was tight as we only had access to the magnetometer for four days.

The analysed field data survey results, tabulated in Appendix I, show a total of 44 hits over both Alternative 1 and Alternative 2. Figure 3 maps the locations of all the mag hits in relation to the Alternative Area 2; these were plotted on the strength of each anomaly.

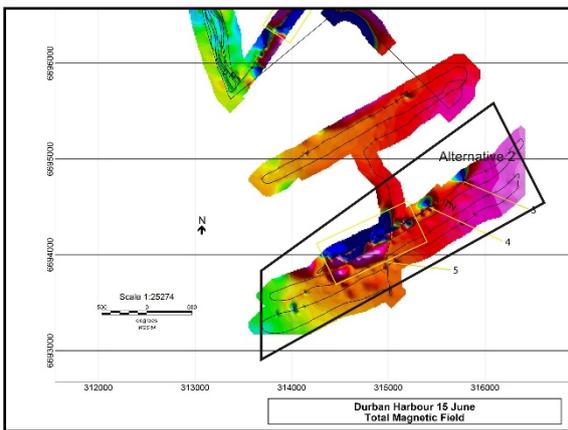
- |                      |                           |
|----------------------|---------------------------|
| • 15 – 100 Gauss (G) | Low probability rating    |
| • 100 – 300 G        | Medium probability rating |
| • 300 – upwards      | High probability rating   |



**Figure 5:** Alternative 2 – Analysed Field Data Magnetic Anomalies showing probability ratings (Adapted from Council for Geoscience map: 2001)

Legend		
	Known shipwrecks	
	<b>Magnetometer Strength</b>	<b>Probability of MUCH Site</b>
	Low Strength	Low Probability
	Medium Strength	Medium Probability
	High Strength	High Probability

Figure 6 shows incomplete secondary analysis of the data by Boshoff of the South African Museum, Cape Town. The middle section is missing from this image as there were no mag hits here. The data that was analysed correlated well with the field data and no further anomalies were noted.



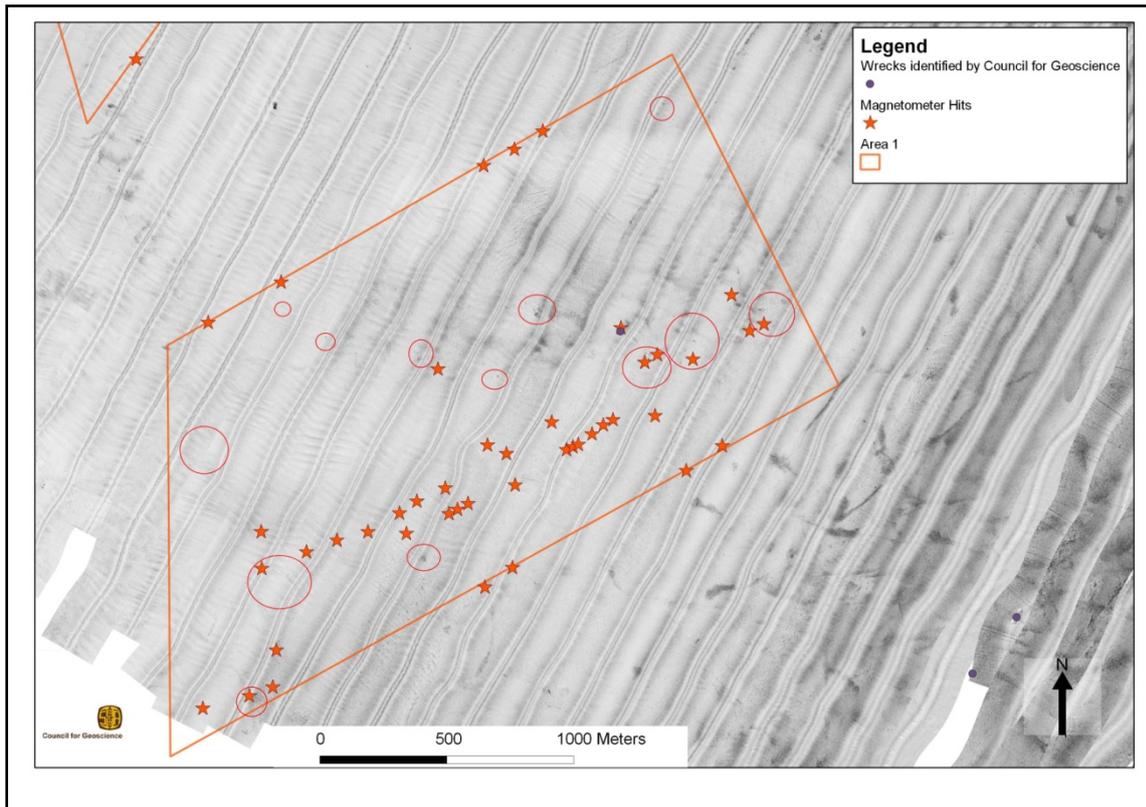
**Figure 6:** Alternative 2 – Post Fieldwork Analysed Magnetic Anomalies; the blue zones indicate magnetic anomalies (Boshoff: 2012).

