

**Underwater Heritage Impact Assessment for the Development
of an Aquaculture Development Zone (ADZ) at Saldanha Bay**
Western Cape

AFRICAN CENTRE FOR HERITAGE ACTIVITIES
11A MARSTON RD
DIEPRIVER
7800

CONTENTS

1. EXECUTIVE SUMMARY.....	3
2. INTRODUCTION	3
3. BRIEF HISTORICAL BACKGROUND	5
4. LEGISLATIVE FRAMEWORK: MARITIME AND UNDERWATER CULTURAL HERITAGE	5
5. IMPACT ON THE MARITIME CULTURAL LANDSCAPE.....	6
6. SHIPWRECK RESOURCES.....	7
7. SIGNIFICANCE ASSESSMENT.....	14
7.1 NATURE OF POTENTIAL IMPACT:	15
7.2 SIGNIFICANCE OF IMPACT:	15
7.3 SIGNIFICANCE RATING FOR: MERESTEIN 1702	16
7.4 SIGNIFICANCE RATING FOR: DAUPHIN 1830.....	17
7.5 SIGNIFICANCE MATRIX: LUNA 1880	18
7.6 SIGNIFICANCE MATRIX: HAMLET 1927.....	19
8. RECOMMENDED MANAGEMENT ACTION.....	19
9. CONCLUSION	20
REFERENCES:	20

1. EXECUTIVE SUMMARY

The Department of Agriculture, Forestry and Fisheries (DAFF) aims to develop and facilitate an Aquaculture Development Zone (ADZ) in Saldanha Bay by identifying and permitting additional sea-based aquaculture areas. The extent of the project footprint, in conjunction with the possibility that positioning of mooring blocks on which aquaculture infrastructure will be anchored may impact on submerged cultural heritage resources, triggers Sections 38 and 35 of the National Heritage Resources Act (Act 25 of 1999).

This heritage impact assessment, prepared to inform DAFF's application for Environmental Authorisation for the project, has identified four protected wreck sites potentially affected by the development: *Dauphin* (1830) in the Big Bay – North ADZ area; *Luna* (1880) in the Big Bay – South ADZ area; *Hamlet* (1927) and *Merestein* (1702) in the Outer Bay – South ADZ area. Of these wrecks, the *Merestein* is the most significant but, since the wreck site - the main section of which lies in the Jutten Island Marine Protected Area - has been extensively salvaged, it is probable that it will not be impacted by the proposed development. A buffer zone of 200m around the wreck site has been recommended.

It has been recommended that divers carry out visual inspections of the seabed while positioning mooring blocks in order to identify wreck material. Should wreck material be located, it is recommended that mooring blocks be repositioned so as not to impact on shipwreck sites.

2. INTRODUCTION

The Department of Agriculture, Forestry and Fisheries (DAFF) aims to develop and facilitate aquaculture (the sea-based or land-based rearing of aquatic animals or the cultivation of aquatic plants for food) in South Africa to supply food, create jobs in marginalised coastal communities and contribute to national income. Saldanha Bay is a highly productive marine environment and has an established sea-based aquaculture industry, with potential for growth.

To facilitate investment and development of additional aquaculture in the Bay, DAFF proposes to establish and obtain Environmental Authorisation (EA) for a sea-based Aquaculture Development Zone (ADZ) in Saldanha Bay.

The proposed ADZ comprises four main precincts (additional aquaculture

areas) in Big Bay and Outer Bay, providing an additional 1 399 ha of aquaculture areas in Saldanha Bay (see Figure 1):

