MARTIME ARCHAEOLOGICAL ASSOCIATION

REPORTS

2019/2020

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Volume 6: September 2019 – July 2020

Reports on the projects of the Maritime Archaeological Association of Western Australia

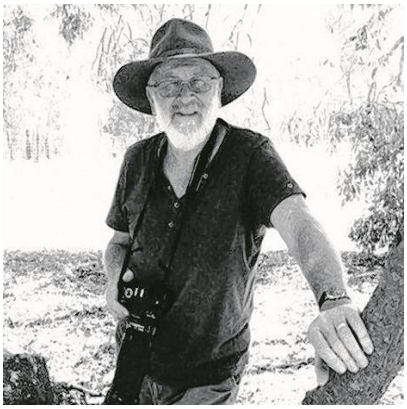
Edited by Marcel Teschendorff

INTRODUCTION

This sixth volume of the Maritime Archaeological Association of Western Australia (MAAWA) reports is a continuation of the publications produced by MAAWA members throughout the 70s, 80s and 90s, many of which represented important contributions to the development of Western Australian maritime archaeological endeavours. After a such a long hiatus since the last report, moving forward, the hope is to maintain a regular publication schedule detailing the nature and scope of the Association's activities.

The years since the last MAAWA publication have seen significant developments in the use of new technologies and methods in underwater archaeology. MAAWA members have had an ongoing contribution to the development of uses for these technologies, assisting with a variety of projects involving sidescan sonar, magnetometers, sub-bottom profilers or digital photogrammetry. Photogrammetry, in particular, has become an area of expertise for MAAWA, as demonstrated by the report on the Rottnest Island Saltworks included in this volume.

Speaking of new methodologies, it would be remiss not to mention the passing of long-time MAAWA member Colin Cockram. Col joined MAAWA around 1985 and immediately showed us a new way to record wrecks using 'isometric' 3D hand drawing. Previous wreck recordings had been done with elaborate plan drawings such as those required for artefact recording. However, this new technique was a quick and easy way to give an overall look and feel of the total site. Col's drawings of various wrecks will be in our ShipwrecksWA apps and our way of remembering his great contribution. Col served as President for two terms and became a Life Member for his dedication. We would like to dedicate this sixth volume of the MAAWA reports to the memory of Col.



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ROTTNEST ISLAND TERRESTRIAL SURVEY

By Kevin Edwards

AIMS AND OBJECTIVES

In September 2019, members of the Maritime Archaeological Association of Western Australia travelled to Rottnest Island to undertake a programme of archaeological site documentation on behalf of the Rottnest Island Authority (RIA). The terrestrial component of the investigations—the subject of the present report—had three main objectives, namely:

- To document a series of linear stone features located on the grounds of the Rottnest Island Country Club;
- To record the old salt works site; and
- To undertake an archaeological reconnaissance survey across the site of the former salt store.

The location of the subject areas is shown in Figure 1, below.

The terrestrial investigations were completed over a three-day period between 21-23 September 2019. Members of the survey team included:

- Kevin Edwards
- Patrick Morrison
- Marcel Teschendorff
- Helen McCall
- Sandy McCall
- Brunhilda Prince
- Anja Becker
- Allison Selmann
- Chris Selmann
- Jacquie Brisbout
- Gary Nicol
- Greg Flowers

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Figure 1 Location of terrestrial survey areas.

STONE ARRANGEMENTS

Several linear stone structures were identified within the grounds of the Rottnest Island Country Club (Figure 1 and 2). The features comprise a series of what appear to be causeways built across a natural drainage channel that runs in a south-easterly direction to discharge into Garden Lake.

A total of four features were identified (designated Features 1-4). Three of the features (Features 1-3) are well-defined, with each comprising two lines of limestone kerb stones, the space between which has been infilled with smaller pieces of limestone rubble. The features are oriented more-or-less perpendicular to the drainage feature on a bearing of N028°E to N075°E, and measure between 9.4m and 10.1m in length and 0.9m to 1.9m in width (Table 1). The remaining feature (Feature 4) is in poor condition, and currently comprises a single discontinuous line of kerb stones and sparse scatter of rubble infill.

No cultural material was found in or around any of the features. The most parsimonious interpretation of these features is that they represent simple causeways built across a relatively low-lying and seasonally inundated drainage feature. The somewhat crude and irregular build of the features, and their somewhat variable condition, would suggest that they are not associated with redevelopment and landscaping of the golf course in 1961 and 2013 respectively; this potentially points to them being relatively early features associated with access to and from former market gardens that are known to have operated in the area. Necessarily, with the limited evidence available, such interpretations must at present remain purely speculative. Additional archival research will be required to address the issue in more detail.

Each stone arrangement was recorded using close-range 3D photogrammetry. This was used to generate a range of assets, including scaled 3D models and ortho-rectified imagery, for the purposes of documentation and analysis (Figures 3 and 4).

Feature	Easting (centroid)	Northing (centroid)	Length	Width	Orientation
Feature 1	115.534486°	-31.995520°	10.1m	1.7-1.9m	N028°E
Feature 2	115.534620°	-31.995678°	9.7m	0.9-1.5m	N075°E
Feature 3	115.534906°	-31.995966°	9.4m	0.9-1.85m	N070°E
Feature 4	115.535396°	-31.996282°	4.4m	N/A	N060°E

Table 1 Features 1-4: summary details (all coordinates in WGS84).

Figure 2 Location of stone arrangements (Features 1-4).

Figure 3 3D photogrammetric model of Feature 2 (scale = 2.0m)

Figure 4 Orthomosaics of Features 1-4.

OLD SALT WORKS

MAAWA was asked to undertake additional recording of the former Rottnest Island Salt Works, located on Herschel Lake. Comprising part of a broader cultural landscape—which encompasses the adjacent stables, huts, causeway, salt stores, and Aboriginal prison (from which it drew its labour force prior to 1903)—the former salt-works represent an important and somewhat overlooked primary industry (archae-aus 2016: ii).

The salt lakes on Rottnest Island were exploited on a limited scale from the 1830s, when unprocessed salt was harvested and sent to Fremantle. Provision for on-site salt processing was undertaken in 1869, when a boiler and two pans were erected in the vicinity of the Salt Lakes under the direction of Adrien H. Courerot, a ticket-of-leave holder with several years' experience in salt production. The boiler and salt pans were subsequently enclosed in a structure built "without cost, with material on the island and by prison labour" (Ferguson 1986: 51). By the end of the nineteenth century, the salt-works were described as being in an advanced state of disrepair, with the walls needing to be reinforced with timber supports, iron bands, and through bolts. Despite this and mounting losses (which amounted to some £800 in the years 1893-1898 alone), a series of running repairs were made to the fabric of the building. The salt-works continued to operate until 1903, when operations were discontinued following the closure of Rottnest prison. The building was for several years used as a storehouse and stable, before being progressively demolished between 1947 and 1959.

Documentation of the former salt works site was accomplished primarily using close-range multi-image 3D photogrammetry. Towards this end, an Olympus OMD-EM5 digital camera fitted with a 14mm wide angle lens was used to capture a total of 1,006 nadiral and oblique images. These images were processed in Agisoft Metashape to generate a high-resolution scaled 3D model comprising 16,147,515 faces and 8,074,661 vertices, with an estimated resolution of 2.56mm/pixel (Figure 5 and 6). The surviving fabric of the salt-works comprises remnant limestone masonry and foundations cut into a limestone outcrop—a feature it shares with the adjacent Salt Store and the Assistant Gardener's Cottage on the shore of Garden Lake (archae-aus 2016: 39). The extant limestone wall-plates measure 15.3m x 9.3m in maximum dimension oriented on a bearing of N078°E. A considerable amount of cultural material—primarily brick and limestone demolition debris—is present across the former interior space of the structure; *in situ* architectural elements, including a series of brick courses, dressed limestone and timber features, appear to have been preserved beneath a slump of sand and limestone at the western end of the structure.

The detailed photogrammetric recording of the former salt-works represents both an important adjunct to existing statements of site significance (e.g. archae-aus 2016) and a dataset that can be used for the purposes of site management and interpretation (Figures 6 and 7).

Figure 5 Orthomosaic of salt works building site, generated from scaled 3D model.