The magnetic anomalies were plotted over the side scan sonar image from the Council for Geoscience. Miller and Leuci (2001) stated one of the seven acoustic facies that they could identify from the side scan mosaic was, "... small localised examples of highly reflective objects with little or no acoustic shadow on the seafloor. *Interpretation: Metal debris or man-made artefacts which have been thrown overboard by passing ships.*" These could also be evidence of MUCH sites.

Miller and Leuci (2001) state in their analysis of the debris:

“The objects have a random arrangement but some occur in fairly dense clusters. The debris in [Alternative 1 and 2] has a very scattered distribution and the objects are usually less than 10m in diameter.”

These debris objects were compared to the magnetic anomalies and the result is mapped in Figure 7. As can be seen, the entire area has small debris fields. However, the magnetometer registered very few hits over the northern area. This debris is either not metal or too small to register. Some of the debris scatters on the south side correlate well to the magnetic data.



**Figure 7:** Alternative 1 and 2 – Field Data Magnetic Anomalies correlated to identified debris (Adapted from Council for Geoscience map: 2001; Miller and Leuci: 2001)

5.4.3. Diver Searches

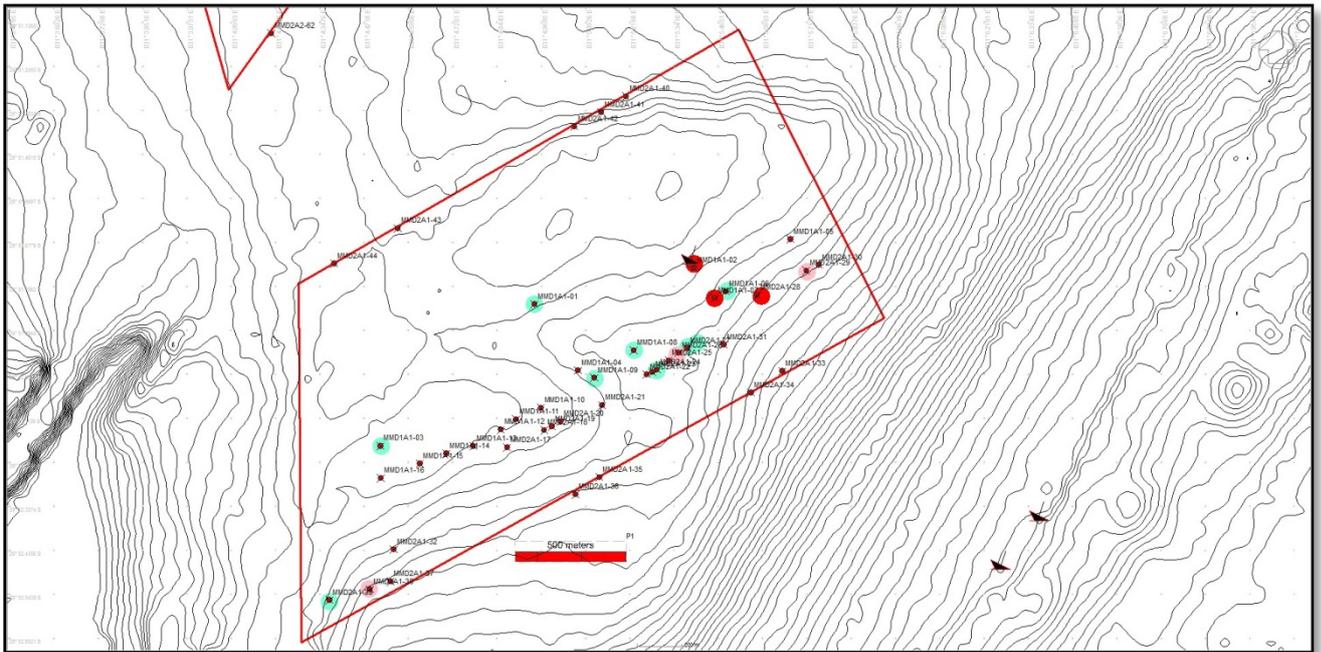


Figure 8: Alternative 1 and 2 – Field Data Magnetic Anomalies showing diver search results (Adapted from Council for Geoscience map: 2001)

Legend	
	Known shipwrecks
	Magnetometer Hit
Diver Search Results	
	Low Strength
	Medium Strength
	High Strength
Probability of MUCH Site	
	Low Probability
	Medium Probability
	High Probability

The mark – MMD1A1-02 – is a 30m long metal trawler known to local divers as “Stuart’s Wreck”. The actual identity of the wreck has not been established to date. All of these strong hits were in the general area of “Stuart’s Wreck”, that is the south-eastern corner of Alternative 2.



Figure 9: Sports divers on the bow of ‘Stuart’s Wreck’ (Image: Naude: 2009)