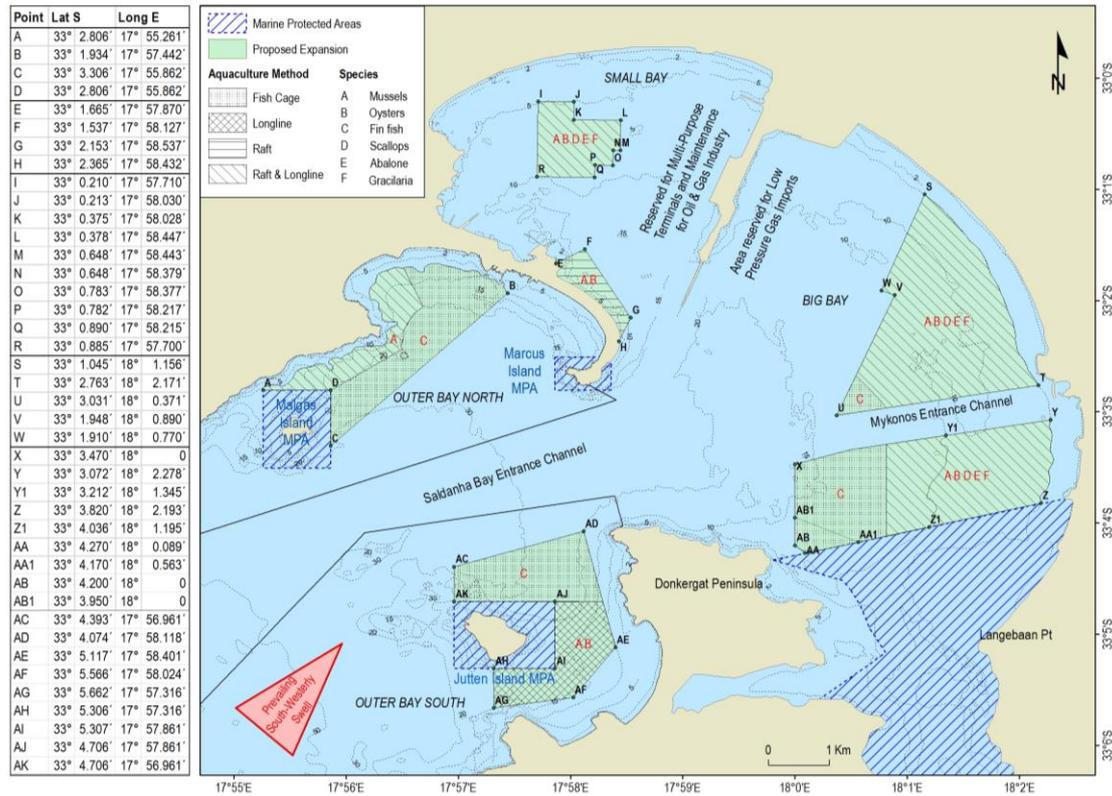


Figure 1: Existing and proposed (green) aquaculture areas in Saldanha Bay

SRK Consulting (South Africa) (Pty) Ltd (SRK) has been appointed to develop a framework for the Saldanha Bay ADZ and undertake the Basic Assessment (BA) process required in terms of the National Environmental Management Act 107 of 1998, as amended (NEMA) and the EIA Regulations, 2014 and commissioned the African Centre for Heritage Activities to provide the required heritage specialist input.

The following ToR applied to the for heritage study:

- Undertake a field assessment and desktop research of the bay and coastal area, as required;
- Identify and map archaeological heritage resources;
- Assess and grade the significance of archaeological heritage;
- Identify potential impacts on heritage resources;
- Recommend mitigation action; and
- Compile and submit a NID to the relevant heritage authority.

3. BRIEF HISTORICAL BACKGROUND

Saldanha Bay has experienced human settlement and activity since the Middle and Late Pleistocene. Early Stone Age and Middle Stone Age archaeological assemblages scattered along the South African West Coast as well as palaeontological fossil beds, such as in the West Coast Fossil Park, are a testament to this long history. Stone Age sites around Saldanha Bay, including Hoedjiespunt, Elandskraal and Speeuwal, have been the focus of archaeological investigation and the pre-colonial history of the Bay and its surrounds is well documented (Kandel & Conrad 2012).

The Bay was given the name Saldanha Bay in 1601 after Antonia de Saldanha, captain of a vessel in the Albuquerque fleet that visited the area in 1503.

Colonial period human activities have been extensively examined. Schrire's work at Dutch outpost sites at Oudepost has contributed considerable knowledge to early colonial life around Saldanha Bay. Early fishing, sealing and whaling activities, especially near Marcus Island/Outer Bay and at Salamander Point, have been extensively documented in the archival and historical record (David & van Sittert 2008), although little has been produced in the archaeological context.

More recently, Saldanha Bay has seen extensive development as a bulk goods port.

4. LEGISLATIVE FRAMEWORK: MARITIME AND UNDERWATER CULTURAL HERITAGE

In the construction of maritime infrastructure, developers must be guided by Sections 38 and 35 of the National Heritage Resources Act (Act 25 of 1999) (hereinafter "the Act"). Specifically, this project triggers the following activity listed in the Act:

Section 38

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

... (c) any development or other activity which will change the character of a site-

- (i) exceeding 5 000m² in extent;

In addition, South Africa protects shipwreck sites older than 60 years in terms of the Act. As archaeological sites, shipwrecks are subject to the same legislative processes as their terrestrial archaeological site counterparts.