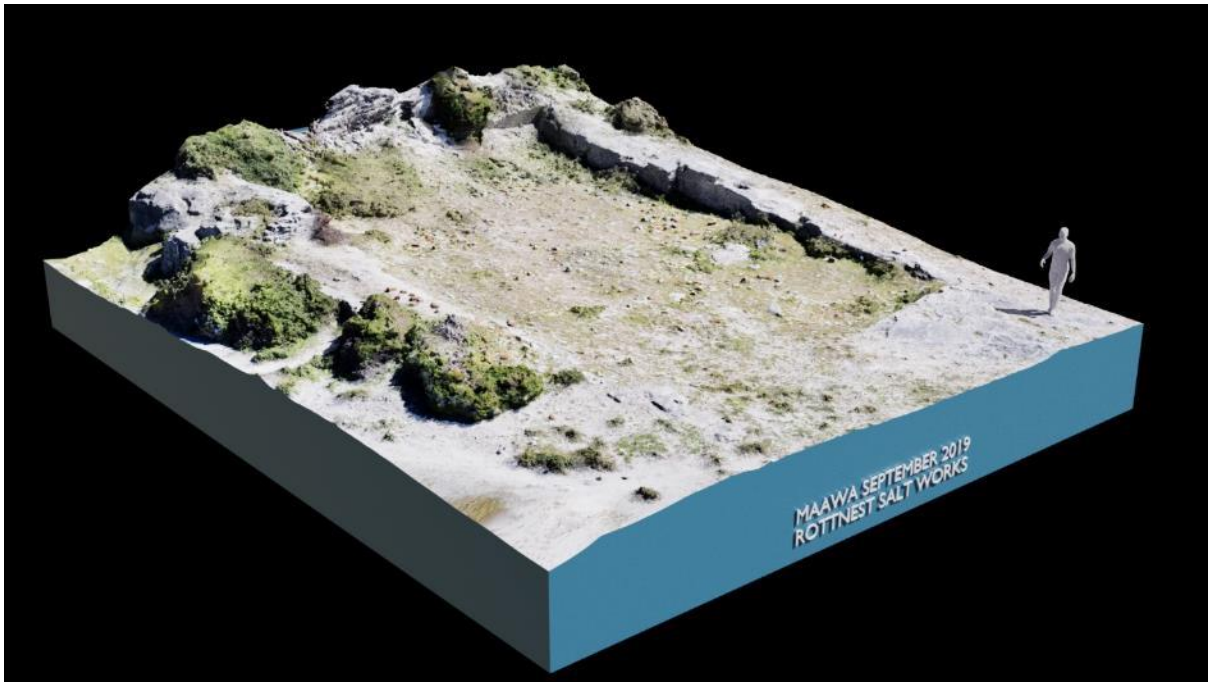

Figure 6 3D photogrammetric model of the former salt works site.

Figure 7 3D reconstruction of former salt works ca. 1898 based on 3D photogrammetry, historic plans, and contemporary photographs.

SALT STORE

MAAWA undertook a preliminary archaeological reconnaissance of the former Salt Store. Located on the western margin of Pearse Lakes, this site has been little studied archaeologically.

The Salt Store appears to represent a late phase in the history of salt extraction on Rottnest Island, having been established following the closure of the adjacent salt-works in 1903 (see above). During this phase, private companies—such as the Victory Salt Refinery Limited (registered in 1932)—took over the collection of salt, which was harvested and shipped untreated to the mainland. Few details about the operation and spatial organization of the site are available; indeed, the most informative description of building stock and associated plant is derived from a tender notice posted in March 1948:

> Tenders are invited for the purchase of the following Assets of the Victory Salt Refinery, Fremantle: (1) Lease of the salt lakes at Rottnest Island, date of expiry—30/0/1952. (2) 3-roomed cottage with 2 verandas, situated at Rottnest Island. (3) Stone store shed with asbestos roof, approximate holding capacity 750 tons, situated at Rottnest Island. (4) 600 to 800 tons crude salt in store on the island. (5) Dodge utility (good running order). (6) Morris truck (out of order). (7) Schumaker mill with elevator and attachments. (8) Schumaker dresser. (9) Eclipse mill with elevator. (10) Set platform scales. (11) 7h.p. electric motor and switch gear. (12) Rakes, forks, barrows and other sundry equipment (*West Australian* Thursday 25 March 1948).

An undated aerial photograph of the site (Figure 8)[1] appears to corroborate these details, showing two large structures (the store itself and an adjacent cottage to the south), both of which appear to be served by a road leading off what is now Digby Drive. Further photographic evidence that purports to depict the salt store itself (Figure 9) indicates that the fabric of the building may have undergone significant change over the course of its operational life.

The archaeological survey was completed over a two-day period. Members of the terrestrial survey team conducted a systematic walk-over survey across an area approximately 0.9ha in extent bounded by Digby Road to the north, Pearse Lake to the east and low limestone ridges to the west and south (refer Figure 1). Archaeological material was recorded over an area approximately 120m (N-S) x 50m (E-W) in extent (Figure 10).

[1] Based on the surviving fabric of the old salt works visible to the right of frame, it is likely that the photograph dates to between 1947-1959, when major phases of demolition occurred.

Several structural elements were identified during the survey, including:

- Salt_Store_018: a large rectangular building foundation, approximately 18m x 12.5m in extent. This feature was partially cut into low limestone ridge to form two walls of approximately 2.0m height to the west and south. This structure is presumed to represent part of the fabric of the salt store itself. This construction detail is shared with the adjacent salt-works and Assistant Gardener's Cottage on Garden Lake
- Salt_Store_019: an expanse of concrete paving slabs encompassing an area approximately 9.7m x 9.0m on the eastern portion of Salt_Store_018 (Figure 11);
- Salt_Store_020: a section of metalled road surface, approximately 20m long and 1.5m wide (Figure 12); and
- Salt_Store_023: an 'L' shaped concrete feature located approximately 20m to the east of the salt store. This was located in close proximity to a series of iron ground bolts and fasteners and may be associated with on-site plant.

Figure 8 Extract from aerial photograph showing the salt store and associated structures (NLA HURL 267A/6).

Figure 9 Photograph showing the salt store (RIB88).

In addition to the structural features, a wide range of cultural material was identified. This comprised a range of objects including concrete basins (Figure 14), glass (bottle and flat), building materials (clusters of brick and corrugated iron sheeting; Figure 14), iron fragments, and domestic wares (Table 2). Evidence for a water tank (Salt_Store_001) and windmill (Salt_Store_008) were also identified. Preliminary analysis indicates there may be segregation between items of a domestic nature and those relating to industry/infrastructure, with most domestic material being clustered in and around what is presumed to have been the site of the former cottage (see above). Summary details are as follows:

Feature	Comment
Salt_Store_001	Circular concrete base of water tank, ca 2.6m in dia.; retains impression of cgi. Associated with glass, porcelain and brick.
Salt_Store_002	Piece of timber with perforation.
Salt_Store_003	Artefact scatter; corrugated cement sheeting, glass and iron fragments.
Salt_Store_004	Cluster of corrugated cement sheeting and iron over area of approx. 1.5m
Salt_Store_005	Cluster of red bricks (n=15) and chicken wire occupying an area approx. 3.3m in diameter.
Salt_Store_006	Downpipe, tin.
Salt_Store_007	Cluster of mixed material encompassing an area approx. 8m x 4.7m in extent. Material includes iron fragments, porcelain, glass bottles, corrugated iron, fragments of drainage pipe, tar, and a ceramic insulator.
Salt_Store_008	Metal windmill blade and oil drum lid
Salt_Store_009	Cluster of mixed material encompassing an area approx. 5.8m x 5.0m in extent. Material comprises fragments of iron, glass fragments, ceramic sherds and tar.
Salt_Store_010	Piece of corrugated iron.
Salt_Store_011	Cluster of bricks (n=5), iron fragments and tar. 1m x 6m area.
Salt_Store_012	Cluster of glass fragments, approx. 8m x 4m in extent.
Salt_Store_013	Piece of timber, tar and rubber gasket.
Salt_Store_014	Piece of corrugated iron
Salt_Store_015	Small cluster of glass and brick fragments
Salt_Store_016	Concrete basins, broken
Salt_Store_017	Iron star picket and bolt
Salt_Store_018	Large rectangular building foundation, approximately 18m x 12.5m in extent, partially cut into low limestone ridge.
Salt_Store_019	Concrete paving slabs to east end of Salt_Store_018, encompassing an area approximately 9.7m x 9.0m in extent.
Salt_Store_020	Section of metalled road surface, approximately 20m x 1.5m in extent.
Salt_Store_021	Depression (rubbish pit), ca. 2m diameter.
Salt_Store_022	Cluster or assorted iron fasteners and in situ threaded ground bolts.
Salt_Store_023	Linear concrete feature.

Table 2 Summary of archaeological features identified in the vicinity of the old salt store.