Figure 10: The Gunnel of ‘Stuart’s Wreck’ (Image: Naude: 2009)

All the relevant magnetic anomalies occurred within Alternative Area 2. Diver searches were conducted on 34% of these hits, of these only two had visible metal objects which may be MUCH sites. All of these were in the general area of “Stuart’s Wreck”, that is the south-eastern corner of Alternative 2. For full details of the

search results see Appendix II.

According to the database there are at least 35 vessels that **may** be found in this area (see Shipwreck Database Limitations). These vessels are either known to have sunk in the vicinity or there is insufficient data to ascertain their whereabouts. These wrecks are mentioned in the interests of full disclosure.

**Table 2:** List of wrecks which may be found in Alternative 1 and 2

Database #	Ship Name	Database #	Ship Name	Database #	Ship Name
4	<i>Altcar</i>	42	<i>Fusileer</i>	83	<i>Namaqua</i>
6	<i>Ann</i>	52	<i>Hogni</i>	88	<i>Northwester</i>
10	<i>Blink</i>	56	<i>Istar</i>	90	<i>Onaway</i>
15	<i>Cetus</i>	64	<i>Kayle</i>	91	<i>HMS Otis</i>
18	<i>City of Lima</i>	65	<i>Lady May</i>	93	<i>Pensamento</i>
19	<i>Colombo</i>	68	<i>Lighter No. 18</i>	103	<i>Richard Pearce</i>
25	<i>Dora P.</i>	69	<i>Lighter No. 20</i>	110	<i>Sarah Smith</i>
32	<i>Elizabeth</i>	71	<i>Lily</i>	114	<i>Sir Gordon</i>
33	<i>Elizabeth Anne</i>	77	<i>M. Smith Peterson</i>	125	<i>Transvaal</i>
37	<i>F. Todenskjold</i>	81	<i>Medway</i>	136	<i>Walter Reichel</i>
38	<i>Fleur de Maurice</i>	82	<i>Minerva</i>	128 - 130	3 x Unnamed scuttled vessels

#### 5.4.4. Conclusions

Alternative 1 is free of magnetic anomalies and would therefore represent, from a heritage POV the best possible area for sandwinning. The magnetic anomalies seem to be clustered on the northern edge of Alternative 1 and within Alternative 2. While there are two historic dredge dumps in the area, these essentially cover the area of Alternative 2 and as mentioned previously (Section 5.1.1), any artefacts within these areas (barring the discovery of an entire shipwreck) will have a low heritage significance.

