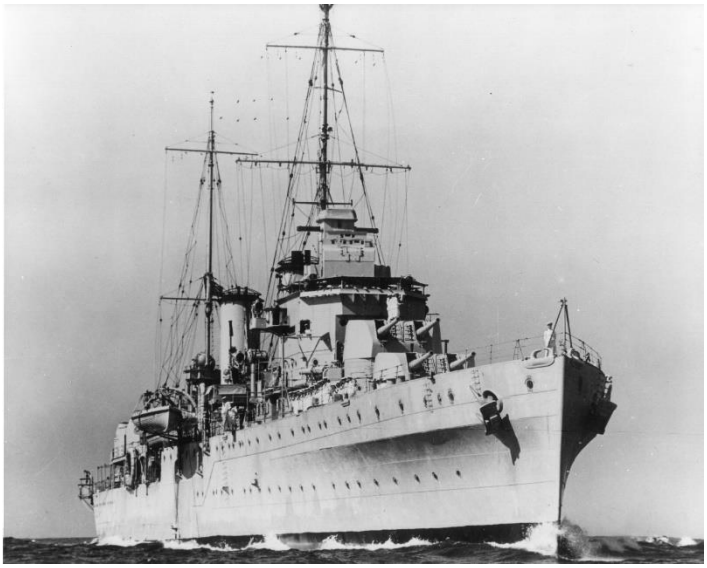

HMAS *Perth* Project 2017, Sunda Strait, Republic of Indonesia

A joint maritime archaeological project between the Australian National Maritime Museum, Sydney, Australia and Pusat Penelitian Arkeologi Nasional, Jakarta Selatan 12510, Republik Indonesia

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Contents

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BACKGROUND

1: The wreck sites of HMAS *Perth* (I) and USS *Houston* lie in the eastern approaches of Sunda Strait between the islands of Java and Sumatra in the Republic of Indonesia. *Perth* lies at S 05°51.581' / E106°07.485' (WGS 84), about 3 nautical miles (4.8 kilometres) north east of St. Nicholas Point on the northwest tip of Java.

2: In late 2013 recreational divers, who had recently visited the *Perth* wreck, reported back to the Australian Federal Government that unknown salvage companies using surface-supplied divers operating off self-propelled barges equipped with crane-operated grabs appeared to be salvaging the site.

3: Concerned at the prospect that salvage operations were disturbing the remnants of an Australian sovereign warship that also contained the remains of naval personnel lost during *Perth*'s engagement with the Imperial Japanese Navy, the Chief of Australian Navy, Vice Admiral Ray Griggs, wrote to his counterpart the Chief of the Indonesian Navy, Admiral Dr Marsetio regarding the alleged salvage works.

4: As the *Perth* wreck site has great emotional and historical significance for many Australians, the Australian National Maritime Museum (ANMM) – an Australian Commonwealth statutory authority established by the *Australian National Maritime Museum Act* (1990) and responsible to the Australian Minister for the Arts, the Hon. George Brandis. QC – was approached by the Royal Australian Navy (RAN) and Australian Department of the Environment to explore the possibility of leading an archaeological expedition to *Perth* to survey the site and assess the alleged damage.

5: In December 2014 the ANMM hosted four representatives from Indonesia's Pusat Penelitian Arkeologi Nasional (ARKENAS) to draft a Memorandum of Understanding (MoU) between the ANMM, the Australian Department of the Environment and ARKENAS. The MoU's objectives were to facilitate cooperative maritime archaeological research and underwater cultural heritage management activities, educational opportunities and capacity building between the parties with an emphasis, in its first year, on the *Perth* shipwreck site.

6: In August 2015 the joint MoU was signed by Dr I Made Geria, (Director, ARKENAS), Kevin Sumption, (Director, ANMM) and Stephen Oxley, (First Assistant Secretary, Department of the Environment)

7. In September 2015 the Museum submitted its research proposal to ARKENAS, the Indonesian Ministry of Marine Affairs and Fisheries, and the Indonesian Ministry of Research and Technology (RISTEK).

8. In October 2015 the ANMM, ARKENAS, the US Naval History and Heritage Command (NHHC), the Indonesian Ministry of Marine Affairs and Fisheries, and the Naval Attachés from the Australian, British and United States Embassies in Indonesia met with Indonesian Navy (TNI-AL) representatives

in Jakarta to discuss the ongoing threat to underwater cultural heritage in Indonesian waters and possible solutions to the problem.