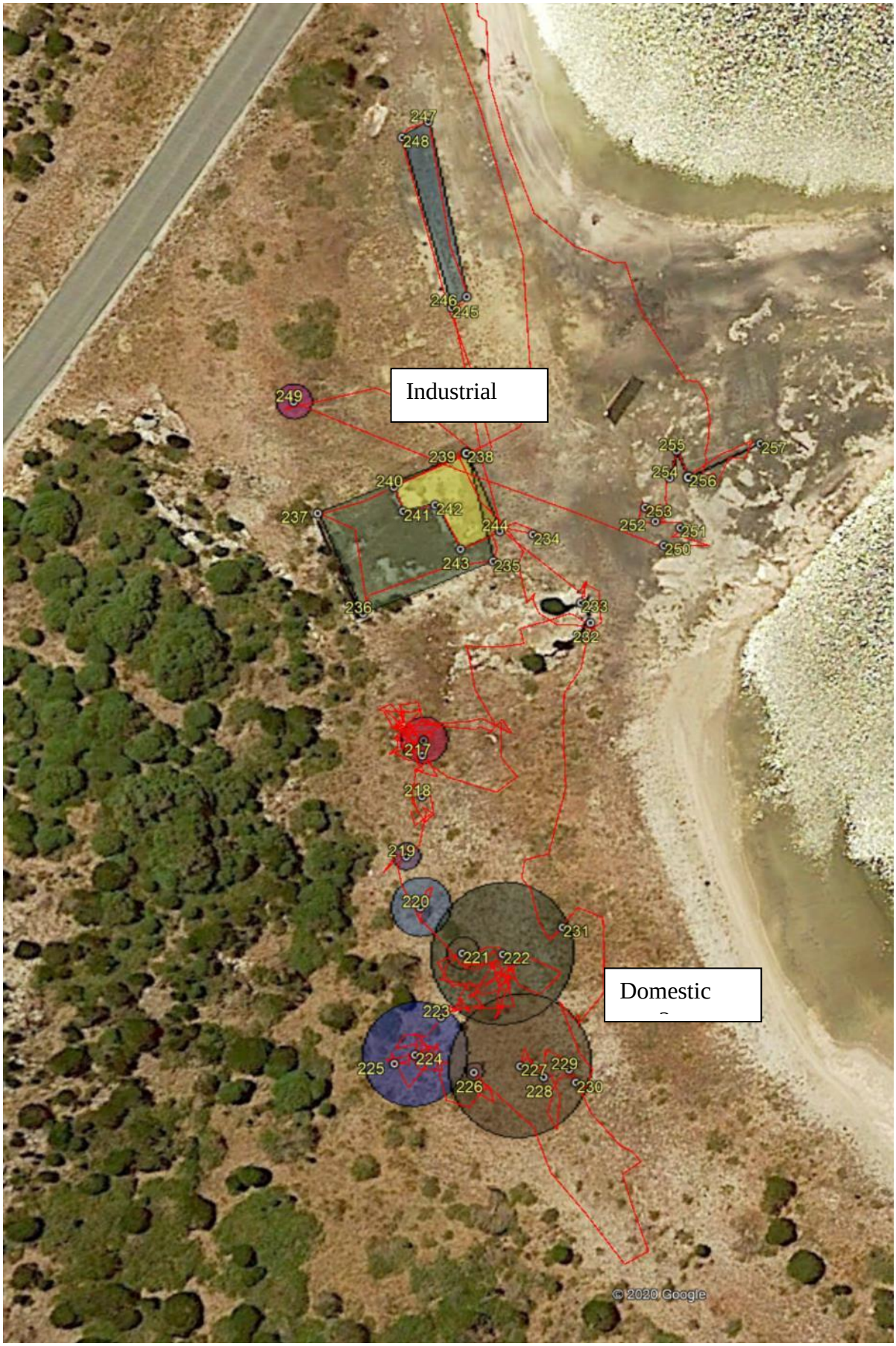

Figure 10 Map showing the location and extent of archaeological material identified in the vicinity of the old salt store.

Figure 11 Salt_Store_019 – concrete surface to western side of salt store.

Figure 12 Salt_Store_020 – metaled road surface.

Figure 13 Salt_Store_016 – one of a series of concrete sinks found in the immediate vicinity of the salt store

Figure 14 Salt_Store_005 – scatter of red brick.

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Ferguson, R. J. (1986). Rottnest Island: History and Architecture. Nedlands: University of Western Australia Press.

FREMANTLE HARBOUR: THE NORTH MOLE

By Ian Warne

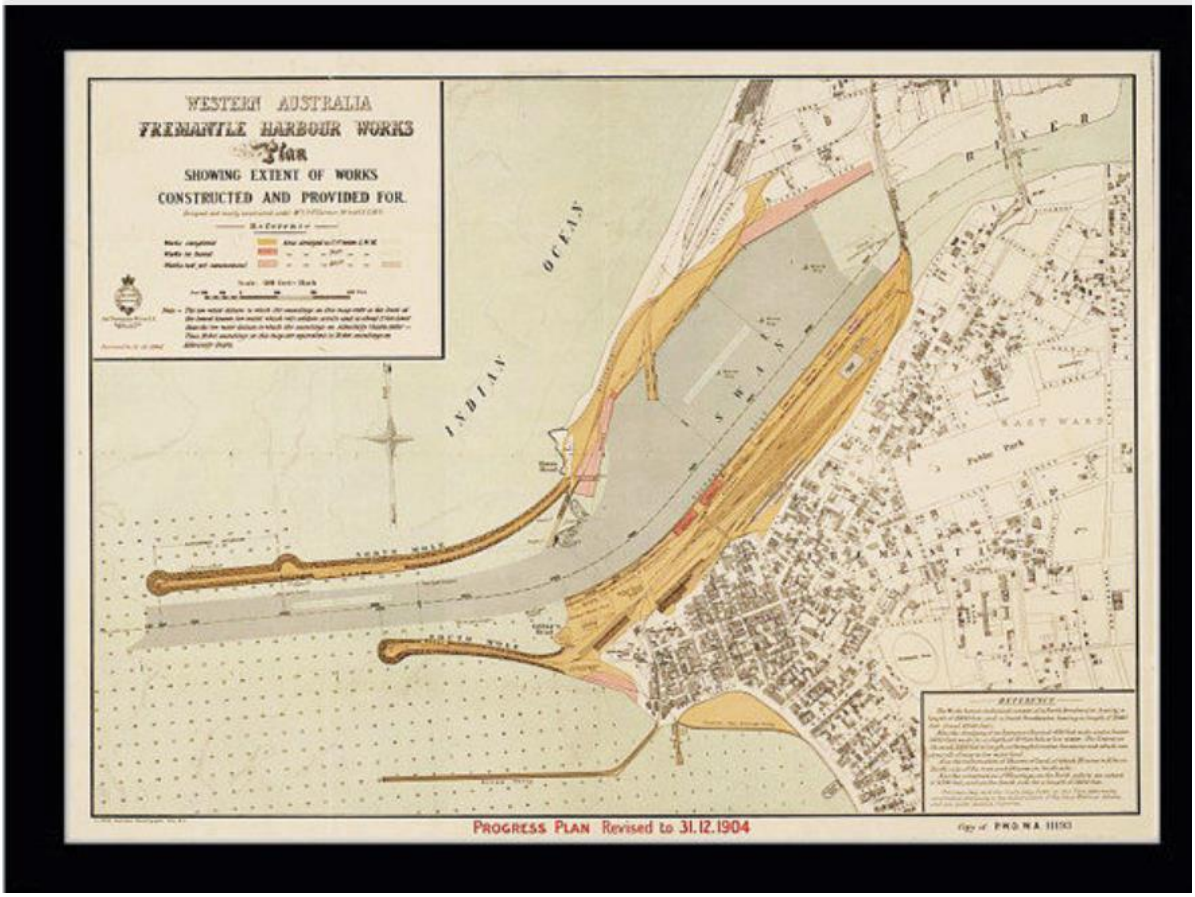

Figure 15 Plan of the Harbour 1894 (State Library of Western Australia).

C Y O'Conner accepted an offer for the position as Engineer-in-Chief for Western Australia in 1891 at a time when the colony was heading towards a major public works program.

O'Connor was able to convince the Government that a river mouth harbour was the best option for Fremantle (Figure 15). The design and construction of the harbour at Fremantle, commenced in 1892, was C.Y. O'Connor's first major public works project.

It was a huge undertaking, involving blasting to clear away the rocky bar that had, until then, blocked the entrance to the Swan River. The first stage of Fremantle Harbour Works began with a ceremony in which the Governor's wife, Lady Robinson, tilted the first truckload of rubble for the North Mole.