Wrecks are defined in terms of Section 2 of the Act as: “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 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which the South African Heritage Resources Agency (SAHRA) considers to be worthy of conservation. Any “part” of a wreck includes flotsam, jetsam, lagan and derelict as well as any portion of the cargo, stores or equipment of a ship and any portion of the personal property on board such ship when it was lost, abandoned, stranded or in distress and belonged to any person who was aboard that ship at that time; or any other material deposited either purposefully or through accident.

If any of these remains are to be disturbed, a permit is required from SAHRA. As described in Section 35(4):

No person may:

- a. Destroy, damage, excavate, alter, deface or otherwise disturb any wreck site;
- b. Destroy, damage, excavate or remove from its original position, collect or own any wreck object or artefact;
- c. Trade in, sell for private gain, export or attempt to export from the Republic any category of wreck object or artefact;
- d. Bring onto or use at a wreck site any excavation equipment or any equipment which assists in the detection or recovery of metals or wreck objects or artefacts.

Except under the authority of a permit issued by SAHRA.

5. IMPACT ON THE MARITIME CULTURAL LANDSCAPE

The proposed project will have little impact on the known maritime cultural landscape other than shipwreck sites (which are discussed in detail in Section 5 below). The project will not impact on historic or archaeological terrestrial sites and will not significantly alter the aesthetics of Saldanha Bay. In addition, the proposed development is in essence an expansion of existing aquaculture

infrastructure and is, therefore, compatible with the current marine landscape. The project will not alter or impact associated maritime intangible cultural heritage such as local folklore. The project will not affect or alter the physical landscape.

The development may, however, affect unknown cultural remnants of utilisation of marine resources especially in the Outer Bay – North and Big Bay – South development areas. Historically, these areas were the focus of fishing, sealing and whaling activities, and undocumented archaeological debris such as anchors or other flotsam and jetsam may lie on the sea floor. The placement of concrete anchor blocks on the sea floor may result in archaeological remains being covered or damaged. Impact on potential archaeological material will, however, be low, and it is likely that the remnants of fishing, sealing and whaling activities are ephemeral. It is unlikely that observations of small objects comprising remnants of fishing, sealing and whaling activities will be possible. It is also likely that small objects will remain buried or sink below concrete anchor plinths.

There is potential that an extensive Pleistocene landscape exists below the current seabed in Saldanha Bay. The landscape may contain fossils, as observed at the West Coast Fossil Park, or the remains of human activities. This landscape will not be affected by the placement of concrete mooring blocks. Observations of the impact of mooring blocks on the seabed were made in Ilha de Mozambique, where comparable environmental conditions exist. While water currents resulted in some scouring of the seabed around mooring blocks, scour was shallow and negligible.

The prehistoric landscape at Saldanha Bay has not been mapped and, therefore, cannot be assessed within the ambit of this study. It is with relative certainty, however, that it can be stated that the Pleistocene layer will not be impacted by the concrete block anchor arrays, as it is understood that no pylons will be sunk into the sea bed. No further assessment actions are recommended.

6. SHIPWRECK RESOURCES

Saldanha Bay has been the focus of maritime activity for 400 years and, as such, has experienced significant infrastructure development and numerous shipwrecks.

The proposed ADZ proposal does not include terrestrial development and, for the purposes of this assessment, only impacts on underwater cultural heritage

are considered.

Known shipwrecks in Saldanha Bay are summarised in Table 1. Their location is shown in Figure 2.

The locations of wreck sites listed in Table 1 have been determined through an examination of archival records. Since these records do not provide precise locations, it is not possible to predict with certainty the position of sites. For this reason, additional wreck sites that are unlikely to be, but *may* be located within the ADZ have been provided. Those sites most likely to lie within the ADZ are shown in bold type.

