

Fromante Outer Harbour  
Cockburn Sound  
Boom Defence West of Channel  
Dolphins N°59 and N°60.  
1 Inch = 1 Foot ①

Note  
They are to be drawn to scale as well  
indicate a scale of 1" = 100 feet  
Rings, beams and braces to be number  
ed to receive into  
Billings and Bolard for to be checked etc etc.  
All bolts to be 1" dia except those marked  
Other jobs which are to be 1" dia.

Drawing N° 7

## Cockburn Sound's World War II anti-submarine boom net Historical background and site inspections



Dolphin N°60 ⑤

General Plan ①

Matt Carter and Ross Anderson

As Constructed

Report—Department of Maritime Archaeology, Western Australian Museum

No. 252 March 2010

J. Stevenson Young 28/11/63  
Explosive for Dolphins and Booms

P.W.D. WA

304.31

P.W.D. WA

29706

**Contents**

**Acknowledgements**

**Introduction**

**Project aims and methodology**

**Historical background**

**Construction of the World War II Cockburn Sound naval base and boom defences**

**Demolition and salvage**

**Dolphin No.60**

**2010 site inspections**

**Conclusions**

**Significance**

**Statement of cultural significance**

**Legal protection**

**Recommendations**

**References**

**Appendix 1 – GPS Positions**

### **Acknowledgements**

Thanks to Jeremy Green, Department of Maritime Archaeology for geo-referencing the Public Works Department plans.

Thanks to Joel Gilman and Kelly Fleming at the Heritage Council of Western Australia for assistance with legal aspects of the protection of the Dolphin No.60 site.

Thanks to Mr Earle Seubert, Historian and Secretary, Friends of Woodman Point for providing valuable information regarding the history and demolition of the boom net and Woodman Point sites. Also to Mr Gary Marsh (Friends of Woodman Point) and Mr Matthew Hayes (Operations Manager, Woodman Point Recreation Camp).

Matt Carter thanks the Our World Underwater Scholarship Society (OWUSS) and Rolex for enabling him to assist the WA Museum with this project.

Thanks to Marie-Amande Coignard for assistance with the diving inspections.

Thanks to Timothy Wilson for the cover design.

Cover images

Public Works Department Plan 29706 Drawing No.7 Dolphin No.60 (National Archives of Australia)

Diver inspecting Dolphin No.60 site (Patrick Baker/ WA Museum)

Type 'A' anti-boat hurdles (Australian War Memorial)

## Introduction

The Cockburn Sound anti-submarine boom defences were a major engineering project undertaken during World War II to protect the approaches to Cockburn Sound, and the northern boom defences spanned 9.37 km of seabed. In 1964 the timber pylons and dolphins were demolished with explosives and the steel nets were cut and dropped onto the seabed (Jeffery 1988). There are still visible above-water remains of timber Dolphin No. 60 situated northeast of Garden Island, and underwater remains. This report summarises recent historical research, underwater archaeological surveys and legal protection issues, and makes recommendations for future management and protection of the site.

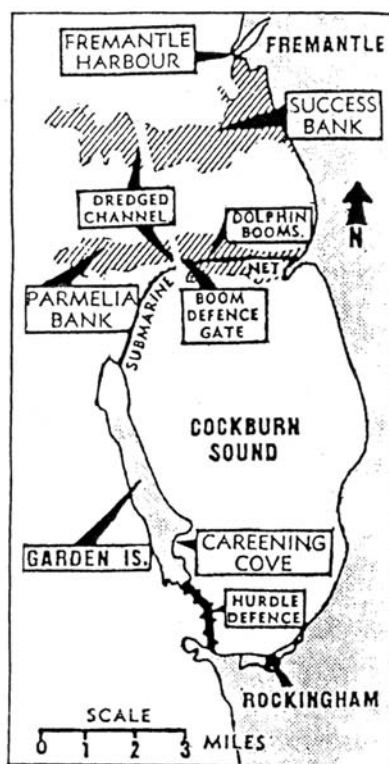


Figure 1: Map of area and Cockburn Sound boom defences (Jeffery 1988)

## Project aims and methodology

The aims of this project were to:

1. Collate background history and resources to determine the location of any underwater remains;
2. Use GIS and geo-referenced historical plans and aerial photographs to determine the location of any potential underwater remains;
3. Identify and inspect underwater remains of the net and position fix and record the sites;
4. Summarise and publish the results with recommendations for future site management.

## Historical background

World War II was an international conflict involving most of the world's developed nations, and fought over—and under—all of the world's oceans. The globalisation of the war front in various theatres saw a corresponding globalisation of allied defence strategy, incorporating similar methods and materials to protect strategic locations such as ports and major cities.

Submarine warfare was integral to naval strategy and submarines were operated by all of the major powers. Submarines were extremely important not just for torpedoing ships, but for coastal reconnaissance, gathering intelligence, mine-laying in enemy coastal waters, and dropping off and picking up agents and conducting other special missions in enemy waters. The construction of anti-submarine boom nets to protect vulnerable ports and harbours was therefore a necessary and common undertaking in World War II. When war broke out in the Pacific Ocean theatre, the threat of direct attack by submarines on Australian ports and the vital shipping which frequented them became a reality. The construction of anti-submarine boom nets required considerable investment as these major engineering works involved much labour, resources and capital in a time when shortages of each were widespread. Their operation and maintenance was also costly and specialised ships (Boom Working Vessels (BWVs)) were used as boom net tenders along with gangs of riggers and sentries. Boom defences were constructed in the major harbours of Darwin, Townsville, Brisbane, Sydney, Albany and Fremantle as an integral part of what were often complex and interlinked defence systems which included other anti-shipping, anti-submarine and anti-aircraft defences including indicator loops, batteries, anti-aircraft guns and radar stations. A boom net was also constructed at Manton Dam—Darwin's main water supply—to counter the threat of aerial torpedo attacks.

Between 1939 and 1945 German and Japanese submarines attacked Allied and neutral shipping in the Indian Ocean, and in the period January-March 1944 more Allied ships were sunk in the Indian Ocean than in the Atlantic Ocean (Peet 1996: 293). When Japanese torpedo bombers destroyed the battleships HMS *Prince of Wales* and HMS *Repulse* with 840 lives on 10 December 1941, it was a severe blow to British strength and morale in the region. The loss of the only two major units of the British Eastern Fleet effectively made Singapore a land base. On 15 February 1942 Singapore—'the Gibraltar of the East' and last bastion of British colonial rule in Southeast Asia—surrendered to Japanese forces.