Dredging was required to deepen the harbour (Figure 16); twin breakwaters (North and South Moles) were constructed and wharves were built the Inner Harbour at Fremantle was officially opened on 4 May 1897 (Figure 17). When the steamer Sultan with Lady Forrest at the wheel was the first ship to enter the partly built port.

The North Mole was extended almost immediately after completion and on a number of occasions since, the most recent being in 1989 (Figure 18), to allow for the addition of an entrance into the Rous Head harbour that was being constructed. Situated on the western end of the mole is a lighthouse this shone with green light but was changed to red after it became necessary to alter the white light on the South Mole to green.

Figure 16 Harbour Mouth dredging with *Black Swan* and a Priestman Dredge c1895 (Fremantle Library).

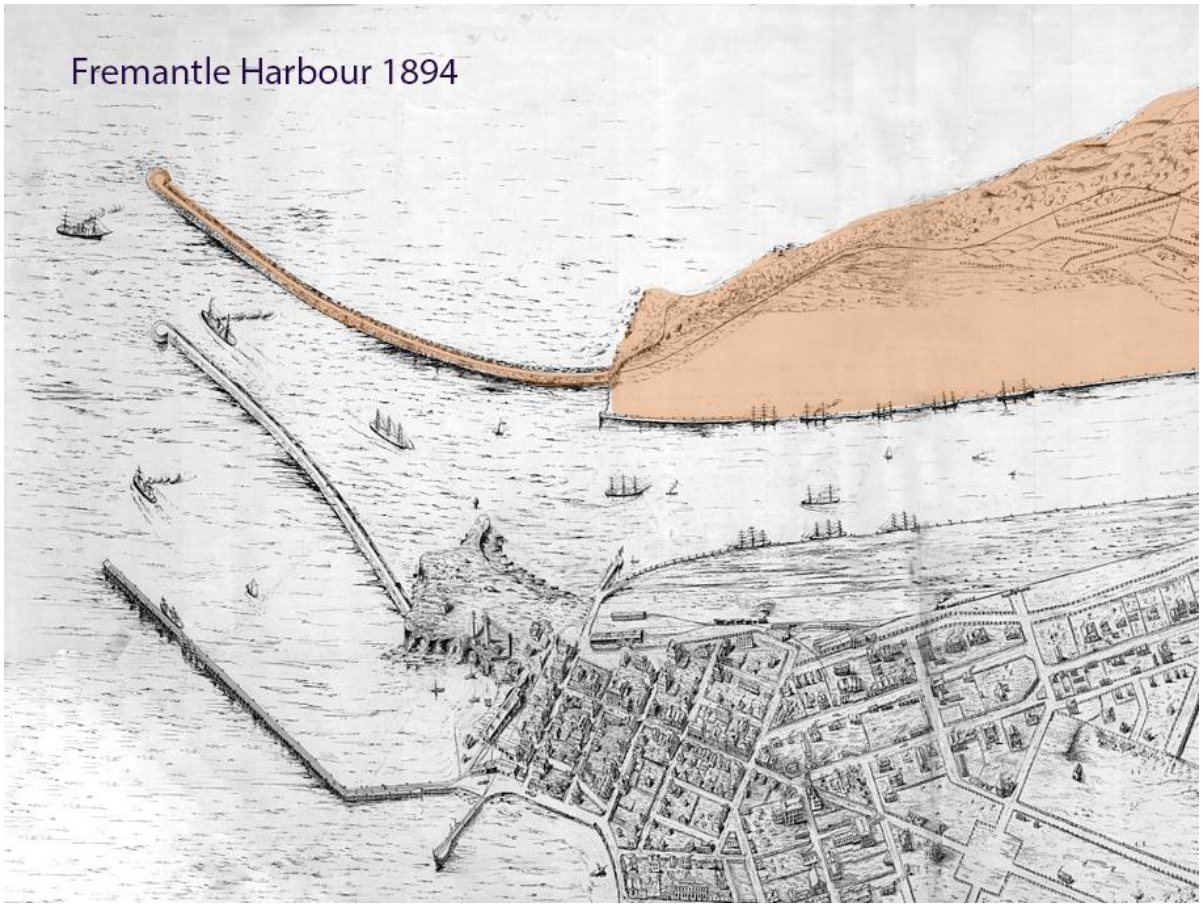

Figure 17 Fremantle Harbour 1894 (Fremantle Library).

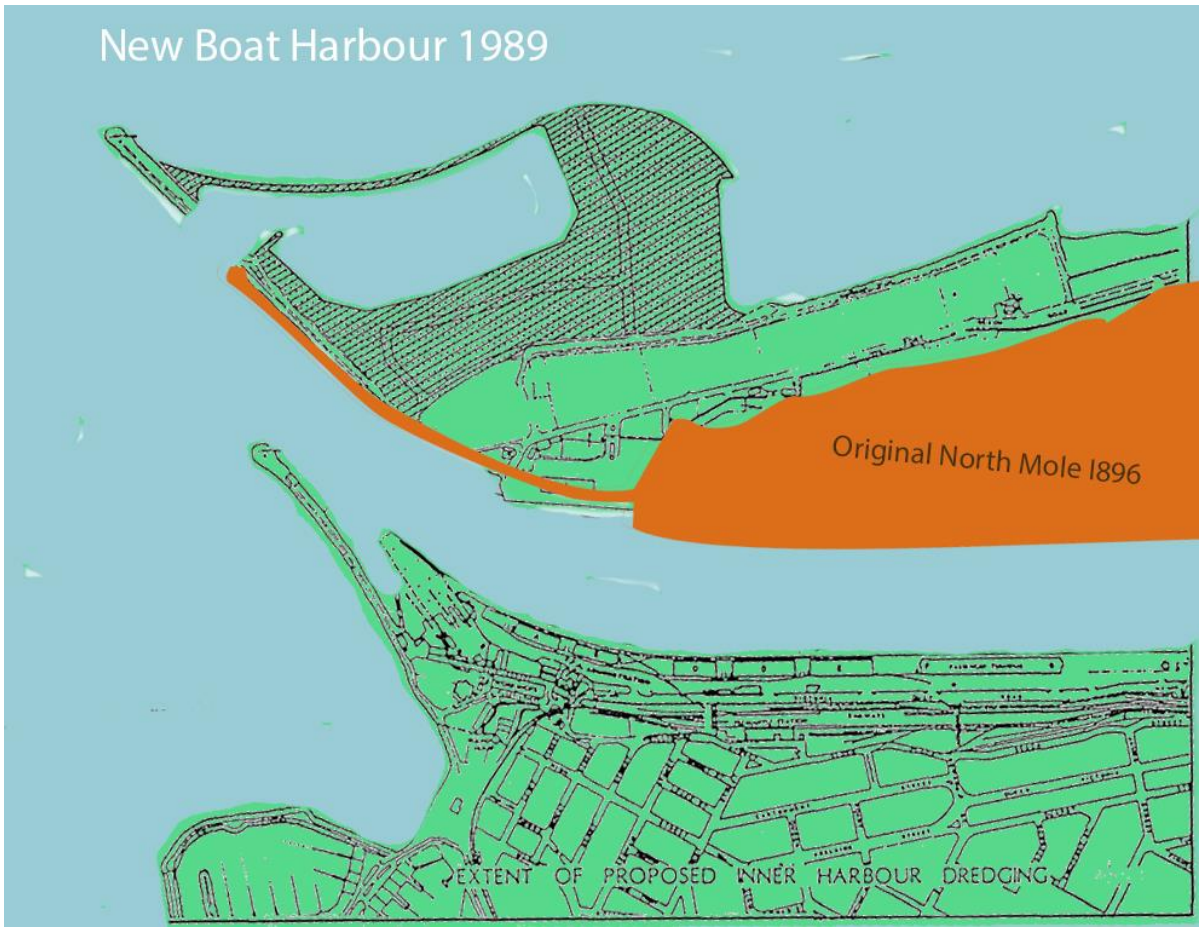

Figure 18 New Boat Harbour 1889 (State Library of Western Australia).

THE NORTH MOLE WRECKS

1. BLACK SWAN DREDGE (1892-1911)

Steam driven Bucket Ladder Dredge, 18 buckets, could dredge to 9 feet (Figure 19). Came out to WA in 1872 in sections was assembled and worked by convict labour. Worked with Priestman dredge on bar removal and narrowing Fremantle Harbour entrance. 1887 repaired, iron bottom replaced with jarrah and bucket ladder increased from 18 to 22 buckets, could dredge 15 ft.