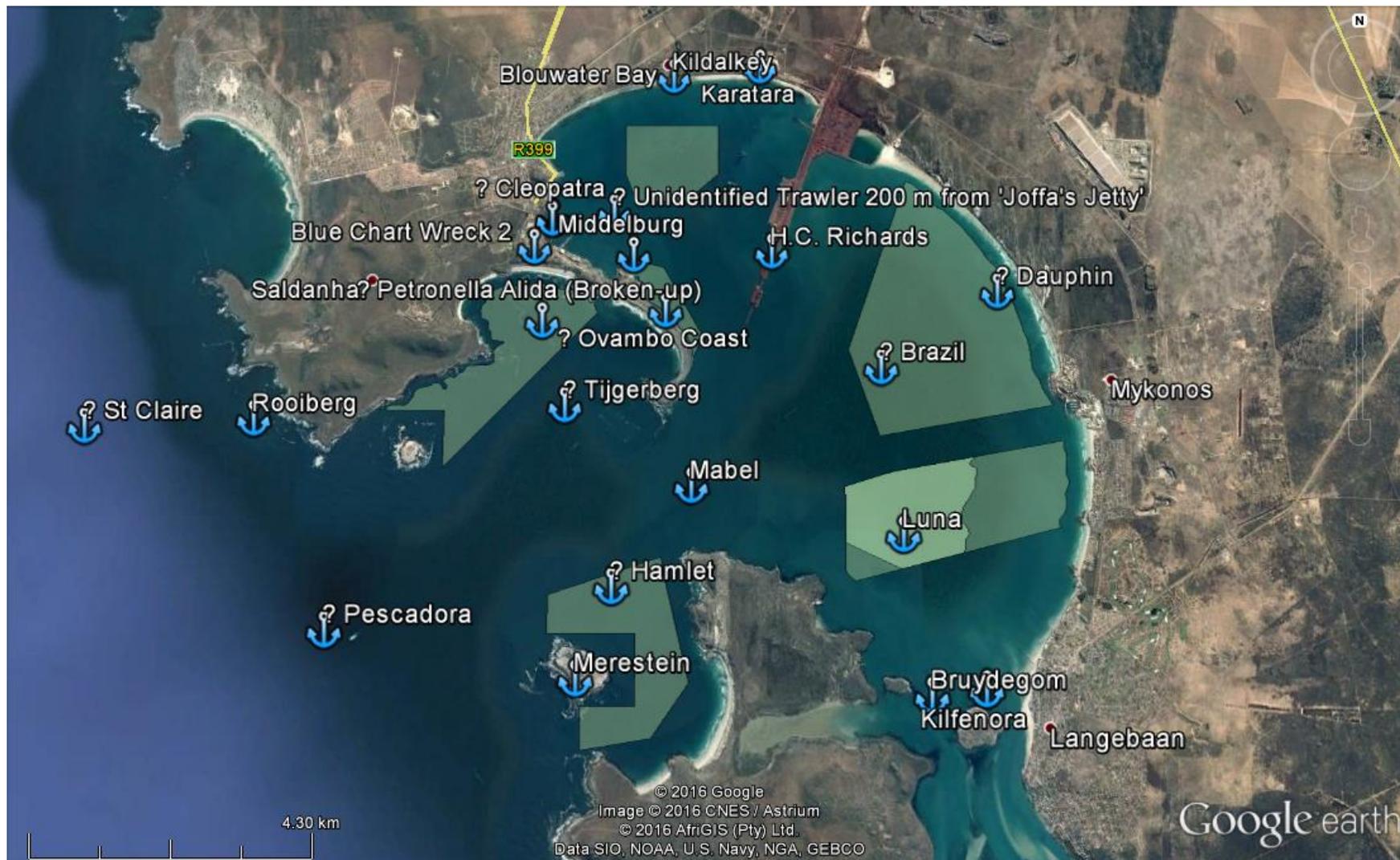


Figure 2: Location of known shipwrecks in and near Saldanha Bay relative to proposed aquaculture areas

Table 1: Summary of known shipwrecks in Saldanha Bay

Name	Date	Information
Brazil	1966	<p>While welders were working on the engine of this fishing boat, waste in the bilge caught on fire. The fire raged for fourteen hours. The boat was then towed to the middle of Saldanha Bay, 2.5 kilometres from the shore, and sunk.</p> <p>In proposed <i>Big Bay – North ADZ</i> area but does not fall within the ambit of the National Heritage Resources Act (less than 60 years old).</p>
Bruydegom	1674	<p>This small ship registered in the Cape struck a rock between Meeuw and Skaap Islands at the entrance to the bay while waiting for a good wind to return to Cape Town. It had a cargo of shells and limestone. The boat drifted into the lagoon and apparently sank near Kraal Bay.</p> <p>Outside of proposed ADZ expansion area.</p>
Cleopatra	1968	<p>This 75-ton fishing vessel caught fire and burned at her slip in Saldanha Bay.</p> <p>Outside of proposed ADZ expansion area.</p>
Dauphin	1830	<p>An American whaling ship under Capt. Hussey, it drifted ashore and became a wreck after the cargo was saved. No lives were lost.</p> <p>Potentially in proposed <i>Big Bay – North ADZ</i> area.</p>
H.C. Richards	1893	<p>Built in 1863, this 806-ton Norwegian barque was built originally as a clipper but later converted and carried a cargo of deals when she struck a rock off Aliwal Shoal. After filling with water she was run aground near the Illovo River and patched up. She was towed to Durban. Later she was towed to Cape Town where she was condemned. She was eventually scuttled in Salamander Bay to form a jetty.</p> <p>Outside of proposed ADZ expansion area.</p>
Hamlet	1927	<p>An Irvin & Johnson steam coaster of 328 tons. Under Capt. Dumares she serviced the Kerguelen</p>