9. In April 2016 ANMM's research proposal was approved by RISTEK and, after submitting additional paperwork, in October 2016 the Museum was granted a RISTEK (Foreign Research Permit) and a 306 Visa from the Indonesian Embassy in Canberra to undertake research in Indonesia.

10. The arrival of the north-western monsoon in Banten Province in late October 2016 meant that conditions on the sites of *Perth* and *Houston* were unfavourable for diving and the underwater component of the survey work was postponed until early to mid-2017.

11. As an interim measure in mid-November 2016, and with the permission of ARKENAS and the NHHC, the Museum contracted Firman Setiawan, S. Kel from Mahesa Prasaya Geoservices in Bandung, West Java, Indonesia to undertake a multi-beam sonar survey of the wreck sites of *Perth* and *Houston*.

12. On 10 December 2016 Mahesa Prasaya Geoservices completed the survey of the two sites and provided accurate information on their respective locations, overall shape and alignment, depth of water and extent of the debris field around each wreck.

13. The survey data for *Perth* showed a number of anomalies, including a long elongated blank area amid-ships, distortion of the bow and stern and a several anomalies adjacent to the wreck. The apparent length of the site (90 metres) also did not correspond with the *Perth*'s known lengths of 171 metres (length overall) or 160 metres (length between perpendiculars).

14. Following the end of the 2016/17 monsoon season the ANMM / ARKENAS team dove on *Perth* in early May 2017.

RESULTS

1: Kieran Hosty and Dr James Hunter arrived in Jakarta on 7 May 2017. Upon arrival they reported to Indonesia's Ministry of Research and Technology, the Ministry of Defence and the National Police for the issuing of permits and travel documents. Hosty and Hunter also met with representatives from ARKENAS and the Australian Embassy in Jakarta.

2: The dive team - consisting of representatives from ANMM, ARKENAS, the Indonesian Ministry of Marine Affairs and Fisheries, Indonesian Preservation Office (Serang), the TNI-AL (Indonesian Navy) and a Banten based dive master / tour guide - carried out eight survey dives over the course of four days from Sunday 14 May to Wednesday 17 May 2017.

3: *Perth* rests on its port side on a silt / sand bottom in 21 to 37 metres of water with its bow facing towards the northeast. What remains of its starboard side faces uppermost (i.e., towards the water's surface). The site's coordinates are S 05°51.581' / E106°07.485' (WGS 84) and were acquired at mid-ships.

4: The vessel's bow has completely collapsed, most likely due to the effect of a Japanese torpedo strike on this section of the ship during the Battle of Sunda Strait in March 1942.

5: The two forward-most 6-inch guns ('A' and 'B') and their respective turrets have been completely removed from the site, and their absence is undoubtedly a deliberate act of salvage. Their removal appears to have occurred sometime after 2009 and before 2013.

6: Since October 2015 around 60% percent of *Perth*'s starboard hull plating has been removed. This has exposed the vessel's inner armoured bulkheads, internal compartments, engine rooms and boiler rooms. Whilst corrosion and battle damage could account for some of the missing hull plating, the majority has been deliberately removed by salvage operations. The most likely explanation is that these hull components were targeted for their steel content. Similarly, the team noted small areas of what appear to be stockpiled copper and copper-alloy cable and piping that has been systematically removed and set aside for later recovery. Again, the rationale seems to be that these items are being removed for their metallic content. Because the vessel's internal architecture has been so detrimentally affected, the remaining deck plating is starting to peel away from existing bulkheads, and will very likely collapse to the seabed at some point in future.

7: Since 2015 *Perth*'s internal compartments have been systematically salvaged, with bulkheads, decks and internal fittings removed. Additionally, three steam turbines, three condensers and four boilers have been salvaged. These are extremely large and heavy pieces of machinery and would have required considerable effort to shift. It is impossible that they would have been completely removed via natural processes, and

consequently they must have been deliberately removed through salvage activities.

8: Since 2013 both of the ship's 4-inch shell magazines and associated cartridge magazines have been breached, and some of their contents (estimated at between 1000 and 1200 shells and cartridges have been salvaged (Fock and Cannon, 2013).

9: Despite the aforementioned, the site still retains a significant quantity of exposed 4-inch and some 6-inch shells. The dispersal of these items around the site indicates human rather than natural intervention. Some of the shells are also leaching picric acid – a chemical component of the explosives used in the shells – making the shells not only toxic to handle but also unstable.