From January 1942 the British Admiralty signalled to Australia that Sydney and Fremantle were favoured locations for establishing naval bases for their Eastern Fleet (Peet 2008: 1). By January 1941 anti-submarine and anti-torpedo boom nets had been placed across the entrance to Fremantle Harbour, and an indicator loop laid from Swanbourne to Rottneest Island (Peet 1996: 293). For the duration of the war Fremantle became an important USA, British and Dutch

submarine base, and 170 American, British and Dutch submarines undertook 416 patrols from Fremantle. The Fremantle boom defence net was a buoyed wire mesh net with a central gate opened by a winch on the North Mole, and two buildings were constructed on the western end of Victoria Quay for the naval boom defence operating unit (Heritage Council of WA 1999: 20). Additionally in 1944 the highly classified Allied Research Bureau also known as the Services Reconnaissance Department—the precursor to modern Special Operations Forces—established a top secret base in Careening Bay, Garden Island for training crews in covert operations behind enemy lines, including the operation of midget submarines and submersibles.

### **Construction of the World War II Cockburn Sound naval base and boom defences**

While submarines, aircraft carriers, merchant ships and battleships could access the security of Fremantle Harbour, the Garden Island naval base in Cockburn Sound was being expanded to cater for large ships up to the size of cruisers. This work involved three stages, dredging a shipping channel through the Parmelia and Success sandbanks and constructing defences spanning the northern and southern entrances of Cockburn Sound.

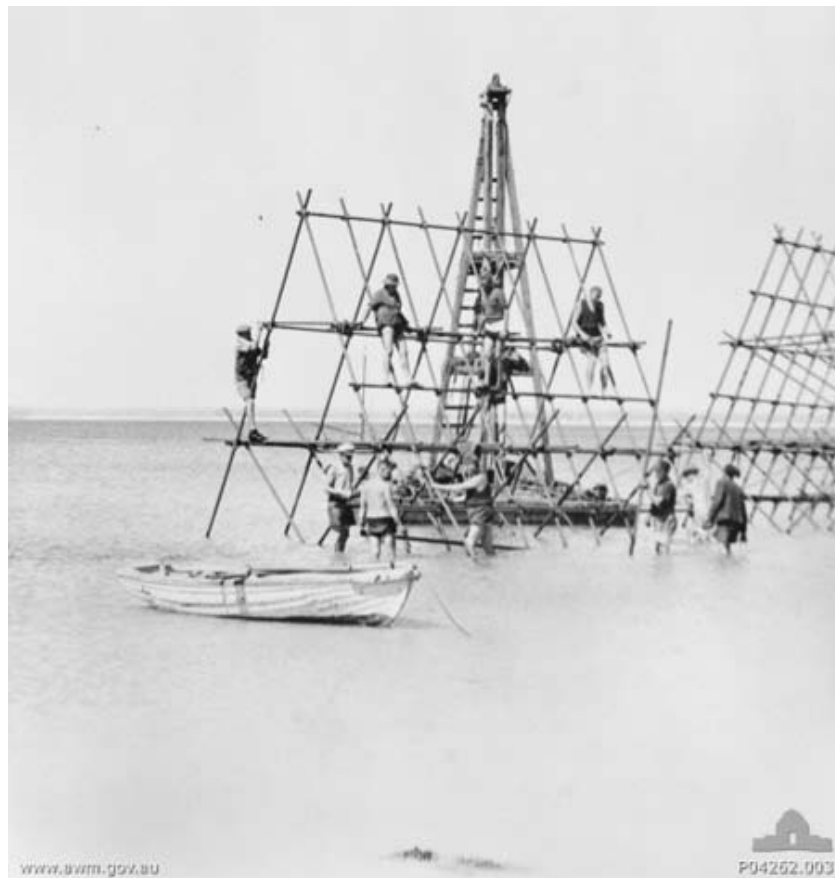


Figure 2: Type 'A' anti-boat scaffolding under construction in Cockburn Sound (Australian War Memorial P04262.003)

Five dredges were used throughout, four having to be brought across from Australia's east coast. The crews lived aboard and worked fourteen hour shifts (Jeffery 1988).

Construction of an anti-submarine boom defence at the northern approaches, and Type 'A' Anti-boat scaffolding (hurdle defence) across the southern approaches, in the approximate area of the modern causeway bridge linking Point Peron with Garden Island, commenced in November 1943. Among the component parts of the defensive structures were 'dolphins' – supports constructed out of groups of timber piles, ranging in number from four to fourteen, driven into the seabed and spaced approximately 100m apart. Depending on their location the dolphins were used either to support the steel mesh anti-submarine nets or Type 'A' Type anti-boat Scaffolding. Piles were made of Western Australian jarrah and driven to a depth of between 11-20 ft (3.4-6.0 m). Some of the jarrah piles were 'charred and tarred' to provide extra protection from marine borers. Installation of northern approaches piling was completed by April 1944, and an indicator loop was also laid 600 ft (183m) north of the anti-submarine boom net on Parmelia Bank west of the channel (Peet 2008: 1).

The anti-submarine netting was made of either three-foot (91cm) or three-foot six inches (106.2cm) diagonal mesh wire cable, supported by steel cylindrical floats and anchored to the seabed with concrete blocks. The installation of netting was completed in September 1944 (Peet 2008: 3-4).

In the case of the anti-submarine boom net at Darwin, this was originally constructed of eight-foot mesh wire cable following Admiralty specifications in 1940, but 'later, due to the threat of midget submarine and human torpedo attacks, the Admiralty ordered the size of the net mesh to be reduced to three feet' (Forster 2005: 8). This decision is likely to have been made as a result of sustained, successful attacks on British naval and merchant shipping in the Mediterranean by Italian frogmen using submersible assault craft including 'Maiale' human torpedoes (Anderson 2009).

The northern approach boom defences spanned 30731 feet (9370m) from Second Head, Garden Island along a boomerang shaped route corresponding to the southern edge of the shallows of the Parmelia Bank, finishing at the northern side of Woodman Point.







Figure 5: Type 'A' anti-boat scaffolding in Cockburn Sound (Australian War Memorial P04262.004)

The northern approaches boom defence was made up of six main sections of various construction:

- 1) 4431 ft (1350.6 m) of 'A' Type anti-boat Scaffolding extending from Second Head, Garden Island to Dolphin No. 60 on a bearing of 022° 28' 49";
- 2) 6369 ft (1941.3 m) of three-foot diagonal mesh anti-submarine net supported by floating steel buoys and anchored with concrete weights from Dolphin No. 60 to Dolphin No. 59 on a bearing of 022° 28' 49". Dolphin No. 59 was constructed out of six individual piles similar to Dolphin No. 50;
- 3) 2687 ft (819 m) of three-foot diagonal mesh anti-submarine net on a bearing of 040° 40' 03" from Dolphin No. 59 to Dolphin No. 50. It was supported at 297 ft (90.5m) intervals by intermediate Dolphins constructed of four piles each;
- 4) 4773 ft (1454.8 m) of three-foot diagonal mesh anti-submarine net on a bearing of 079° 08' 13" from Anchor Dolphin No. 50 to Dolphin No. 37. This section included a 1200 ft (365.8 m) gap between Gate Dolphins 40 and 41 in which the Boom Gate would operate however, the installation of the Gate was cancelled in December 1944. Each of these Gate Dolphins consisted of fourteen individual piles and in addition a 'Turning Back Dolphin' was

constructed out of ten piles 675 ft (205.7m) to the south of Dolphin No. 40 to hold the Boom Gate open;

- 5) 10,697 ft (3260.5 m) of three-foot diagonal mesh anti-submarine net on a bearing of 096° 58' 00" from Dolphin No. 37 to Dolphin No.1, supported at 297 ft (90.5m) intervals by intermediate Dolphins comprising of four piles each;
- 6) 1974 ft (601.7 m) of 'A' Type Anti-Boat Scaffolding covering the remaining distance of from Dolphin No 1 to Woodman Point on a bearing of 096° 58' 00" (Peet 2008).