Relaunched 1888 and renamed *Black Swan*, dredged Perth Port. Worked Canning Reach and 'Convict Fence' 1892-96. Perth Esplanade and Barrack St East reclamation works 1900-1911.Scuttled 1911 with other plant outside North Mole.

Figure 19 *Black Swan* at Fremantle decorated for Duke and Duchess Royal visit in July 1901 (Battye Library 230481PD).

2. TORRENS DREDGE (1877 -1926)

Originally built in 1877 as a Steam Powered Dredge by W. Simons & Co. Renfrew, Scotland. 135 tons with round stern, clincher iron built with 1 deck, two masts (Figure 20). For South Australian Co, Pt Adelaide, thence Melbourne Harbour Trust Feb. 1897 McIlwraith, McEacharn & Co. and converted to cargo. Transported to Fremantle in 1904 and used as transport and Tug by North Coast Shipping Company Ltd.

On 9 June 1926 when of no further use, *Torrens* was towed outside Fremantle Harbour and scuttled off the North Mole. It was reported that after the removal of the engines the Torrens was to be moored at Crawley Bay in the Swan River for the use of the Sea Scouts at Pelican Point. It is not known whether this ever happened, or whether it was taken away immediately for scuttling.

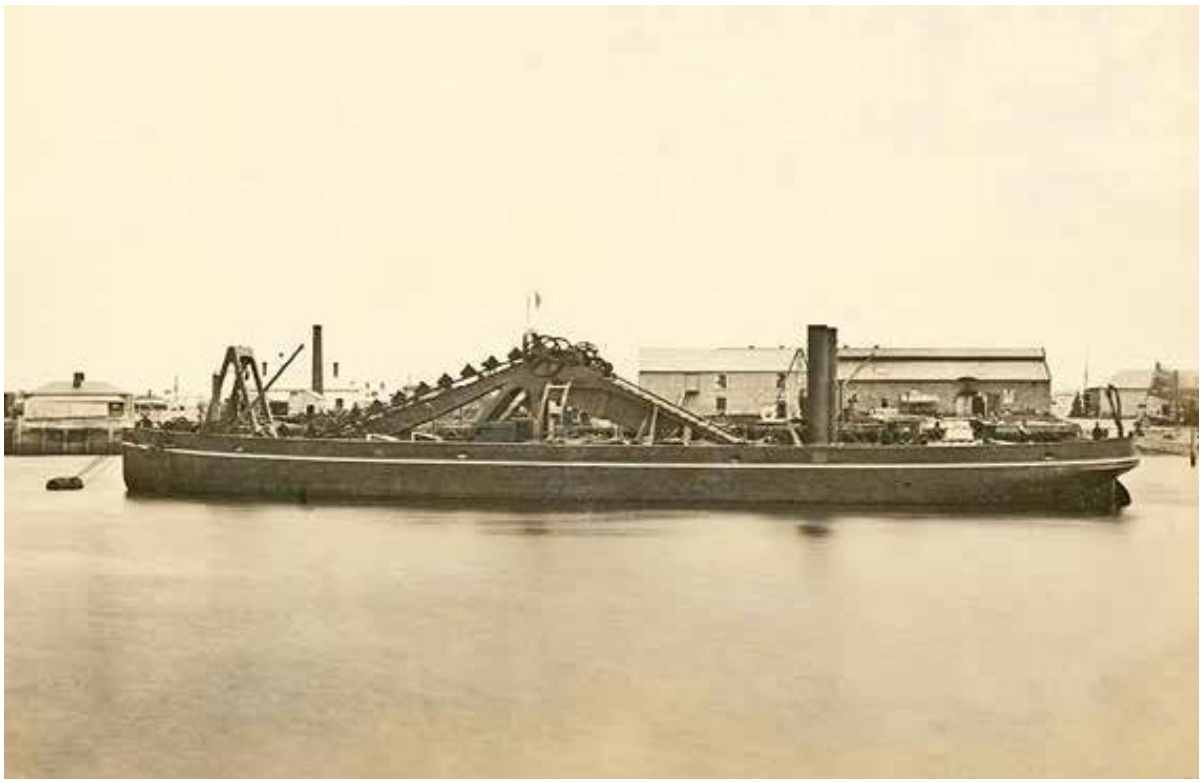

Figure 20 The dredge *Torrens* at Adelaide (photo: State Library of South Australia).

3. PS GAREENUP (1893-1923)

Originally built as a Paddle Steamer in Jarrah timber by W and S Lawrence, Bazaar Terrace, Perth. 84 tons with length 29.3m (Figure 21), owned by Randell, Knight and Company.

The steamer operated in the Swan River as a passenger ferry carrying passengers between Perth and Fremantle and on picnics. Around 1906 the vessel was stripped down and converted to a lighter and used in Fremantle Harbour. On 21 August 1923 the steam tug *Euro* was returning to harbour after taking out the Dutch steamer *Tjikandi*. The *Gareenup*, under the command of H. Dodd with a crew of six, was moored alongside the 5247ton Swedish ship

Yangaren, and as the tug made towards its berth at F Shed it struck the lighter on the starboard bow and sank quickly.

A wire hawser was run around her and a powerful tug raised the hulk from the bottom sufficiently to permit of her being dragged clear of the north mole, and there allowed to go again to the bottom close by the remains of another veteran, Hume… (The Daily News, 26 July 1930: 5c).

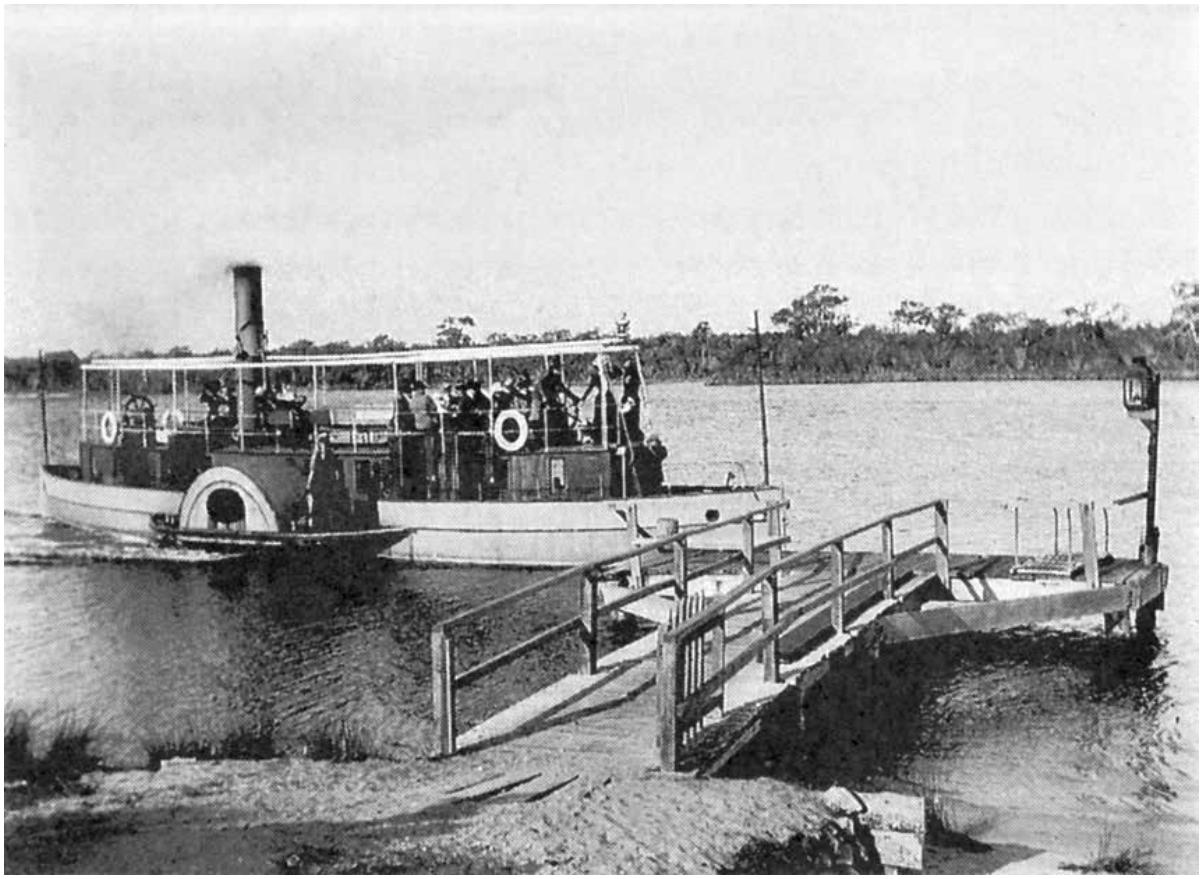

Figure 21 *Gareenup* as a Passenger Ferry in the Swan River (State Library of Western Australia).