Therefore, I would recommend dredging in Alternative 1. However, the dredgers should be aware of their work environment and follow the recommended management measures should they uncover any potential MUCH sites during the work.

## 6. SITE SIGNIFICANCE AND ASSESSMENT

### 6.1. 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 its 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 was developed whereby the above criteria, as set out in Sections 3(3) and 7 of the NHRA, No. 25 of 1999, were applied for each identified site (see Appendix III). This allowed some form of control over the application of similar values for similar sites.

### 6.2. Statement of Significance

In terms of Section 7 of the NHRA, the sites currently known or which are expected to occur in the three areas are evaluated to have the following significance:

Grade I – As all heritage resources found below the high water mark fall under the national heritage organization (SAHRA), shipwrecks are automatically Grade 1. There is at least one confirmed shipwreck in Alternative 2. However, if during dredging, a MUCH site is uncovered it will need to be reassessed and its significance could change.

### 6.3. Impact Assessment

**Table 3: 'Stuart's Wreck' in Alternative 2**

<b>Site Number</b>	MMD1A1-02	
<b>Environmental Parameter</b>	MUCH Site - Shipwreck	
<b>Issue/Impact/Environmental Effect/Nature</b>	Grade I MUCH site, as it is an unidentified wreck, I am unable to assess its historical significance.	
<b>Extent</b>	National, possibly international	
<b>Probability</b>	Definite	
<b>Reversibility</b>	Irreversible	
<b>Irreplaceable loss of resources</b>	The impact will result in significant loss of resources	
<b>Duration</b>	Permanent	
<b>Cumulative effect</b>	High cumulative impact	
<b>Intensity/magnitude</b>	Very High	
<b>Significance Rating</b>	Sites have a high significance on a national level and may have high international significance depending on the vessel's nationality	
	<b>Pre-mitigation impact rating</b>	<b>Post mitigation impact rating</b>
<b>Extent</b>	3	2
<b>Probability</b>	4	4
<b>Reversibility</b>	4	4
<b>Irreplaceable loss</b>	3	3
<b>Duration</b>	4	4
<b>Cumulative effect</b>	4	4
<b>Intensity/magnitude</b>	4	2
<b>Significance rating</b>	90% (negative, very high)	80% (negative, high)
<b>Mitigation measures</b>	This is a MUCH site. As we do not know the identity of the wreck and therefore its historical significance, we should avoid the area altogether. If the area cannot be avoided, a maritime archaeologist must make an in-depth investigation of the wreck in order to assess its significance.	
<b>Confidence Level</b>	High	

## 7. 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.

### 7.1. Objectives

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

The following shall apply:

- The dredgers should be notified and held to the no-dredge zone to avoid destroying MUCH sites.
- The contractors and workers should be notified that archaeological sites might be exposed during the dredging activities.
- Should any heritage artefacts be exposed during dredging, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible;

- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and
- Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the NHRA (Act No. 25 of 1999), Section 51. (1).

## 7.2. Control

In order to achieve the above, the following should be in place:

- Transnet must take responsibility to contact the heritage practitioner to assess any sites uncovered during the project.
- If the proposed dredge area is accepted, the co-ordinates of the new dredge area should be programmed into the dredger position fixing equipment.

## 8. CONCLUSIONS

The aim of the survey was to locate, identify, evaluate and document MUCH sites found within the offshore areas in which it is proposed to dredge for infill material for the construction to increase the capacity and efficiency of the Port of Durban.

Due to the nature of the maritime environment, the impact assessment can't always be as precise as land archaeology. The use of a magnetometer can assist in pinpointing potential sites of importance. However, it is often only during the dredging phase that these sites are revealed. The heritage resources legislation associated with maritime underwater cultural heritage gives high importance to all MUCH sites by default and the significance is determined after the fact.