Name	Date	Information
		<p>sealing fleet. She had a cargo of provisions and coal from Table Bay when she was wrecked near South Head, Saldanha.</p> <p>Potentially in area proposed <i>Outer Bay – South ADZ</i> area.</p>
Herlille	1978	<p>This 82-ton purse seiner was, according to Levine (1989), wrecked at Saldanha Bay. Van den Bosch (2014) states that this vessel was wrecked at Kommetjie.</p> <p>Position unknown.</p>
Karatará	1921	<p>This vessel was built for the sealing trade. While in Table Bay, she caught on fire. Although the fire was put out, the vessel was scuttled in Saldanha Bay Whaling Station, as part of the jetty.</p> <p>Outside of proposed ADZ expansion area.</p>
Kildalkey	1937	<p>This steamship was built during World War I (WWI) with identical stern and bow in order to confuse enemy submarines. After the war she was converted into a tanker and used in the sealing trade. Later she transported whale oil. She had a cargo of whale oil when, during a heavy fog, she hit the rocks known as the Seven Blinders. The wreck may have been removed in 1974.</p> <p>Outside of proposed ADZ expansion area.</p>
Kilfenora	1940	<p>This 610-ton vessel, managed by Irvin & Johnson, ran aground on the easterly point of the north side of Schaapen Island. The wreck may have been removed in 1974.</p> <p>Outside of proposed ADZ expansion area.</p>
Luna	1880	<p>This 41-ton schooner was carrying a cargo of skins between Hondeklip Bay and Cape Town when she began to leak. The crew abandoned her half a kilometre from shore in Saldanha Bay. She is apparently located near Salamander Point. She</p>

Name	Date	Information
		<p>sank but no lives were lost.</p> <p>Potentially in proposed <i>Big Bay – South</i> ADZ expansion area.</p>
Mabel	1909	<p>A sailing cutter of 8 tons and a crew of four sailed from Langebaan for Cape Town with a cargo of wheat. She was sailing between Marcus Island and the mainland when she struck a rock. Thereafter she capsized and sank. Only one crew member survived by swimming ashore.</p> <p>Outside of proposed ADZ expansion area.</p>
Merestein	1702	<p>This Dutch pinnace of 826 tons was built in 1693 at the Amsterdam Yard for the Dutch East-India Company. Under the command of Capt. Subbing, she was wrecked on the south-west corner of Jutten Island at the entrance to Saldanha Bay. She was on her outward-bound voyage from Texel with a large cargo of coins. 101 people died in the wreck. Most of the coins, cannons and lead bars were salvaged in 1971. The wreck lies in the harbour area of Saldanha Bay at a depth of between 3 and 6 metres.</p> <p>Debris may be affected by development in proposed <i>Outer Bay – South</i> ADZ area.</p>
Middelburg	1781	<p>This Dutch East-India man of 1150 tons was built in 1775 for the Zeeland Yard. She was on her homeward bound voyage with a cargo of porcelain, tea, silk, aniseed and tin under Capt. Van Gennep. Her crew set her on fire in order to avoid her capture by the British. She eventually sank near Hoedjies Point. The wreck has been worked on by various salvors over the years.</p> <p>Outside of proposed ADZ expansion area.</p>
Ovambo Coast	1958	<p>This South African coaster of 217 tons was built in 1939 and owned by Thesens. Commanded by Capt. Baird she was wrecked on Marcus Island, during a fog. She was carrying a cargo of fish oil</p>