After all of the materials and effort that went into the construction of the net it is interesting to find that the central component of the defences, the boom gate, was never actually installed. In December 1944 the British Admiral Lord Fraser flew into Perth and after inspecting the defences he declared that he thought they would never be used as Japan was then on the defensive. As a result, the boom gate, additional anti-aircraft gun emplacements and maintenance and repair facilities that had been planned for the defences were never completed (Jeffery 1988).

### **Demolition and salvage**

Following World War II both the southern approaches hurdle defences, and the northern approaches boom net defences fell into disrepair. The turning back dolphin appears to have been removed in 1954 for 'channel widening', while in November 1963 the Fremantle Harbour Trust contacted the navy with concerns about safety to navigation and deterioration of the structure. Two of the dolphins had washed ashore in winter storms, and teredo worm damage had weakened many of the remaining piles. Between March-April 1964 the Naval Officer in Charge of WA (NOCWA) organised the demolition of the structure using explosives and removed the remains to Woodman Point. In April 1964 the NOCWA reported that 'all dolphins in Cockburn Sound have been removed' (Peet 2008: 5). It appears that the remaining Dolphin No. 60 was left, being some distance from the shipping channel and the Navy not having the right explosive primers and detonators (Peet 2008: 5).

While there was discussion that the Navy might recover the floating boom nets, it appears that the buoys were removed, but most, if not all of the nets were abandoned on the seafloor, along with their concrete anchors. It is likely that the nets were not salvaged as they were corroded and covered in marine growth, and unable to be easily recycled or re-used for other purposes. There is reportedly a roll of anti-submarine netting sitting in a scrap metal yard in Bunbury (Seubert, E. pers. comm., 17/2/2010). This may have been spare netting for repairs or replacement, or the un-installed gate section.

The Type 'A' anti-boat scaffolding had some salvage value however and was removed shortly after the war. This salvage came with an unexpected bonus as the scaffolding was covered in thousands of mussels which were bottled and sold in Perth (Jeffrey 1988). The tubular scaffolding was purchased by a local company Ryan and Ryan who used it to build farm sheds. Such was the demand for these sheds that Ryan and Ryan had to move into a larger premises to keep up with demand (Seubert, E. pers. comm., 17/2/2010).

The marine growth and damage to the piles by marine borers meant that it was unlikely that the wood was able to be easily salvaged for re-use and the timbers were subsequently dumped or cut up for firewood. There is a dumping area on Woodman Point where three degraded timber piles and some corroded sections of steel net cable can still be seen today (see below).

### **Dolphin No. 60**



Figure 6: Timber pile structure off Garden Island since identified as Dolphin No. 60 in April 2007 after loss of timber platform bracing in a storm in 2006, view looking southeast. (Patrick Baker/ WA Museum)

In February 2007 the Fremantle Port Authority approached the WA Museum's Department of Maritime Archaeology (DMA) with concerns about deterioration to the timber piles off Garden Island, and the risk of the structure or piles breaking off in winter storms and becoming a navigation hazard. As the structure was constructed for defensive purposes in WWII the Fremantle Port Authority had initially approached the Department of Defence asking them to demolish what was believed to be their structure. The Department of Defence noted that the structure was outside the Commonwealth Naval Waters of Cockburn Sound and therefore no longer their responsibility but agreed to assist. Prior to demolition Defence requested advice from heritage consultants Environmental Resources Management Australia (ERM).

ERM's comparative analysis provided advice that other terrestrial components of the submarine boom net on Victoria Quay and on Garden Island are rated as having 'high significance', that no intact examples of submarine boom nets are known elsewhere in Australia, and that the Darwin boom net elements at East Arm are recognised as being historically important (ERM 2007: 10).

Though it was not physically examined, ERM assessed the Garden Island pile structure as having 'medium significance' and advised that removal of the remnant submarine boom pylon structure would not be considered a significant impact. They also noted that the structure may have State significance as it is within State Waters, and recommended Department of Defence consult the Western Australian Museum (ERM 2007).

In March 2007 the DMA undertook a site inspection of the timber pile structure. The structure is located at GPS position 32° 09.2106S and 115°40.7066E (GDA94) in 6.5m of water on a sandy seabed surrounded by seagrass beds, approximately 500m off the northeast end of Garden Island. The structure presently lies within a mussel farm aquaculture zone. Underwater elements of the structure include collapsed timber piles, cut off or collapsed pile stumps, collapsed timber platform bracing and the Type 'A' anti-boat hurdles made of steel scaffolding. In the resulting site inspection report some of the issues associated with the structure and a range of recommendations were presented (Anderson 2007).



Figure 7: Diver and piles of Dolphin No.60 underwater in April 2007. Note collapsed timber beams and piles on seabed (Patrick Baker/ WA Museum)