10: Between October 2015 and November 2016 approximately 70 metres of the stern of the ship - from the stern post through to the aftermost engine room bulkhead - has disappeared. This includes the four propeller shafts and the two aftermost 6-inch gun turrets ('X' and 'Y'). Again, this is clearly a deliberate act of salvage and must have been carried out using substantial equipment, such as crane-operated grab mounted on a barge.

11: In examining the 2016 multi-beam and side-scan sonar survey data the team expected to see some damage to the stern, starboard hull plating and mid-ship sections of the vessel. The team were also concerned about the absence of a sonar return from the engine / boiler room area, but did not expect complete removal of the stern, stern turrets, propeller shafts, engine and boiler room components, or the almost complete absence of internal bulkheads and decks.

12: There was evidence of ongoing small-scale salvage occurring on site in the form of lifting slings (wrapped around various hull components), a chain block, and a hammer and chisel. However, this is very small scale in the grand scheme of things, and would not have caused the amount of damage witnessed throughout the site as a whole.

13: There is evidence of flash rusting occurring on many parts of the site, which seems to indicate disturbance in the last 10 to 12 months. This possibly correlates to an incident in which the TNI-AL apprehended a small salvage vessel positioned over *Perth* in late April 2017.

14: Historical data and the May 2017 inspection of the site indicates that four stages of salvage activity have occurred on the site – these are:

- Historic salvage commencing with David Burchell's discovery of the site in 1967 and terminating with the recovery of the 4-inch guns and propellers in the mid-1970s;
- Recreational / technical diver salvage occurring from the mid-1980s to the present;

- Opportunistic and small scale salvage by local fishers from the mid-1980s to present;
- Planned, large scale commercial salvage from 2012 to present.

15: The *Perth* site, its remaining contents and associated debris field are directly related to the poorly conceived and desperately fought Allied military actions in the Java Sea and Sunda Strait in early 1942.

16: The site of *Perth*, its remaining contents and its associated debris field are directly related to the Japanese invasion and occupation of the Indonesian archipelago in 1942.

17: The *Perth* site, its remaining contents and its associated debris field are of significant cultural, historical and archaeological importance.

18: The *Perth* site, its remaining contents and its associated debris field have high potential of containing the skeletal remains of some of the vessel's former crew.

19: *Perth* was a commissioned ship in the Royal Australian Navy, was sunk during a naval engagement with the Imperial Japanese Navy, and was not surrendered or abandoned.

20: International Law (*International Convention for the Unification of certain Rules Concerning The Immunity Status of State-Owned Ships,* 1926) and Article 95 of the *Law of the Sea* (UNCLOS, 1982) attributes sovereign immunity status to the shipwreck and the Australian Government considers HMAS *Perth* (I) to be a sovereign vessel of Australia.

21: The *Perth* site, its remaining contents and its associated debris field are, as regulated in UNCLOS (1982), within the territorial sea of the Republic of Indonesia and as such are governed by the national laws of Indonesia.

22: Indonesian Government Regulation 19/2007 Part 1 states that *"....if a wreck is over 50 years old and lies in Indonesian waters, it belongs to the Indonesian government."*

23: Through:

- The Decree of the Minister of Education and Culture No 0843/001989 (Specifically relating to Cultural Heritage Objects Lying within Indonesian Waters);
- The Decree of the National Committee for Salving and Exploiting (Objects No KEP-17/PN/BMKT/12/1990);
- Law of the Republic of Indonesia Act no 5 of 1992 regarding Cultural Heritage Objects (*Undang-Undang Republik Indonesia Nomor 5 Tahun 1992 Tentang Benda Caqar Budaya*); and

- Law of the Republic of Indonesia No 11 of 2010 considering Cultural Heritage (*Undang-Undang Republik Indonesia Nomor 11 Tahun 2010 Tentang Cagar Budaya*)

  The Republic of Indonesia has the necessary legislative framework to protect the site of HMAS *Perth* (I) under national law.

RECOMMENDATIONS

1: To prevent the highly destructive, ongoing and intentional large-scale salvage of the HMAS *Perth* (I) shipwreck site, its surviving hull and associated artefacts and debris field require immediate and urgent protection under:

A: The Republic of Indonesia Act No 11 of 2010 considering Cultural Heritage (*Undang-Undang Republik Indonesia Nomor 11 Tahun 2010 Tentang Cagar Budaya*) as a *Situs Cagar Budaya* (Cultural Heritage Site); and

B: Republic of Indonesia Act No 1/2014 *Juncto Undang-undang No. 27/2007 Tentang Pengelolaan Wilayah Pesisir dan Pulau-Pulau Kecil*; and

C: Under informal local village / community rules, regulations and customary law (*Adit)*

2: That Pusat Penelitian Arkeologi Nasional (ARKENAS), working in cooperation with Indonesia's Ministry of Marine Affairs and Fisheries, submit an application to the Indonesian Ministry of Education and Culture (Kementrian Pendidikan dan Budayaan (Kemdikbud) that *Perth*'s wreck site and its surviving hull and associated artefacts and debris field be classified as a *Situs Cagar Budaya* (Cultural Heritage Site).