Name	Date	Information
		<p>bound for Cape Town.</p> <p>Outside of proposed ADZ expansion area.</p>
Pescadora	1839	<p>This Portuguese schooner, owned by the Lisbon Fishing Company was wrecked on a reef near the entrance to Saldanha Bay. No lives were lost.</p> <p>Most likely outside of proposed ADZ expansion area.</p>
Petronella Alida	1738	<p>This 550-ton Dutch East-Indiaman was broken-up at Saldanha Bay.</p> <p>Since the vessel was broken up, it is unlikely that remnants of the vessel remain.</p>
President	Between the two world wars	<p>This 3385-ton German steamer masqueraded as a hospital ship during WWI. She served as a supply ship for the German raider, <i>Konigsberg</i>. However, in 1914, the <i>President</i> was spotted by a British patrol vessel and sunk near the Lindi River in East Africa. Later she was raised by Irvin & Johnson and she served as a coal depot for the Donkergat Whaling Station. After the whaling station was shut down, the vessel was stripped and served as a hulk at Hoedjies Point. Years after this, she was finally filled with stone and sunk to form a jetty. When WWII broke out, the jetty was used by small military vessels and the jetty became known as President Jetty.</p> <p>Outside of proposed ADZ expansion area.</p>
Rooiberg	1936	<p>This Irvin & Johnson, 200-ton whaler struck the rocks near North Head and was completely wrecked. Her crew of twelve were rescued.</p> <p>Outside of proposed ADZ expansion area.</p>
Tijgerberg	1937	<p>This 314-ton, Irvin & Johnson whaler ran aground at Saldanha Bay. Two of the crew died.</p> <p>Outside of proposed ADZ expansion area.</p>

Name	Date	Information
St Clair	1838	Wrecked in the vicinity of Saldanha Bay, during a south-east gale, several people lost their lives. Position unknown.
Unidentified Trawler	1967	A trawler, anchored 200m from Joffa's Jetty, caught on fire. Two local men boarded the vessel where they found a man fast asleep in the bows. After waking him and returning to shore, the vessel sank. Outside of proposed ADZ expansion area.
Blue Chart Wreck 2		This is a wreck marked on the Garmin Blue Charts (Garmin's proprietary marine navigation software compiled from various data sources including the South African Navy Hydrographic Office); it probably corresponds with one of the above wrecks. Outside of proposed ADZ expansion area.

Of the 23 wrecks discussed above, five potentially lie within proposed ADZ expansion areas:

- Two wrecks potentially lie in Big Bay North: Brazil, Dauphin;
- One wreck potentially lies in Big Bay South: Luna; and
- Two wrecks potentially lie in Outer Bay South: Hamlet, Merestein.

The wreck of the Brazil is younger than 60 years and, therefore, does not fall within the ambit of the National Heritage Resources Act, It will not be considered in the assessment of the wrecks below.

7. SIGNIFICANCE ASSESSMENT

According to the Act Section 2(vi), the **significance** of heritage sites and artefacts is determined by their aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technical value in relation to their 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 aspects.

Of the wrecks described above, only those wrecks older than 60 years will be considered here. Special attention will be given to shipwrecks with high significance rating.

7.1 NATURE OF POTENTIAL IMPACT:

Nature of impact is determined by development activities. Specifically, an assessment of the nature of impact will examine the potential for activities to alter damage or destroy archaeological sites and materials or heritage sites or practices. Nature of impact is defined as follows:

- *Destroy*: development activities will result in partial or complete destruction of heritage material or sites. Permits from relevant heritage management agencies will be required. The services of a heritage practitioner will be required. Development work schedules will be affected.

- *Damage*: development activities will damage but not destroy heritage material or sites. Permits from relevant heritage management agencies will be required. The services of a heritage practitioner will be required. Development work schedules may be affected.

- *Alter*: development activities will alter the characteristics of heritage materials or sites. Permits from relevant heritage management agencies will be required. The services of a heritage practitioner may be required. Public consultation may be required. Development work schedules may be affected.

Restrict (level I): development activities will result in restriction of access to significant heritage materials or sites. Permits from relevant heritage authorities may not be required, but authorities should be informed. The services of a heritage practitioner may not be required. Public consultation may be necessary. Work schedules may not be affected.

- *Restrict (level II)*: development activities will result in restriction of access to heritage materials or sites. Permits from relevant heritage authorities may not be required, but authorities should be informed. The services of a heritage practitioner will not be required. Work schedules will not be affected.

7.2 SIGNIFICANCE OF IMPACT:

The significance of an impact is defined as follows:

- *Low*: the impact will not have an influence on the project design or need to be significantly accommodated in the project design

- *Medium*: the impact could have an influence on the project design, which will require modification or alternative mitigation

- *High*: the impact would have a “no-go” implication on the project regardless of any mitigation

In the instance of shipwrecks, any wreck older than 60 has been given a medium significance rating by default, in that the Act is triggered.

7.3 SIGNIFICANCE RATING FOR: MERESTEIN 1702

Wrecked off Jutten Island – majority of wreck lies within the Jutten Island Marine Protected Area and thus outside of the proposed ADZ area.

Historic value

- Although the Merestein was mostly salvaged in the 1980's and 1990's, poor reporting on excavation activities has resulted in little archaeological data being available. The extent of the destruction of the wreck site is not known. Valuable data may still be available at this site.