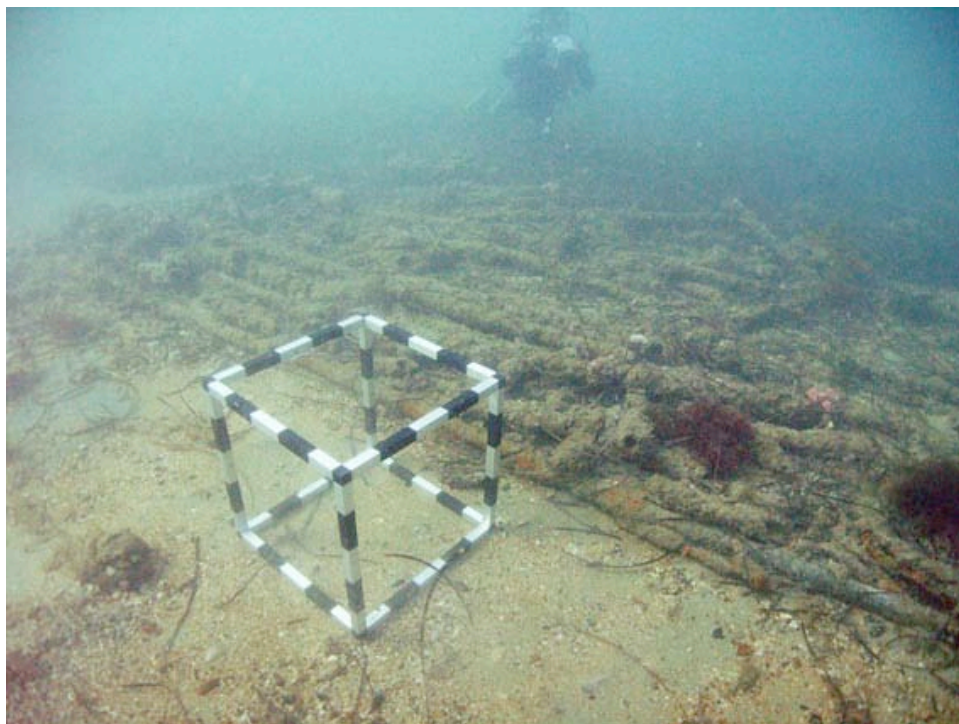


Figure 8: Collapsed Type 'A' anti-boat scaffolding on the seabed south of Dolphin No.60 (Patrick Baker/ WA Museum)

Following the DMA site inspection, in June 2007 Seaforce Marine Diving Services Pty Ltd were contracted by Fremantle Ports (on behalf of the Heritage Council of WA) to conduct a non-intrusive site survey on the remains of the 'Department of Defence Submarine Netting Pylons 0.5 miles WNW of Beacon Head, Garden Island'. Seaforce noted that the original supporting platform that joined the pylons was displaced by a storm in 2006 and since then the remaining four pylons had been left freestanding without mutual engineering support. Seaforce noted that the loss of the supporting platform had weakened the overall engineering of the pylons which they believed may accelerate failure. By May 2008 when the DMA next inspected the site, the south-east pile had collapsed to the seabed, leaving three standing piles still visible above water as at March 2010.



Figure 9: Dolphin No.60 structure in May 2008 after collapse of southeast pile, view looking west. (Patrick Baker/ WA Museum)

Meanwhile the Heritage Council of Western Australia commissioned a report by historian Lindsay Peet, the principal objective of which was to 'identify the existing piles and conserve them'. As a result Peet identified the structure as most likely being the remains of Dolphin Number 60 (Peet 2008: 6).

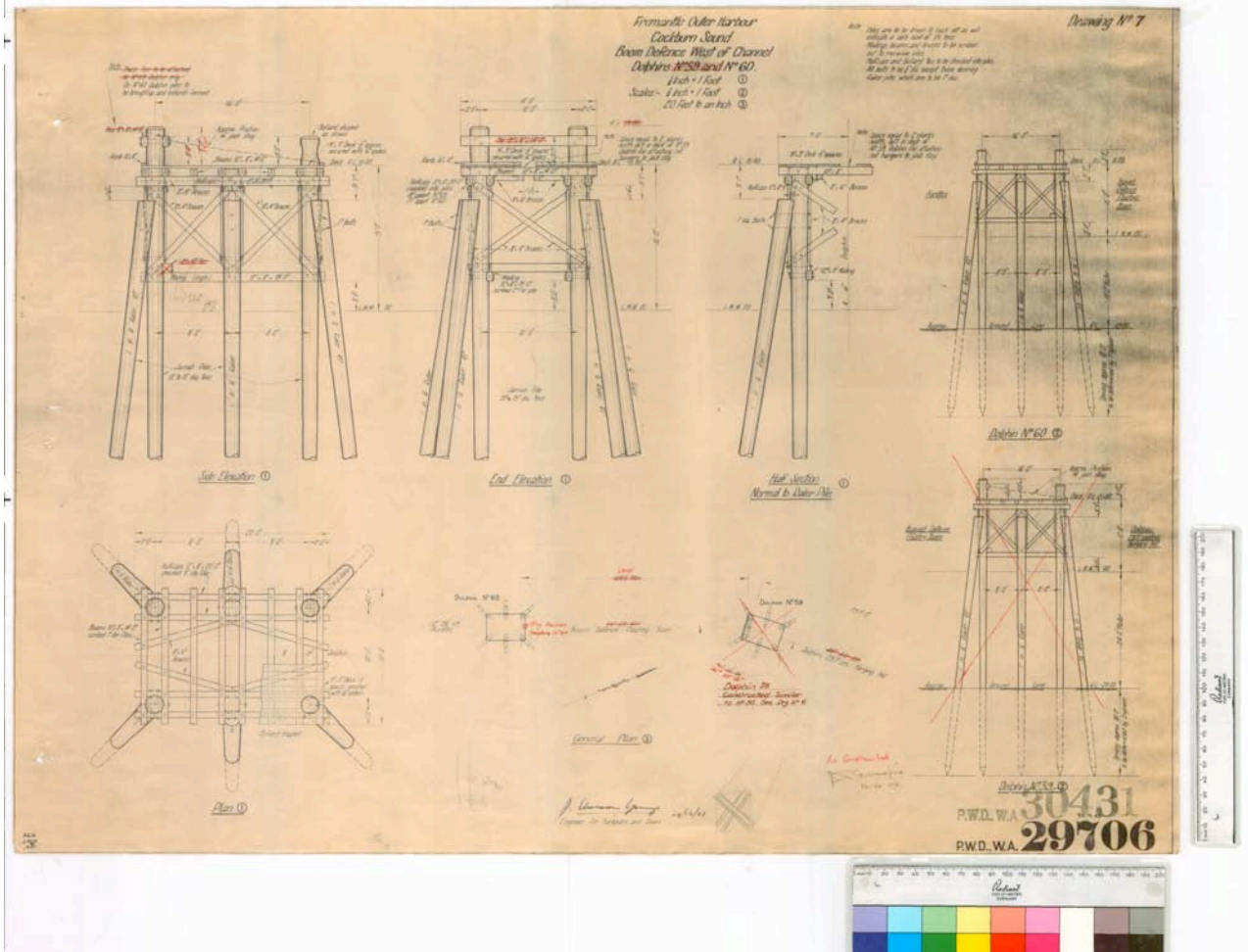


Figure 10: Public Works Department Plan 29706 of Dolphin No.59 and 60. Note 'No.59' has been crossed out and text added 'Dolphin 59 constructed similar to Dolphin 50 see Drawing No.6' (National Archives of Australia)

### 2010 site inspections

On Thursday the 4<sup>th</sup> and Friday the 5<sup>th</sup> February 2010 DMA staff inspected nine underwater sites in Cockburn Sound. Aerial photographs and Public Works Department plans were geo-referenced to provide GPS positions for targeted site inspection of key features. The survey aimed to investigate whether any of these features still existed on the seabed, and to document them. The features are described below with their GPS point prefix ASN (Anti-Submarine Net). The scale used in all the underwater photographs is a one metre cross-grid marked in 10cm increments.