This impact assessment focuses on the offshore sandwinning areas, delineated in 2001.

Based on the study, it is our conclusion that:

- There is one definite MUCH site – an unidentified shipwreck in Alternative 2.
- There are clusters of magnetic anomalies within Alternative 2.
- Alternative 1 has lower MUCH site potential.
- From a heritage point of view, work can continue in the Alternative 1 sandwinning area, as long as the mitigation measures are implemented.
- No impact on heritage sites, features or objects can be allowed without a valid permit from SAHRA.

**REFERENCES:****Legal Sources:**

National Environmental Management Act, 1998 (Act No. 107 of 1998)

National Heritage Resources Act, 1999 (Act No. 25 of 1999)

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**Oral Sources:**

Donkin, Stuart. 2012. Oral testimony as a local diver / skipper.

DUC Divers. Barraclough, D.; Booyesen, A.; Caetano, T.; Chapman, J.C.; Collins, R.; de Oliveira, C.; de Sousa, T.; Donkin, S.; Ehlers, L.; Featherstone, T.; Fourie, M.; Grundy, S.; Karlsen, B.; King, G.; King, K.; Moldenhauer, D.; Moore, C.; Naude, P.; Robinson, D.; Sorrell, A.; Zunckel, M.; Zunckel, R.

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Boshoff, J. South African Museum Maritime Archaeologist. Magnetic Anomaly Maps. June 2012.

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**Photograph Sources:**

Naude, P. 2009.

King, G. 2012.

<b>APPENDIX I – FIELD DATA FROM MAGNETOMETER SURVEY – WGS84</b>						
<b>File:</b> Mag 14-06-2012 / sl_data_000						
<b>Date:</b> Thursday 14-06-2012						
<b>Site:</b> Alternative 1 and 2 Possible Heritage Sites						
GIS Mark #		South	East	Strength G	Size-m	Sealink Mark #
MMD1A1-01	1	29 051.851' S	31 04.936' E	35		4
MMD1A1-02	2	29 051.769' S	31 05.385' E	300	93	7
MMD1A1-03	3	29 052.194' S	31 04.497' E	30	9	9
MMD1A1-04	4	29 052.016' S	31 05.054' E	40	72	11
MMD1A1-05	5	29 051.702' S	31 05.657' E	150	12	12
MMD1A1-06	6	29 051.828' S	31 05.473' E	300	9	13
MMD1A1-07	7	29 051.844' S	31 05.442' E	100	9	14
MMD1A1-08	8	29 051.969' S	31 05.212' E	500	48	15
MMD1A1-09	9	29 052.035' S	31 05.100' E	1200	60	16
MMD1A1-10	10	29 052.107' S	31 04.949' E	50	9	17
MMD1A1-11	11	29 052.134' S	31 04.879' E	60	21	
MMD1A1-12	12	29 052.159' S	31 04.836' E	40	9	19
MMD1A1-13	13	29 052.198' S	31 04.758' E	70	30	20
MMD1A1-14	14	29 052.215' S	31 04.682' E	100	9	21
MMD1A1-15	15	29 052.239' S	31 04.607' E	60	9	
MMD1A1-16	16	29 052.273' S	31 04.497' E	65	21	23
<b>File:</b> Mag 15-06-2012 / sl_data & sl_data_000						
<b>Date:</b> Friday 15-06-2012						
<b>Site:</b> Alternative 1 and 2 Possible Heritage Sites						
MMD2A1-17	1	29 052.203' S	31 04.852' E	15	9	1
MMD2A1-18	2	29 052.162' S	31 04.957' E	55	9	
MMD2A1-19	3	29 052.153' S	31 04.978' E	15	9	2
MMD2A1-20	4	29 052.141' S	31 05.004' E	80	12	3
MMD2A1-21	5	29 052.103' S	31 05.120' E	45	9	4
MMD2A1-22	6	29 052.029' S	31 05.247' E	150	9	
MMD2A1-23	7	29 052.023' S	31 05.263' E	45	9	5
MMD2A1-24	8	29 052.018' S	31 05.276' E	150	9	
MMD2A1-25	9	29 051.996' S	31 05.310' E	50	21	6
MMD2A1-26	10	29 051.977' S	31 05.338' E	200	12	7
MMD2A1-27	11	29 051.966' S	31 05.362' E	65	18	
MMD2A1-28	12	29 051.839' S	31 05.560' E	300	21	8
MMD2A1-29	13	29 051.780' S	31 05.700' E	30	9	9
MMD2A1-30	14	29 051.766' S	31 05.735' E	25	9	10
MMD2A1-31	15	29 051.959' S	31 05.465' E	120	9	11
MMD2A1-32	16	29 052.449' S	31 04.529' E	120	9	12
MMD2A1-33	17	29 052.026' S	31 05.628' E	60	9	13
MMD2A1-34	18	29 052.078' S	31 05.539' E	70	15	14
MMD2A1-35	19	29 052.280' S	31 05.110' E	70	9	15
MMD2A1-36	20	29 052.321' S	31 05.042' E	45	9	16
MMD2A1-37	21	29 052.528' S	31 04.519' E	15	6	17
MMD2A1-38	22	29 052.546' S	31 04.461' E	130	9	18
MMD2A1-39	23	29 052.571' S	31 04.347' E	65	9	19
MMD2A1-40	24	29 051.344' S	31 05.202' E	280	15	
MMD2A1-41	25	29 051.382' S	31 05.132' E	35	9	20
MMD2A1-42	26	29 051.416' S	31 05.056' E	25	9	21
MMD2A1-43	27	29 051.659' S	31 04.556' E	65	21	22
MMD2A1-44	28	29 051.743' S	31 04.376' E	35	9	23