Aesthetic value

- The wreck has no known aesthetic value. Some debris has washed onto Jutten Island.

Scientific value

- The vessel is of medium scientific value. Until an assessment of the wreck site has been undertaken, it must be assumed that the site is significant. However, salvage activities have destroyed portions of the site and may have decontextualized the artefact assemblage.

Social value

- The shipwreck may have social significance with regard to the history of Jutten Island.

Rarity

- Examples of Dutch East Indiamen are relatively rare. The Merestein is one of the earlier examples of VOC shipwrecks in South African waters.

Representivity

- Because no archaeological assessment of these wreck sites has been undertaken, a valuation of representivity is difficult.

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

Significance rating of feature

Medium – The age of the vessel dictates that mitigation measures must be implemented should the project result in the location and disturbance of the wreck.

Certainty of prediction:

- Possible: More than 50% sure of the likelihood of that impact occurring. A permit for the destruction of the wreck will be a requirement of SAHRA should the project impact on the site directly. Further site assessment and recording may be necessary.

The main portion of the site lies within the southern portion of the Jutten Island MPA. Strong currents and steep bathymetry may mean that wreck debris has scattered outside of the MPA. Following a final determination of the placement of anchor blocks, it may be possible to exclude this wreck from the impact area.

7.4 SIGNIFICANCE RATING FOR: DAUPHIN 1830

Position unknown, most likely in/adjacent to the Big Bay – North development area.

Historic value

- Little historic data is available for this shipwreck site. Saldanha Bay has a rich history of whaling and this site is representative of this past.

Aesthetic value

- The wreck has no known aesthetic value.

Scientific value

- The vessel is of low scientific value. While the ship may be of some interest in the study of whaling and whaling activities, its cargo was recovered and, most likely, ship fittings were salvaged.

Social value

- The shipwreck may have social significance with regard to the history of whaling and the development of tourism based on these historic activities.

Rarity

- Whaling ships are well represented in the South African shipwreck collection.

Representivity

- Better examples of whaling vessels are available.

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

Significance rating of feature

Low – The age of the vessel dictates that mitigation measures must be implemented should the project result in the location and disturbance of the wreck.

Certainty of prediction:

- Low: Less than 50% sure of the likelihood of that impact occurring. The wreck is on the edge of the development area. A permit for the destruction of the wreck will be a requirement of SAHRA should the project impact on the site directly. Further site assessment and recording may be necessary.

7.5 SIGNIFICANCE MATRIX: LUNA 1880

Position unknown, most likely in/adjacent to the Big Bay – South development area.

Historic value

- Little historic data is available for this shipwreck site. The wreck may contain significant archaeological data related to coastal trade. Historic significance is low.

Aesthetic value

- The wreck has no known aesthetic value.

Scientific value

- The vessel is of medium scientific value. While the ship may be of some interest in the study of trade activities, its cargo is unlikely to have survived. The ship may be of interest with regard to coastal trade and coastal trade ships.

Social value

- The shipwreck has low social value.

Rarity

- Local coastal traders have not been archaeologically or historically examined in the South African shipwreck collection.

Representivity

- The wreck may be a good example for the study of local trade vessels.

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

Significance rating of feature

Low – The age of the vessel dictates that mitigation measures must be implemented should the project result in the location and disturbance of the wreck.

Certainty of prediction:

- Possible: More than 50% sure of the likelihood of that impact occurring. The wreck is possibly inside of the development area. A permit for the destruction of the wreck will be a requirement of SAHRA should the project impact on the site directly. Further site assessment and recording will be necessary should it not be possible to place mooring blocks in a position that does not impact on the wreck site. In an instance where planned mooring block positions cannot

be adjusted, archaeologists will need to conduct a pre-disturbance mapping and assessment exercise to determine the extent of the wreck site, affected features and potential further need for mitigation.

7.6 SIGNIFICANCE MATRIX: HAMLET 1927

Precise location unknown, may be in development area.

This vessel has been assessed as having **low** significance as it is relatively recent and not an unusual vessel type. It is included here as it will trigger the Act if impacted by the development. Given that the wreck is relatively recent, substantial ship structure may still exist above the sea floor and may need to be removed or damaged to place anchor blocks. This will require permits for disturbance or removal from SAHRA for destruction/removal of wreck remains.