#### ASN101

A linear feature of anti-submarine net visible on aerial photographs on the Parmelia Bank in 2.5-3m depth, east of the channel and near Woodman Point. Consists of a length of anti-submarine net with square mesh netting attached at either end to a thicker cable. This site extends for approximately 80 m on a sand

and seagrass bottom. Sand has built up along the southern side of the net creating a mound which is heavily covered in seagrass beds, although the northern side is exposed. At the western extent of this waypoint two piles were found which had been cut off approximately 60cm above the seafloor. These piles are likely to be the remains of an intermediate dolphin.

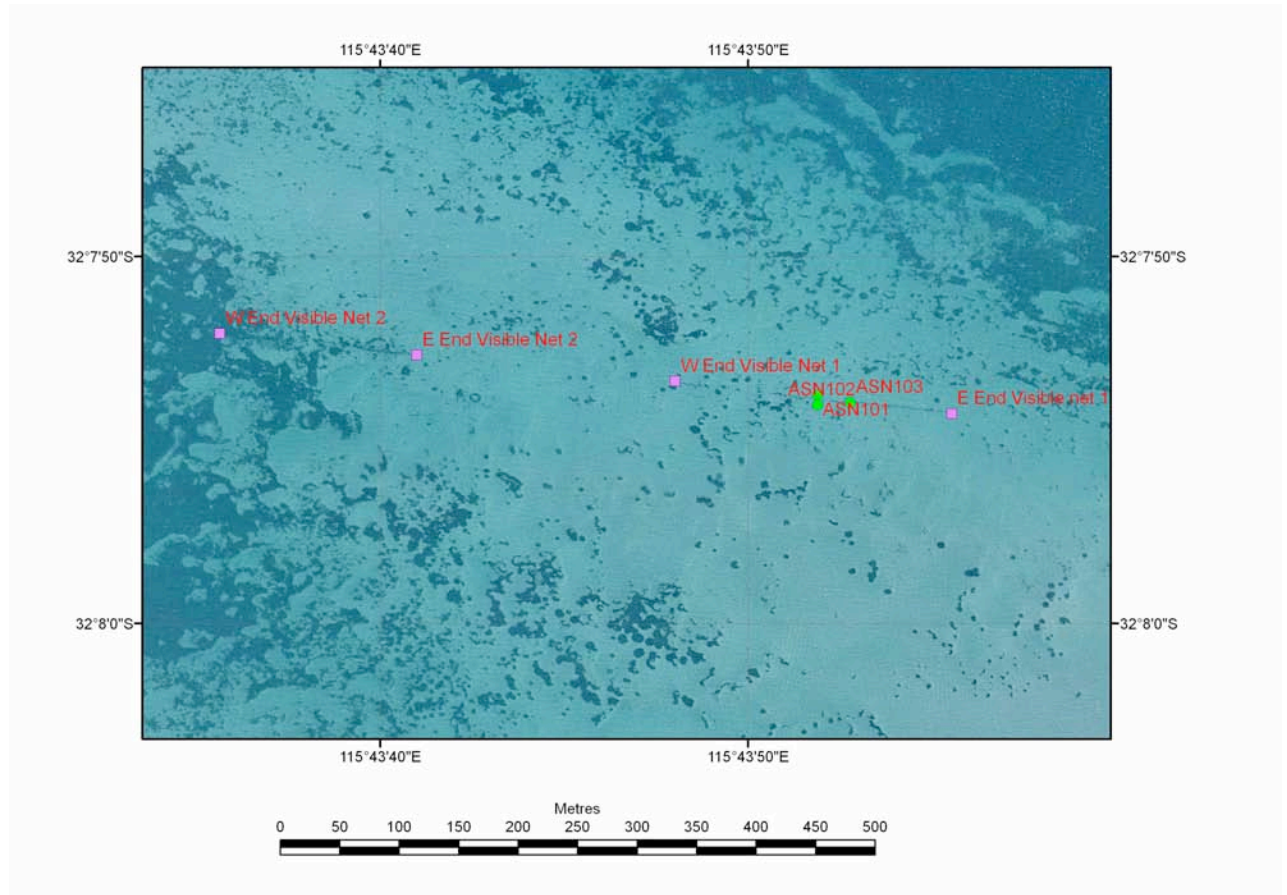
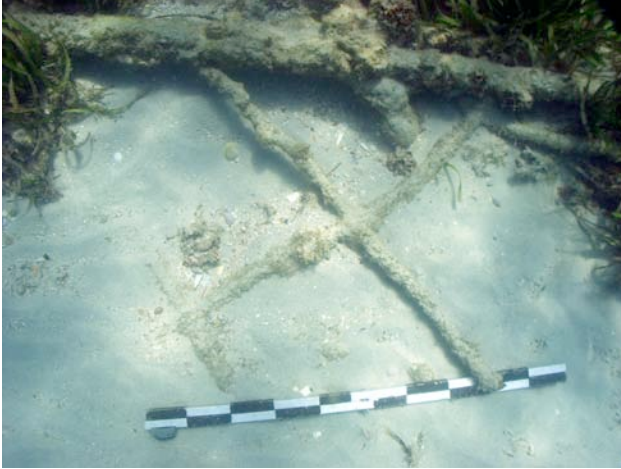


Figure 11: Detail of aerial photograph showing visible lines of collapsed anti-submarine net on seabed with GPS points. (Jeremy Green/ WA Museum)





Figures 12 and 13: Close-up of anti-submarine mesh underwater and view of the collapsed net near Woodman Point from the surface at site ASN101.  
(Ross Anderson/ WA Museum)

#### ASN103

A linear feature of anti-submarine net visible in aerial photographs approximately 40m in length in 3.5m depth, on the Parmelia Bank east of the channel.