4. NORTH MOLE BARGE (1894-c1928)

After the first Priestman Dredge was sunk at Fremantle Long Jetty in1893 another was imported in parts, assembled and launched in 1894. This new steam driven grab bucket dredge continued work in the Swan and Fremantle harbour until two new Priestman dredges on barges were built at State Implement works and launched in April 1928 and commenced work dredging channels at the Causeway, Perth (Figure 22). It was possibly around this time Priestman Dredge was stripped and sunk at North Mole.

Now laying 180 m off the North Mole the Barge initially lay 200m to the southeast of the original position, which is now marked by an incinerator, built on reclaimed land. The Barge was moved in 1988 by request of the WA Maritime Museum and divers to preserve this popular diving location (Figure 23).

Figure 22 Steam powered Grab Crane Dredge operating in Fremantle Harbour 1924 State Library of Western Australia).

Figure 23 The *North Mole Barge* raised by the *Pelican* and moving to new site (West Australian Museum).

WRECKS OF NORTH MOLE: SUMMARY

Most of the Wrecks off North Mole now lay under land. Most of these wrecks now lay under the new extensions to the harbour in 1989, except for the relocated ‘Barge’ all other Barges and Dredges scuttled off the original North Mole will probably be never seen again?

In 1932 The Federal Government enacted legislation to control dumping at sea and an area SW of Rottnest (Rottnest Graveyard) was chosen as the new site for all unwanted vessels.

ROTTNEST ISLAND UNDERWATER HERITAGE TRAILS

By Marcel Teschendorff

On 20-23 September 2019 and the weekend of 6-7 March 2020 MAAWA members of the travelled to Rottnest Island for the purpose of cleaning and assessing the condition of interpretive underwater wreck trail plaques placed by the Maritime Museum of WA and the Rottnest Island Authority and the previously detailed survey and recording of the Salt Works site. The following report provides a brief overview of the work completed relating to the underwater heritage trail.

In general, the underwater heritage trail is in good condition. None of the signs placed by the Maritime Museum of WA and the Rottnest Island Authority are illegible. There is, however, evidence of degradation and some fading of the text on all of the interpretive plaques. This is likely the result of general weathering and abrasion from repeated cleaning. All the plinths placed by the Museum are structurally intact and should remain functional for the foreseeable future.

The majority of the signage placed by CALM, on the other hand, is severely degraded and many of these signs have become unreadable or are barely readable.

Wrecks visited by MAAWA members during Sept 2019 / March 2020 include:

- *Miraflores*
- *City of York*
- *Denton Holme*
- *S. S. Macedon*
- *Gem*
- *Janet*
- *Transit*
- *Lady Elizabeth*
- *Raven*
- *Shark*
- *Uribes*

At all the plinths visited during the March 2020 trip, coral and seaweed had largely overgrown the interpretive plaques. Continued cleaning at 6-month intervals is recommended to ensure the text remains readable for visitors. Selected images of the cleaning of the underwater heritage trail are featured below (Figure 24-29). In addition to cleaning the shipwreck trail MAAWA members also documented the unidentified site at Salmon bay (Figure 30-32) and cleaned the snorkel trails (Figure 33 and 34).

LADY ELIZABETH

GPS location: S 32° 01.082' E 115° 32.950'

Figure 24 *Lady Elizabeth* plaque after cleaning (MAAWA, 2019).

Figure 25 *Lady Elizabeth* plaque after cleaning (MAAWA, 2020).

DENTON HOLME

S 31° 59.169' E 115° 33.402'

Figure 26 *Denton Holme* plaque after cleaning (MAAWA, 2020).

RAVEN

GPS position S 32° 01.197' E 115° 33.196'

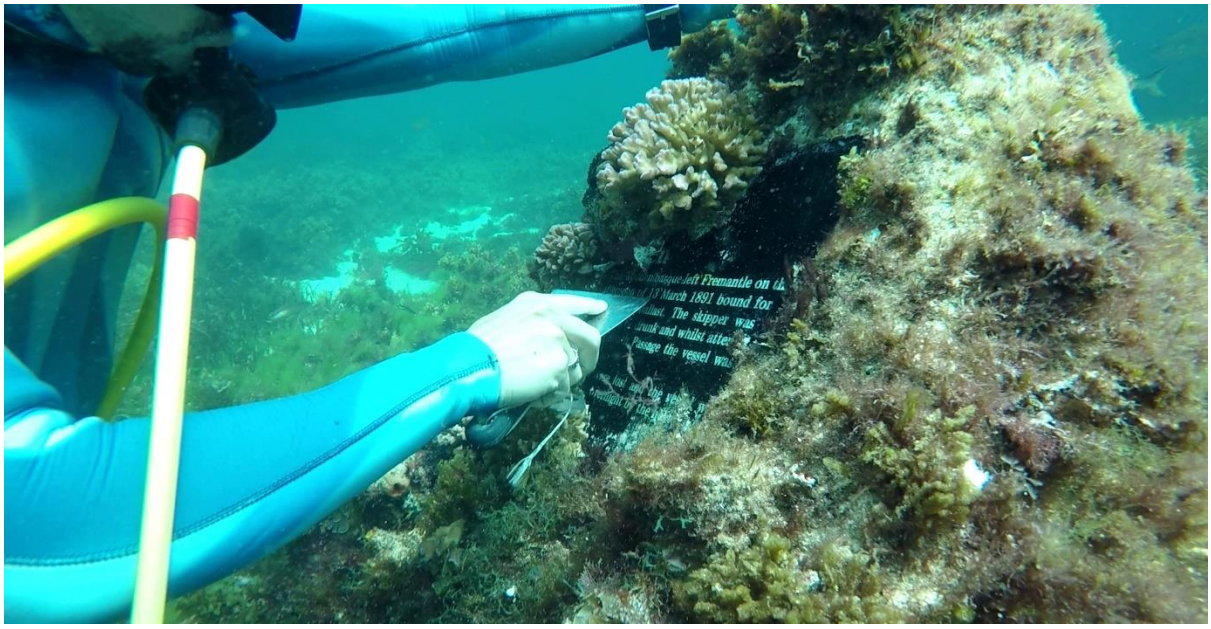

Figure 27 *Raven* plaque after cleaning. Note the build-up of hard coral over portions of the text (MAAWA, 2020).

S.S. MACEDON

GPS position: S 31° 59.202' E 115° 33.423'

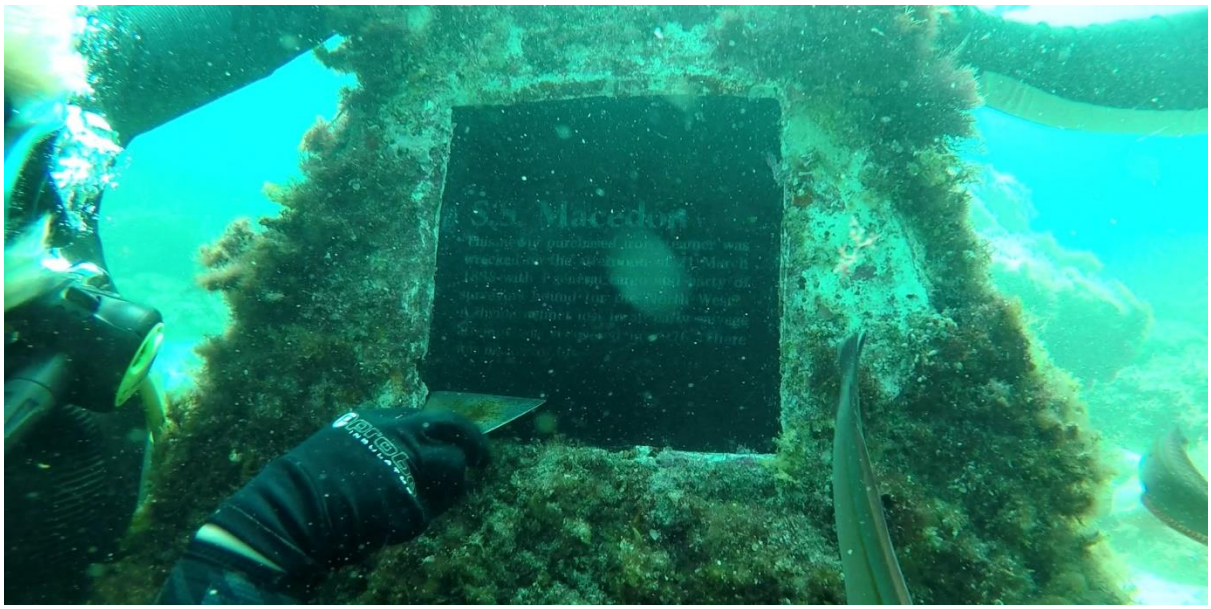

Figure 28 *Macedon* plaque after cleaning (MAAWA, 2020).