In summary, the following significance ratings were identified:

Wreck	Location	Significance	Certainty
Dauphin	Big Bay North	Low	Low
Luna	Big Bay South	Low	Possible
Hamlet	Outer Bay South	Low	Possible
Merestein	Outer Bay South	Medium	Possible

8. RECOMMENDED MANAGEMENT ACTION

1. NOTE: Potential for impact is low across the ADZ. Concrete anchors will be placed on the sea floor and will not affect buried shipwreck material. In addition, 5-ton (roughly 5m²) concrete blocks are relatively small and have a small footprint on the seabed. As stated, scour around concrete blocks will be negligible and shipwreck sites will be minimally affected, if at all. Impact may result if moorings are placed on exposed shipwreck material.
2. It is recommended that no new mooring blocks be placed within a 200m of the Merestein site (33.087355°S, 17.955044°E – WGS84, Decimal Degrees)
3. It is suggested that a detailed anchor distribution plan be provided to the Maritime and Underwater Cultural Heritage Unit at SAHRA once this has been finalised. This can be used to reassess potential shipwreck impacts to assist developers in determining whether to amend placement plans to avoid incurring further heritage intervention costs. While this is not mandatory, it may be beneficial.
4. It is recommended that diver surveys be completed during the activities required for setting anchor arrays. It is most cost effective to provide

commercial divers working on the project with brief orientation training. If wreck material is identified, archaeologists can be contracted to make an assessment.

5. Should wreck sites be identified, it is recommended that, if possible, and more cost effective than archaeological mapping and assessment, planned positions of mooring blocks should be relocated off of visible features (above the seabed) on wreck sites.
6. It is recommended that the location and nature of any identified maritime and underwater cultural heritage resource be provided to a maritime archaeologist and to the South African Heritage Resources Agency for inclusion on their Shipwreck Database.
7. Should evidence of archaeological material be identified, the Maritime and Underwater Cultural Heritage Unit at SAHRA must be notified and it should be provided to an archaeologist for assessment
8. Should any wreck site, or part thereof, or object or artefacts from a wreck site be disturbed during operations, a permit from SAHRA must be acquired prior to continuing with activities.

9. CONCLUSION

The Saldanha Bay Aquaculture Development Zone is a low impact expansion project that is unlikely to affect maritime and underwater cultural heritage resources. The project will be limited to above-seabed infrastructure, which will, in most instances, not result in damage or disturbance to shipwreck material. In instances where shipwreck material protrudes from the seabed, diver visual surveys would ensure that heritage resources are avoided. Where impact is unavoidable, mitigation will be triggered and an assessment of solutions will be undertaken. Given the low likelihood of encountering heritage material and the relatively small footprint of both wreck sites and mooring points, it is unlikely that the project will have significant effect on resources or be unduly affected by shipwreck material.

Based on low impact potential and limited significance of wreck sites, this report recommends that approval be granted for the expansion of aquaculture infrastructure in Saldanha Bay.

REFERENCES:

Burman, J. & Levin, S. 1974. *The Saldanha Bay Story*. Human and Russouw: Pretoria.

David, J. & van Sittert, L. 2006. *A Reconstruction of the Cape (South African)*

fur seal harvest 1653 – 1899 and a comparison with the 20th-century harvest. South African Journal of Science 104. Pp 107 – 110.

Kandel, A.W., & Conrad, N.J. (2012). *Settlement patterns during the Earlier and Middle Stone Age around Langebaan Lagoon, Western Cape (South Africa)*. Quarternary International. Vol. 270: 15-29.

Levine, M. 1989. Shipwreck History of Southern Africa. Unpublished manuscript held by Vanessa Maitland.

Maritime Connector. Available from: <http://maritime-connector.com/ship/harvest-sirius-6412114/>

Miramar Ship Index. Available from: www.miramarshipindex.org.nz/

Roux A.P. (1975). *Die geskiedenis van Saldanhaabaai, St Helenabaai en Dasseneiland 1652–1806*. M.A. thesis, University of Stellenbosch. In: David, J. & van Sittert, L. 2006. *A Reconstruction of the Cape (South African) fur seal harvest 1653 – 1899 and a comparison with the 20th-century harvest*. South African Journal of Science 104. Pp 107 – 110.

Smith, AB., Sadr, K., Gribble, J. & Yates, R. 1991. *Excavations in the southwestern Cape, South Africa and the archaeological identity of prehistoric hunter-gatherers within the last 2000 years*. South African Archaeological Bulletin 46: 71-91.

Sleigh, D. 2004. *Die Buitenposte: VOC-Buitenposte onder Kaapse bestuur 1652-1795*. Protea Boekhuis: Pretoria.

Turner, M. 1988. Shipwrecks and Salvage in South Africa: 1505 to the Present. Cape Town: Struik.

Van der Bosch, F. 2014. South African Shipwreck Database CD.