	South	East	Strength G	size-m	GIS Mark #	Dive Date	Divers	Depth	Dive Time	Viz.	Conditions	Observations	Photos
<b>APPENDIX II – DIVER SEARCH RESULTS</b>						<b>DIVER SEARCH RESULTS</b>							
File: Mag 14-06-2012 / sl_data_000													
Date: Thursday 14-06-2012													
Site: Alternative 1 and 2 Possible Heritage Sites													
1	29 051.851' S	31 04.936' E	35		MMD1A1-01	21-07-2012	S. Grundy C. de Oliveira	21.7 m	3 min	10 m	Slight current	Sand. Some bait fish.	
2	29 051.769' S	31 05.385' E	300	93	MMD1A1-02	21-07-2012	D. Moldenhauer A. Booysen	22 m	6 min	10 m	Slight S-N current	Sand. Some bait fish. Scattered 'rocks'. Coal, metal, cable, rope, square metal beam. 'Stuart's Wreck'	
3	29 052.194' S	31 04.497' E	30	9	MMD1A1-03	21-07-2012	D. Moldenhauer A. Booysen	20 m	5 min	10 m	Slight S-N current	Sand. Lots of bait fish. Insulated electrical cable. Large plastic bag filled with sand.	
4	29 052.016' S	31 05.054' E	40	72	MMD1A1-04								
5	29 051.702' S	31 05.657' E	150	12	MMD1A1-05								
6	29 051.828' S	31 05.473' E	300	9	MMD1A1-06	21-07-2012	S. Grundy C. de Oliveira	21m	3 min	10 m	Slight current	Sand. Lots of bait fish.	
7	29 051.844' S	31 05.442' E	100	9	MMD1A1-07	21-07-2012	T. Featherstone L. Ehlers	21m	10 min	10 m	Slight current	Flat sand. 3 x rectangular 'concrete' textured blocks, two parallel, the third above the first, aligned. Cylindrical metal object buried in the sand, possible boiler.	
8	29 051.969' S	31 05.212' E	500	48	MMD1A1-08	07-07-2012	R. Collins D. Barraclough	24.8 m	5 min	10 m		Fine grainy silt. Lots of bait fish.	
9	29 052.035' S	31 05.100' E	1200	60	MMD1A1-09	14-07-2012	J.C. Chapman M. Fourie	22 m	11 min	10 m		Flat sand. Some bait fish.	
10	29 052.107' S	31 04.949' E	50	9	MMD1A1-10								
11	29 052.134' S	31 04.879' E	60	21	MMD1A1-11								
12	29 052.159' S	31 04.836' E	40	9	MMD1A1-12								
13	29 052.198' S	31 04.758' E	70	30	MMD1A1-13								
14	29 052.215' S	31 04.682' E	100	9	MMD1A1-14								
15	29 052.239' S	31 04.607' E	60	9	MMD1A1-15								
16	29 052.273' S	31 04.497' E	65	21	MMD1A1-16								
File: Mag 15-06-2012 / sl_data & sl_data_000						<b>DIVER SEARCH RESULTS</b>							
Date: Friday 15-06-2012													
Site: Alternative 1 and 2 Possible Heritage Sites													
1	29 052.203' S	31 04.852' E	15	9	MMD2A1-17								