CITY OF YORK

GPS position: 31°59.649' S 115°29.3394' E.

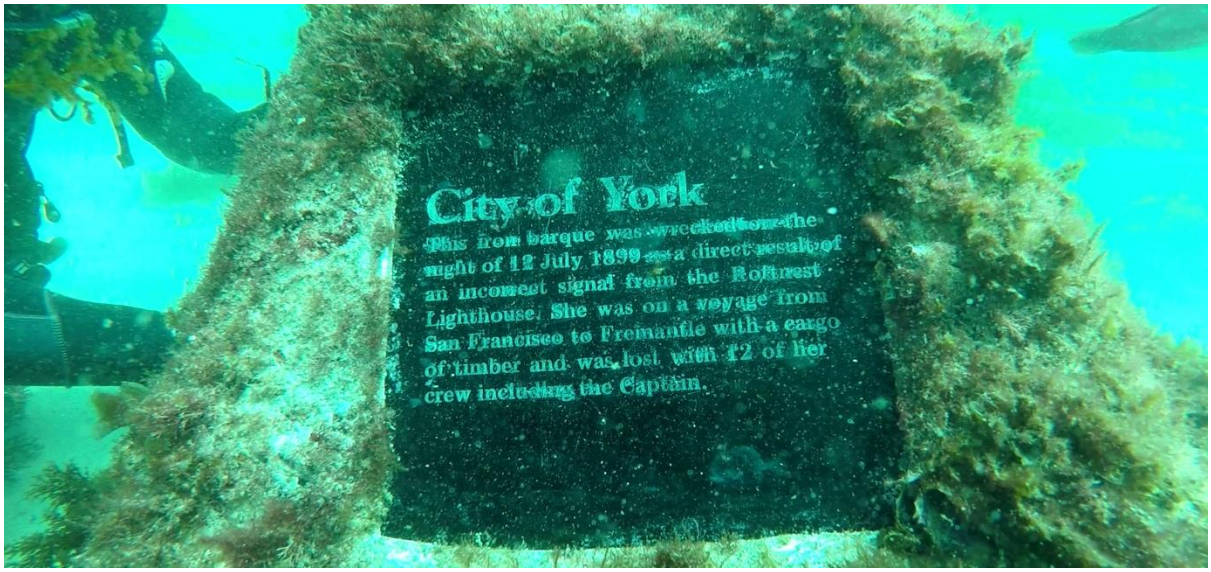

Figure 29 *City of York* plaque after cleaning (MAAWA, 2020).

SALMON BAY UNIDENTIFIED SITE

S 32° 01.774' E 115° 30.173'

The site is located in deeper water around 3.5km off Salmon Bay. The site has very little visible wreckage on the small limestone reef besides a boiler of good condition, a propeller and shaft, and two unknown pieces of wreckage laying north east of the boiler. MAAWA visited the wreck sites in 2015 and again in 2020. As can be seen from the images below, the boiler has fallen onto its side, possibly the effect of strong currents.

Figure 30 Salmon Bay Unidentified Site 2015 (MAAWA, 2015).

Figure 31 Salmon Bay unidentified site 2020 (MAAWA, 2020).

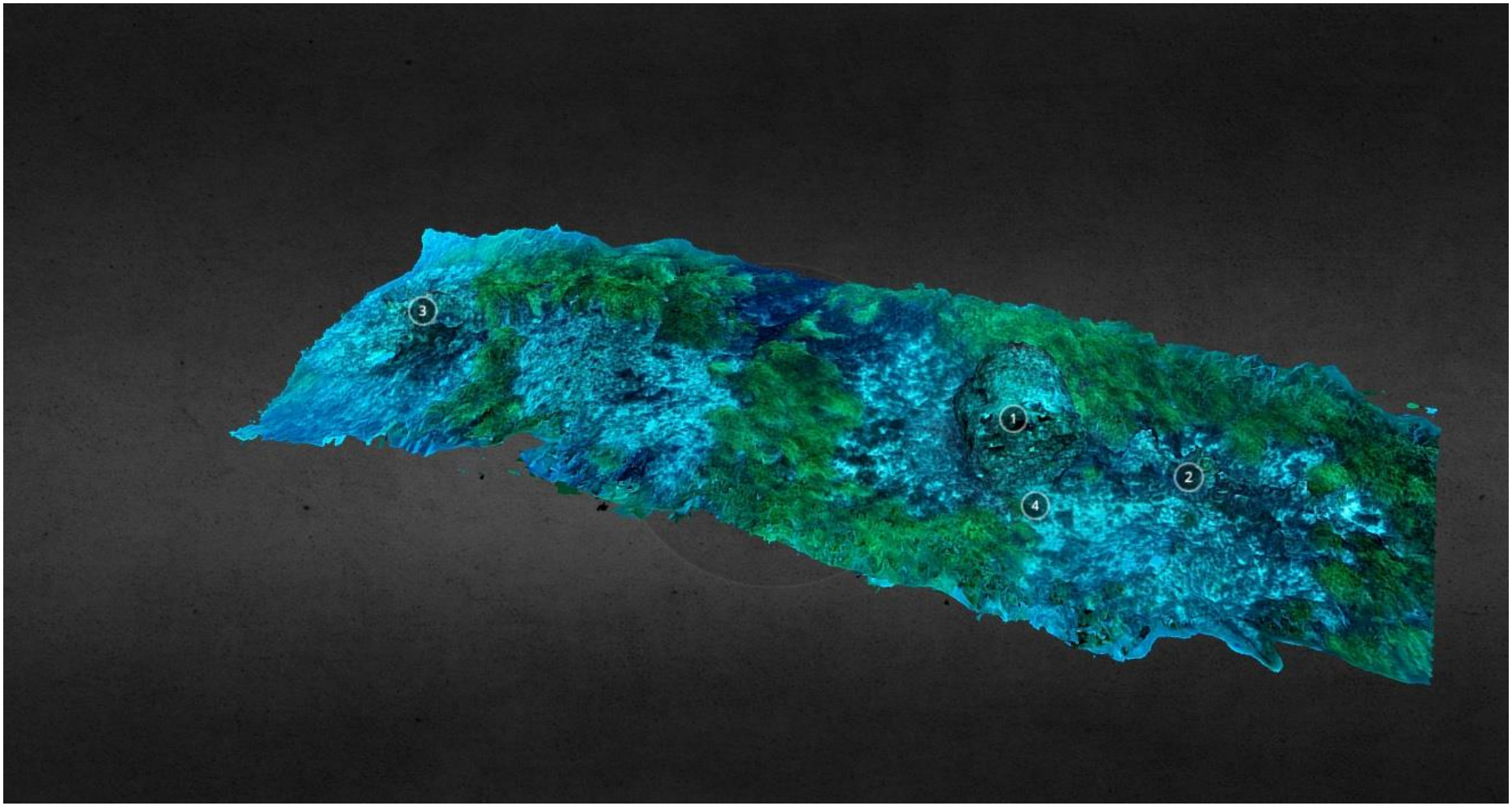

Figure 32 3D model of Salmon Bay Unidentified wreck. 1. Boiler, 2. Unidentified wreckage/machinery, 3. Propeller, 4. 2m scale bar (David Jackson, 2020).

SNORKEL TRAILS

Figure 33 Snorkelers need to hold their breath to access the signage

MAAWA members who attended the trip in March 2020 and assisted with the cleaning of snorkel trail reiterated observations of members from previous trips: the need for the replacement of interpretive signs, the difficulty of diving to read them at depth, their lack of visibility, and the potential danger of getting stuck in the hand holds while reading them.

We suggest the use of waterproof information cards with an elastic wrist attachment, that would match with corresponding trail points. A new set of numbered buoys, corresponding to the information cards and preferably reaching the surface at each location, would work well. This approach has been successful on Magnetic Island.

For more information, refer to: http://www.whatsonmagneticisland.com.au/ (under snorkel trails).