Figure 14: Collapsed section of anti-submarine net at site ASN103  
(Jeremy Green/ WA Museum)

#### ASN001

A single pile from an intermediate dolphin was located 27m NE of the GPS point, and was protruding from the seabed at an angle, upside down with its steel shoe attached in 8m depth. Ten metres to the south of the pile was a small fragment of concrete that is potentially the remains of a net weight. The damage to the two components of the site is consistent with demolition using explosives by the

navy, and possibly subsequent limestone sand dredging in the area, evidence of which is apparent from large hollows in the surrounding seabed



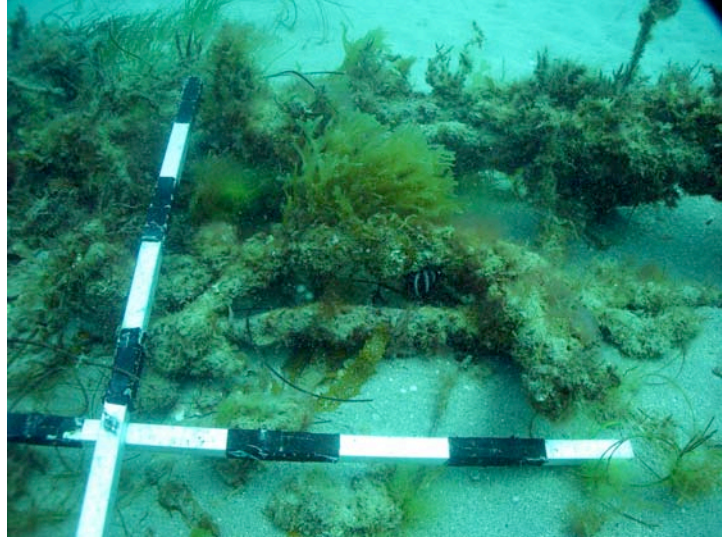
Figure 15. Upended dolphin pile, note steel pile shoe on end  
(Ross Anderson/ WA Museum)

#### ASN 108

This site consists of approximately 12m of fragmented and corroded net cable on a sandy seafloor at a depth of around 7.6m, on the Parmelia Bank west of the channel.

#### ASN007

Consists of a 30m length of netting and cable oriented W-E with two thick parallel cables in one part, west of the channel in 6.5m depth. Two parallel cables, one thick and one thin, are running in parallel on the seabed in one section.



Figures 16 and 17: Thick steel cable with anti-submarine mesh attached at ASN007 (Ross Anderson/ WA Museum)

#### ASN268/ Dolphin No.50

Consists of a thick cable with anti-submarine mesh extending a distance of approximately 80m. The PWD plan indicates that Dolphin No.50 was installed at this location, however no evidence of timber piles was found.

#### ASN005/ intermediate dolphin between Dolphins No. 50 and 59

Collapsed partial remains of a four-pile intermediate support dolphin, consisting of the remains of two large timber piles held together with a timber cross-brace. The visible extent of the piles measured 12.6m long with the ends buried in sand, and 38cm diameter .



Figures 18 and 19: Two large timber piles from a collapsed intermediate support four pile dolphin, with detail of cross head timber bracing at ASN005. (Jeremy Green/ WA Museum)

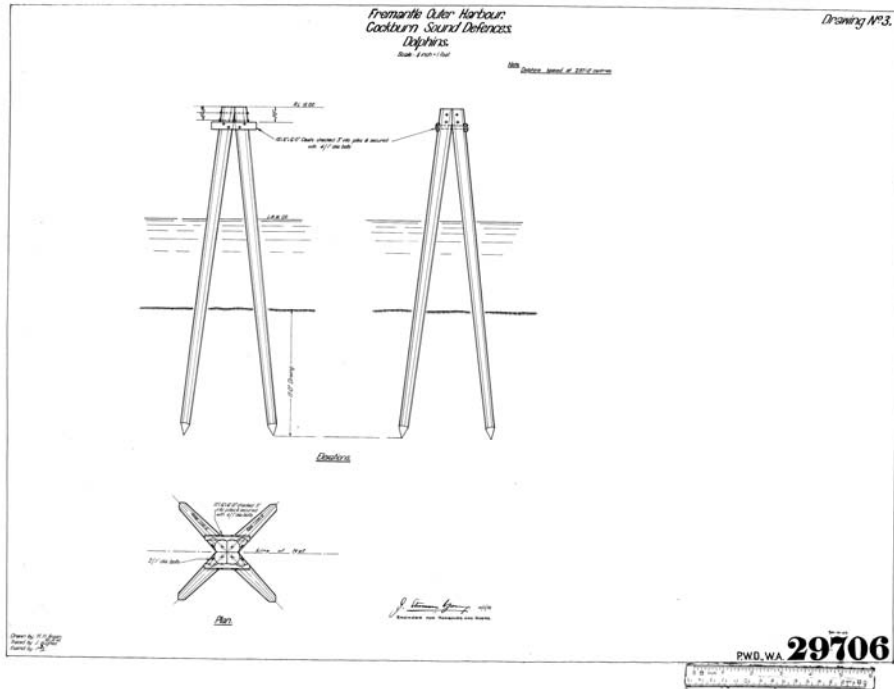
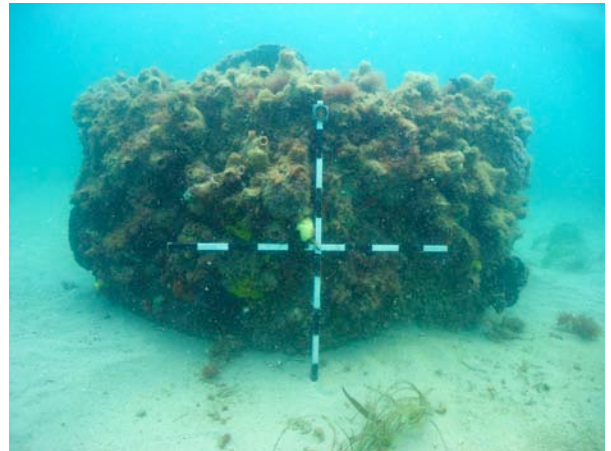


Figure 20: Public Works Department Plan 29706 Drawing No.3 of four piles intermediate supporting dolphin. (National Archives of Australia)

#### ASN269/ Dolphin No.59

Consists of a cylindrical concrete net weight 2.3m in diameter and 1.0m in height. Approximately 2.5m NNE of the net weight was the remains of a timber pile cut off at the seabed while 2.5m further NNE of this pile was a pair of timber piles also cut off at the seabed. This feature is in the location of the Dolphin No.59 as marked on the PWD works plan, but on PWD Drawing of Dolphins No. 59 and 60 the 'No.59' has been crossed out with a double line and text added 'Dolphin 59 constructed similar to Dolphin 50 see Drawing No.6'.