	South	East	Strength G	size-m	GIS Mark #	Dive Date	Divers	Depth	Dive Time	Viz.	Conditions	Observations	Photos
2	29 052.162' S	31 04.957' E	55	9	MMD2A1-18								
3	29 052.153' S	31 04.978' E	15	9	MMD2A1-19								
4	29 052.141' S	31 05.004' E	80	12	MMD2A1-20								
5	29 052.103' S	31 05.120' E	45	9	MMD2A1-21								
6	29 052.029' S	31 05.247' E	150	9	MMD2A1-22								
7	29 052.023' S	31 05.263' E	45	9	MMD2A1-23	07-07-2012	P. Naude C. de Oliveira	25.5 m	4 min	15 m	Good	Sand. Some bait fish.	
8	29 052.018' S	31 05.276' E	150	9	MMD2A1-24								
9	29 051.996' S	31 05.310' E	50	21	MMD2A1-25	14-07-2012	C. Moore T. Caetano	26 m	7 min	10 m		Sand. Lots of bait fish. Scattered objects with soft and hard coral growth.	
10	29 051.977' S	31 05.338' E	200	12	MMD2A1-26	14-07-2012	A. Sorrell M. Fourie	23 m	5 min	10 m		Flat sand. Some bait fish.	
11	29 051.966' S	31 05.362' E	65	18	MMD2A1-27	14-07-2012	C. Moore T. Caetano	23.9 m	10 min	10 m	Some surge	Flat sand. Lots of bait fish. Large tractor tyre with 15 x 50 cm metal pyramid shaped object.	
12	29 051.839' S	31 05.560' E	300	21	MMD2A1-28	07-07-2012	G. King A. Booysen	25 m	7 min	15 m	Slight current	Flat sand. Lots of bait fish. Protruding metal block. 10mm diameter cable.	

Figure II – 1: Protruding metal object (King: 2012)

	South	East	Strength G	size-m	GIS Mark #	Dive Date	Divers	Depth	Dive Time	Viz.	Conditions	Observations	Photos
													
													Figure II – 2: Cable (King: 2012)
13	29 051.780' S	31 05.700' E	30	9	MMD2A1-29	07-07-2012	D. Robinson T. de Sousa	26.3 m	8 min	15 m	Slight current	Sand. No fish life. Protruding wedge shaped metal object, 50 x 30 x 20 cm. Covered in marine growth.	
													Figure II – 3: Wedge-shaped object (de Sousa: 2012)
14	29 051.766' S	31 05.735' E	25	9	MMD2A1-30								
15	29 051.959' S	31 05.465' E	120	9	MMD2A1-31								
16	29 052.449' S	31 04.529' E	120	9	MMD2A1-32								
17	29 052.026' S	31 05.628' E	60	9	MMD2A1-33								
18	29 052.078' S	31 05.539' E	70	15	MMD2A1-34								
19	29 052.280' S	31 05.110' E	70	9	MMD2A1-35								
20	29 052.321' S	31 05.042' E	45	9	MMD2A1-36								
21	29 052.528' S	31 04.519' E	15	6	MMD2A1-37								
22	29 052.546' S	31 04.461' E	130	9	MMD2A1-38	14-07-2012	D. Moldenhauer L. Ehlers	26 m	4 min	7 m	Slight current	Sand. Some bait fish. Sheet of wood.	
23	29 052.571' S	31 04.347' E	65	9	MMD2A1-39		S. Grundy C. de Oliveira	21.3 m	7 min	10 m		Flat sand. Some bait fish.	
24	29 051.344' S	31 05.202' E	280	15	MMD2A1-40								
25	29 051.382' S	31 05.132' E	35	9	MMD2A1-41								