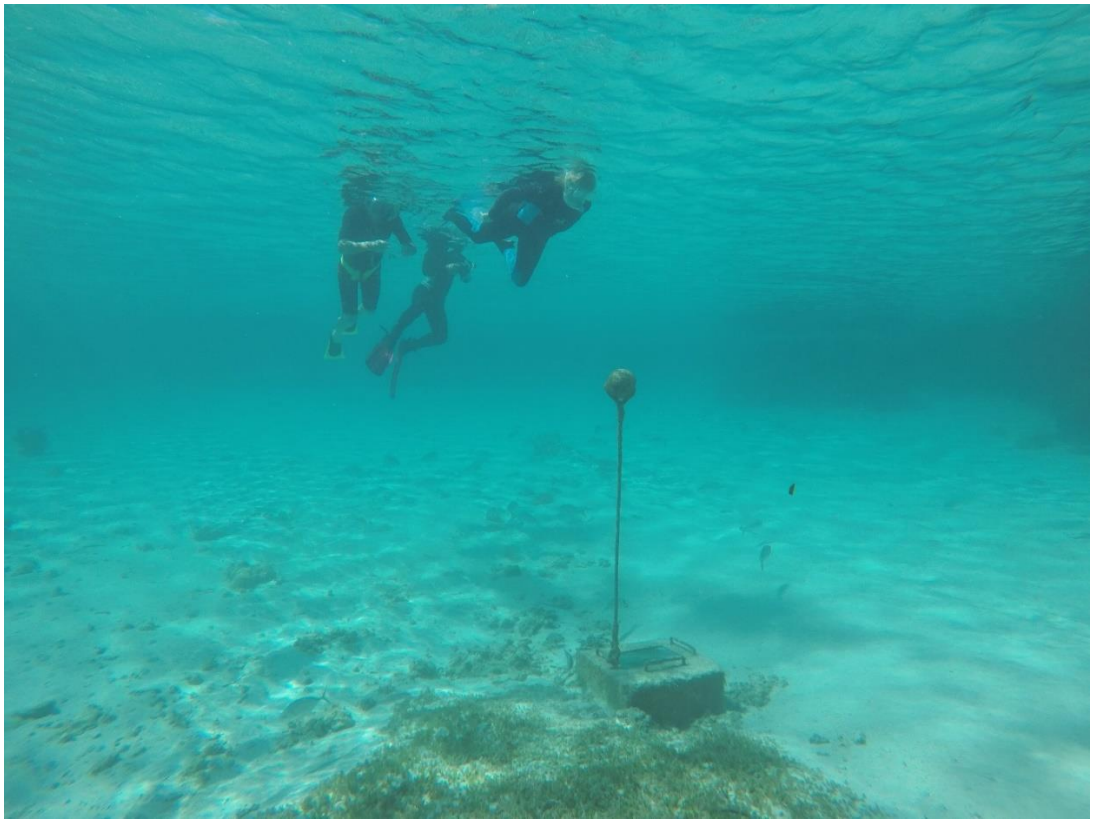

Figure 34 Signage can be difficult to see from the surface and is too deep for some people to safely access (MAAWA, 2019).

CROWN OF ENGLAND

By David Jackson

In September 2020, myself and my partner Jacqui managed to spend a few nights in the area around Whim Creek and the old townsite of Balla Balla where the Whim Well Copper Mine operated in the late 1800's until the mid-1900's. Offshore, near Depuch Island, we managed to visit the *Crown of England* wreck that was lost at anchor in 1912 with its cargo of copper from the mine (Figure 35).

Figure 35 Drone imagery of the *Crown of England* wreck site (David Jackson, 2020).

Crown of England was lost in an intense cyclone in March 1912. The same cyclone that claimed 5 vessels anchored off Depuch Island for the Whim Well Copper mine and also the SS Koombana, one of Australia's longest standing maritime mysteries, lost without a trace off the coast between Port Hedland and Broome (Figure 36).

Figure 36 Coastline near the *Crown of England* wreck site (David Jackson, 2020).

Crown of England went aground in the dark with its anchors straining against the 100 knot winds of the cyclone towards a lee shore of rocks and reef. The vessel lost almost half of its crew, six of which were buried on the shore near the site of the wreck. The site is dominated by its huge masts laid out in deeper water; it's sobering to dive amongst the mast sections that the stricken crew were lashed to during the cyclone only moments before the vessel began to break apart. Also, to the north of the site is one of its anchors (Figure 37), still set and holding with cables attached and leading to the bow of the wrecked ship.

HOW THE CROWN OF ENGLAND WAS LOST

Daily Commercial News and Shipping List (Sydney, NSW: 1891 - 1954), Thursday 28 March 1912, page 4:

> "Further advices relative to the loss of the Norwegian ship *Crown of England* have been received. It seems that she struck Depuch Island at 11 o'clock on the Wednesday night during the height of the 'willy-willy. All night the men had been in the rigging; but they took to the rail of the main deck. They had barely left, the rigging when the three masts went over the sides. At the same time the vessel broke in three pieces, the forecastle and poop separating from the main part of the ship. The men were advised by the captain to strip, but they did not seem to like the idea and kept their clothes on. Some were already washed off, so the remainder, with the exception of one, jumped in the sea and swam to the shore. The captain mustered the men. Eight were missing. Their bodies were found between the point where the vessel was wrecked and the north point; but the discoverers were so exhausted that they could do nothing more than take them higher up the beach, out of the way of the sea."

Figure 37 *Crown of England* anchor (David Jackson, 2020).

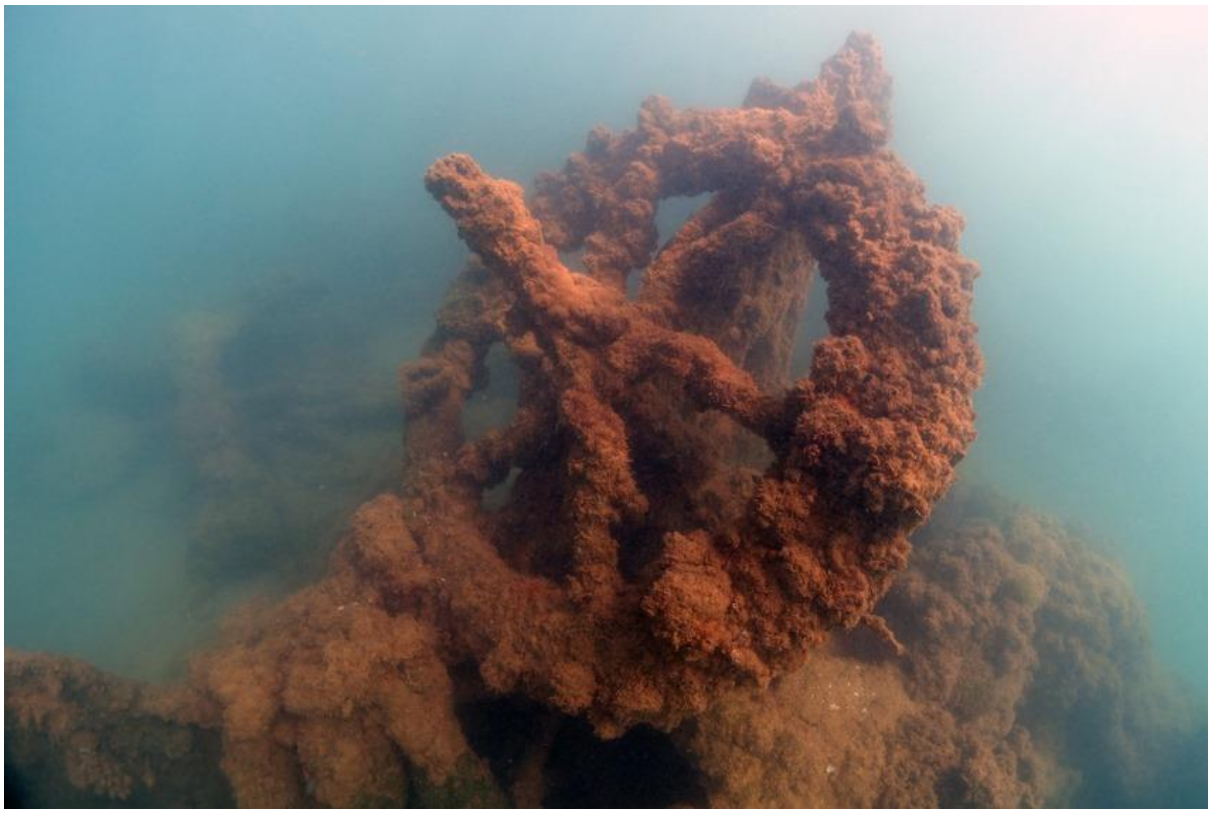

Figure 38 *Crown of England* wreckage (David Jackson, 2020).

THE MARITIME ARCHAEOLOGICAL ASSOCIATION OF W.A.

New office bearers elected November 2019
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