Figures 21 and 22: Concrete net weight Dolphin No.59 position (Ross Anderson/ WA Museum)

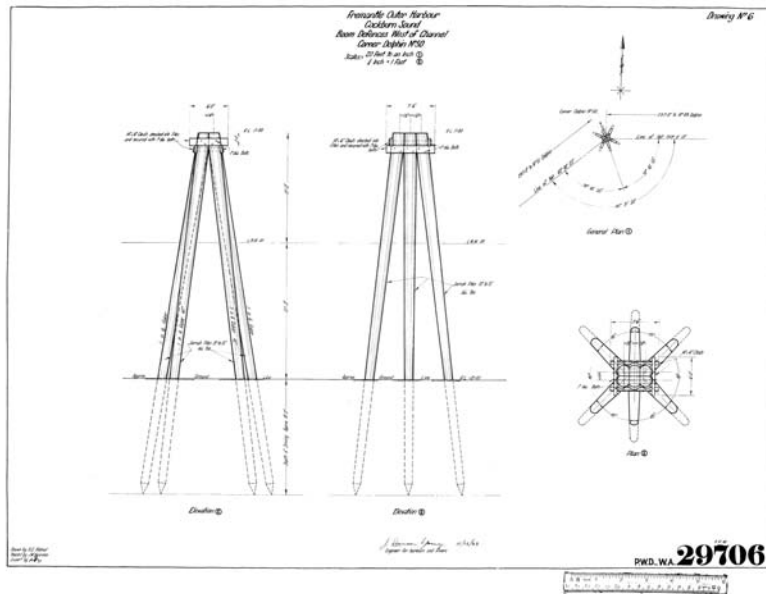


Figure 23: Public Works Department Plan 29706 Drawing No.6 of Dolphin No.50 constructed of six piles. Dolphin No.59 was constructed following this plan instead of Dolphin No. 60. (National Archives of Australia)

#### ASN102

According to the georeferenced PWD plan this was the location of the eastern end of the anti-submarine boom net where it came ashore at the north end of Woodman Point, however no remains were found in the vicinity. This section featured Type 'A' anti-boat hurdle defences constructed of steel scaffolding, that is known to have been salvaged and recycled.

Woodman Point Quarantine Station dumping site  
 GPS (GDA94) S 32° 07.872 E 115° 45.294

On 26 February 2010 a visit was made to Woodman Point Quarantine Station with Mr Earl Seubert (Secretary and Historian, Friends of Woodman Point), Mr Gary Marsh (ex-resident whose father was Officer in Charge of Quarantine Station) and Mr Matthew Hayes (Operations Manager, Woodman Point Recreation Camp). Gary guided the group to a site near the foreshore consisting of three deteriorated and insect damaged timber piles, and some corroded remnants of steel cable from the boom net. Gary described a number of piles having been previously removed and burnt. The site appears to be the location of dumped material, either the remains of clusters of piles and nets that were recorded to have 'washed ashore' on Woodman Point in storms in 1963, or resulting from demolition activities in March-April 1964.



Figure 24: Corroding steel anti-submarine net cable at Woodman Point in February 2010. (Matt Carter/ WA Museum)



Figure 25: Deteriorated remains of anti-submarine defence timber pile at Woodman Point in February 2010. (Matt Carter/ WA Museum)

## **Conclusions**

Underwater surveys have confirmed that extensive sections of collapsed net and key structural features of the anti-submarine boom defence (northern approaches) remain *in situ* on the Cockburn Sound sea bed. With the exception of the floating net buoys, examples of all other constructional components of the boom defence are present including timber dolphin piles (Dolphin No. 60 and intermediate supporting dolphins), concrete net weights, tubular steel scaffolding from the Type 'A' anti-boat hurdle defences and anti-submarine steel netting mesh and cables.

## **Significance**

Following the guidelines of the ICOMOS Burra Charter (1999) the cultural significance of a place is defined by its 'aesthetic, historic, scientific or social value for past, present and future generations' (ICOMOS Burra Charter 1999). The remains of the Cockburn Sound anti-submarine boom defence will be discussed below as it applies to these categories.

## **Aesthetic**

The remains of the Cockburn Sound anti-submarine boom net have aesthetic and recreational value as a 'linear' dive site for divers and snorkellers. The shallow nature of the site (<10 metres) and clear visibility combine to make visiting the site an enjoyable experience. In addition, the fact that many of the individual components of the anti-submarine net can be found, often in association with one another, allows the visitor to experience and understand how the different components were put together to create the structure as a whole. It can be promoted as a unique underwater cultural heritage dive site in proximity to the Perth/ Fremantle metropolitan area.

## **Historic**

The Cockburn Sound anti-submarine boom defence has historic value for its relationship with key historical events in World War II and changes in Allied defence strategy. The loss of the HMS *Prince of Wales* and HMS *Repulse* in 1941 and the fall of Singapore in 1942 forced the British Eastern Fleet to establish new Naval bases in Australia including Fremantle. A basic requirement for such a base was protection from enemy submarines and as a direct result the Cockburn Sound anti-submarine boom net was constructed.

The characteristics of the submarine net itself can also be linked to historical events in the Mediterranean as well as Southeast Asia. In the early phases of the war British naval and merchant shipping faced sustained attacks in the Mediterranean by Italian frogmen using submersible assault craft. Prior to these attacks anti-submarine nets were typically constructed of eight-foot mesh wire cable. In Darwin, the Admiralty ordered the size of the net mesh to be reduced to

counter the threat of 'human torpedoes' (Forster 2005: 8) and it is this smaller mesh size that is evident on the Cockburn Sound anti-submarine netting. The Cockburn Sound boom defence indicates the importance of both submarines, and anti-submarine defences in naval warfare, and the threats that Australia faced during World War II, in particular in 1942-43.

Another point of historic value for the Cockburn Sound anti-submarine net is its relationship with the broader historical World War Two defence landscape of the Fremantle area. In order to create a secure naval base for the British Eastern Fleet in Cockburn Sound and the naval and merchant shipping at Fremantle a defensive network was created in the region comprising of anti-shipping, anti-submarine and anti-aircraft defences including indicator loops, batteries, anti-aircraft guns and radar stations. The Cockburn Sound anti-submarine boom net was a vital component in this defensive arrangement and its remnants provide a tangible link with the many other existing World War II defence structures in the region. With a length of 9.37km the Cockburn sound boom defence (northern approaches) appears to have been the longest boom defence structure in Australia.

With specific reference to Dolphin No. 60, after the cessation of hostilities all Australian ports were cleared of anti-submarine defences except for Darwin and Fremantle (Forster 2005: 19), so the remains of Dolphin No. 60 is one of only a few extant remaining boom net pylon structures in Australia, and appears to be the only remaining original timber pylon structure related to anti-submarine boom defences in Australia.

### **Scientific Value**

The remnants of the Cockburn Sound anti-submarine boom net have scientific value for the potential to provide information on the deterioration of materials in the underwater environment of Cockburn Sound. In addition the remains of the net may be of interest to marine biologists studying the growth of colonising fauna and its role as an artificial reef.

### **Social Value**

The Cockburn Sound anti-submarine boom defence is one component of a considerable maritime heritage that is evident and celebrated around the Fremantle area. It is a tangible link to the past for those whose family members were servicemen who built and maintained the net. There are also various heritage and defence heritage interest groups in the area such as the Friends of Woodman Point, the Returned Services League, Royal Australian Navy, Army Museum, Maritime Archaeology Association of Western Australia and others who take an active interest in local and defence heritage places.

### **Statement of Cultural Significance**

There are few visible World War II related sites in Western Australia, and few original *in situ* remains of anti-submarine nets or boom defences in Australia.