	South	East	Strength G	size-m	GIS Mark #	Dive Date	Divers	Depth	Dive Time	Viz.	Conditions	Observations	Photos
26	29 051.416' S	31 05.056' E	25	9	MMD2A1-42								
27	29 051.659' S	31 04.556' E	65	21	MMD2A1-43								
28	29 051.743' S	31 04.376' E	35	9	MMD2A1-44								
6	29 050.224' S	31 04.584' E	200	15	MMD4A2-93	05-08-2012	G. King K. King	23 m	5 min	8 m		Sand. Starfish. Small wooden debris.	
7	29 049.834' S	31 04.459' E	600	18	MMD4A2-94	05-08-2012	S. Donkin B. Karlsen	22 m	6 min	6 m		Sand. 20 m scatter of coal. Rusted cable, 52.5cm x 5 m. Modern wine bottle.	Figure II – 5: Starfish (King: 2012)
8	29 049.777' S	31 04.434' E	20		MMD4A2-95	05-08-2012	M. Zunckel R. Zunckel	22.5 m	9 min	6 m		Fine sand with decayed organic matter. Some bait fish. Sea pens. Sea grass.	
9	29 049.737' S	31 04.419' E	15		MMD4A2-96								
10	29 049.500' S	31 04.351' E	425		MMD4A2-97	05-08-2012	G. King	21.5 m	4 min	6 m		Fine sand. Some bait fish. Sea pens.	
11	29 049.451' S	31 04.330' E	40		MMD4A2-98								
12	29 049.371' S	31 04.318' E	35		MMD4A2-99								
13	29 049.344' S	31 04.312' E	300		MMD4A2-100	05-08-2012	B. Karlsen	22 m	6 min	8 m		Fine sand. Some bait fish. Sea pens.	
14	29 049.268' S	31 04.285' E	65		MMD4A2-101								
15	29 049.097' S	31 04.225' E	30		MMD4A2-102								
16	29 049.757' S	31 03.874' E	120		MMD4A2-103								
17	29 050.526' S	31 03.946' E	50		MMD4A2-104								
18	29 050.227' S	31 04.022' E	15		MMD4A2-105								
19	29 050.149' S	31 04.363' E	30		MMD4A2-106								
20	29 050.558' S	31 04.410' E	50		MMD4A2-107								
21	29 050.675' S	31 04.396' E	70		MMD4A2-108								
22	29 050.561' S	31 04.126' E	45		MMD4A2-109								

**APPENDIX III: 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 its 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**

- Is it important in exhibiting particular aesthetic characteristics valued by a community or cultural group

**3. Scientific value**

- Does it have potential to yield information that will contribute to an understanding of natural or cultural heritage
- Is it important in demonstrating a high degree of creative or technical achievement at a particular period

**4. Social value**

- Does it have strong or special association with a particular community or cultural group for social, cultural or spiritual reasons

**5. Rarity**

- Does it possess uncommon, rare or endangered aspects of natural or cultural heritage

**6. Representivity**

- Is it important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects
- Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class
- Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.

<b>7. Sphere of Significance</b>	<b>High</b>	<b>Medium</b>	<b>Low</b>
International			
National			
Provincial			
Regional			
Local			
Specific community			

**8. Significance rating of feature**

1. Low
2. Medium
3. High

**Significance of impact:**

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

**Certainty of prediction:**

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

**Recommended management action:**

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

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

**Legal requirements:**

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