Given the significance of Fremantle as a World War II allied submarine base (and Garden Island as current Fleet Base West for Collins Class submarines), the (buried) wreck of the Dutch submarine KVIII at Woodman Point and as yet not located 'Sleeping Beauty' or Motorised Submersible Canoe (MSC) in Careening Bay, Cockburn Sound there is a strong argument to be made for retaining and conserving the structure as part of the World War II submarine and defence infrastructure heritage in Cockburn Sound. It is also strongly associated with the naval and defence heritage of Woodman Point.

In archaeological terms all of the major components of various sections of the anti-submarine net are represented underwater, including Dolphin No. 60, steel hurdles, steel mesh netting, concrete net weights and timber piles. Together these sites contribute to demonstrate the location, extent, structure and dimensions of the anti-submarine boom defence structure as a whole.

### **Legal Protection**

The *Maritime Archaeology Act 1973* (MAA) administered by the WA Museum does not protect structures built after 1900, however the WA Museum takes an active interest in all underwater cultural heritage sites in Western Australia. The MAA is presently undergoing parliamentary review for amendments to allow future inclusion and protection of significant 20th century sites, including World War II sites.

At present Dolphin No. 60 is protected by a Conservation Order from the Heritage Council of Western Australia, and is entered on the Heritage Council of Western Australian heritage places database as Place No. P17789.

It is recommended that legal protection be expanded to include the other remaining elements of the Cockburn Sound boom defence, in order to protect the site in its entirety as a significant World War II underwater cultural heritage site.

## Recommendations

1. That the Dolphin No.60 structure be stabilised and retained for its significance as the last visible above water remnant of the World War II Cockburn Sound boom defences.
2. That the rest of the remaining fabric combining to make up the underwater cultural heritage site of the Cockburn Sound boom defences (northern approaches) are protected by the Heritage Council of Western Australia as a significant part of Western Australia's World War II heritage, and the maritime and defence landscape of Fremantle and Cockburn Sound.
3. That risk and safety issues are considered with a view to retaining the remnant parts of the Cockburn boom defence structure, rather than demolition and/ or removal.
4. That above water interpretation is provided at Woodman Point to enable public appreciation of the significance of the submarine boom net infrastructure and World War II activities in Western Australian waters.
5. That underwater interpretation is provided along the section of exposed boom mesh net at Woodman Point, and that it is promoted as an underwater cultural heritage dive site.
6. That the Cockburn Sound anti-submarine boom net is considered as an intrinsic part of the broader Leighton, Rottnest Island, Fremantle and Cockburn Sound World War II defence landscape that includes anti-aircraft gun emplacements, batteries, slipways, shipwrecks, remains of the Fremantle Harbour anti-submarine net infrastructure and related buildings on Victoria Quay and North and South Moles.
7. That further underwater surveys are carried out to record the features and extent of the site.
8. If the Dolphin No.60 is not going to be stabilised then it should be left as a ruinous structure, and allowed to naturally collapse and deteriorate to form an underwater cultural heritage site, in preference to demolition and removal of fabric.

## References

- Anderson, R., March 2007, Site inspection report, Cockburn Sound submarine boom net, unpublished report, Department of Maritime Archaeology, Western Australian Museum, Fremantle.
- Anderson, R., September 2009, Fear of the Deep–Cockburn Sound’s anti submarine boom net, unpublished paper presented at Australasian Institute for Maritime Archaeology/ Australasian Society for Historical Archaeology annual conference, Conflict Archaeology session, Launceston, Tasmania.
- Environmental Resources Management Australia (ERM), February 2007, WWII submarine boom Cockburn Sound Western Australia heritage management advice, unpublished report for Department of Defence, Corporate Services Infrastructure Group-Western Australia (CSIG-WA).
- Forster, P., 2005, *Fixed naval defences in Darwin Harbour 1939-45*, Museum and Art Gallery of the Northern Territory.
- Jeffery, V., 1988, Securing Cockburn Sound, *White Ensign*, Winter Edition 1988, Royal Australian Navy Public Affairs.
- Peet, L.J., 1996, Chronological outline of the armed forces in Western Australia during World War II, in Gregory, J., 1996, *On the homefront: Western Australia and World War II*, University of Western Australia Press, Nedlands.
- Peet, L.J., February 2008, Final report–Cockburn Sound boom defences (Northern channel), unpublished report to Heritage Council of Western Australia.

## Drawings and plans

- Drawing A.B.D. 27/11 of 29 September 1943 from National Archives of Australia: K1141/1, 1941/42/138 (Perth)
- Un-numbered sketch of 12 October 1943 from National Archives of Australia: MP 1049/5, 1855/10/24 (Melbourne)
- PWD Plan 29706 (22 pages including Drawing DBD 27/12 and Boom Defence West of Channel Progress Plan), original held in ‘E-plan’ database, Department of Housing and Works, Perth.
- PWD Plan 30431 (State Records Office of Western Australia, Cons 1647)

## Appendix 1

### GPS Positions of Cockburn Sound anti-submarine boom defence sites (northern approaches)

Datum: GDA94

Feature/ Waypoint/ Description	LATITUDE	LONGITUDE	Source
Second Head Garden Is	-32.164625	115.672931	PWD plan
No 60 Tower	-32.153452	115.678378	PWD plan
No 59 Tower	-32.137164	115.686050	PWD plan
No 50 Tower	-32.131549	115.691832	PWD plan
No 41 Tower	-32.130159	115.700281	PWD plan
No 40 Tower	-32.129493	115.704117	PWD plan
No 37 Tower	-32.129159	115.706897	PWD plan
No 1 Tower	-32.132718	115.741251	PWD plan
E End Visible net 1	-32.131746	115.732096	Aerial photo
W End Visible Net 1	-32.131500	115.730005	Aerial photo
E End Visible Net 2	-32.131301	115.728055	Aerial photo
W End Visible Net 2	-32.131138	115.726566	Aerial photo
E End Visible Net 3	-32.130583	115.698178	Aerial photo
Mid Turn Visible Net 3	-32.131594	115.691966	Aerial photo
W End Visible Net 3	-32.137147	115.686611	Aerial photo
ASN001/ upside down pile	-32.12911	115.70695	GPS
ASN005/ net between Dolphins 50-59	-32.135400	115.688280	GPS
ASN007/ net between Dolphins 41-59	-32.131150	115.694630	GPS
ASN008/ net between Dolphins 41-59	-32.130720	115.697370	GPS
ASN101/ net between Dolphins 1-35	-32.131610	115.731080	GPS
ASN102/ E extent of net	-32.131680	115.732200	GPS
ASN103/ net between Dolphins 1-35	-32.131660	115.731330	GPS
ASN268/ Dolphin 50	-32.131590	115.692020	GPS
ASN269/ ASN004/ Dolphin 59	-32.137200	115.686120	GPS
ASN270/ Dolphin 60	-32.153530	115.678370	GPS