3: That ARKENAS and ANMM submit an application to the government of Banten Province to include the area surrounding *Perth* into the marine spatial planning of Banten Province, as a Marine Conservation Area.

4: That the Preservation Office (Serang), and the government of Banten Province identify which *Kelian Adat* (Community Leader) is responsible for waters in the vicinity of *Perth's* wreck site and assist the local community in monitoring the site and protect it from additional damage. Further recommend that the Australian Government consider options to assist the Indonesian authorities monitor the site.

5: That ARKENAS and ANMM continue to work with the Indonesian Ministry of Marine Affairs and Fisheries and the Australian Embassy (Jakarta) to regularly assess and monitor *Perth*'s wreck site.

Photographs, maps and illustrations

Locational map of HMAS *Perth* (I) and USS *Houston*
http://www.perthone.com/pcarbean.html (accessed 10 August 2015).

Salvage crane caught stripping the wreck of a Dutch submarine in October 2013, ABC News, 13 December 2013

Launching of HMS *Amphion* on 26 July 1934
(http://www.navy.gov.au/hmas-perth-i, accessed 20 March 2014)

HMAS *Perth* (I) arriving Port Jackson, Sydney, NSW in March 1940
(Australian War Memorial #301166)

Map showing vessel movements during the Battle of Sunda Strait, 1 March 1942.
(Image: http://www.perthone.com/images/sun-sundbatmap.jpg, accessed 15 August 2015)

Crew of HMAS *Perth* (I), Fremantle, Western Australia, August 1941
(P0395.002 Australian War Memorial, Canberra)

HMS *Amphion*, 1935,
http://www.perthone.com/pamphion.htm, accessed 10 August 2015

HMS *Amphion*, 1937,
http://www.perthone.com/pamphion.htm, accessed 10 August 2015.

HMAS *Perth (ex-Amphion*) entering New York, August 1939.
http://www.perthone.com.htm, accessed 15 August 2015

Perth in Jamaica, August 1939
Source: http://www.perthone.com.htm, accessed 15 August 2015

Perth on its delivery voyage to Australia, Panama Canal, November 1939
(Australian National Maritime Museum)

Perth at Gatun Locks, Panama Canal, late 1939 or early 1940.
Source: http://www.perthone.com.htm, accessed 15 August 2015

A schematic of *Perth*, showing the vessel's first Camouflage Pattern (December 1940 – November 1941) (Image: http://www.perthone.com.htm, accessed 15 August 2015).

Perth at Alexandria, 1941
(Source: http://www.perthone.com/pamphion.htm,accessed 15 August 2015

Perth, Second Camouflage Pattern (November 1941-1 March 1942)
Source: http://www.perthone.com.htm, accessed 15 August 2015

A schematic of *Perth*, showing the vessel's second Camouflage Pattern (November 1941-1st March 1942) (Image: http://www.perthone.com.htm, accessed 15 August 2015).

Perth painted in its second Camouflage Pattern, late 1941
(Image: http://www.perthone.com.htm, accessed 15 August 2015).

HMAS *Perth* (I) shipwreck site, Sunda Strait, as it appeared between 1967 and 1971.
(Image: Burchell, D., *The Bells of Sunda Strait*, 1971, pp22-23

Relics for Memorial
The Canberra Times, 14 November 1967

The *Perth* Bell
The Canberra Times, Monday 25 November 1974

X Turret, HMAS *Perth* (I), 27/02-2/03 2002 (David Faltot, http://www.asiaticfleet.com/diving_in_the_sunda_strait.htm, accessed 20 March 2016)

Perth's 6-inch gun turret, 16 November 2002 (Surya Prihadi, http://perthone.com/pwre.html, accessed 20 September 2015)

Perth's Y gun turret, 16 November 2002 (Surya Prihadi, http://perthone.com/pwre.html, accessed 20 September 2015)

"A" Turret points a few degrees off centre to Starboard, A torpedo hit just forward of here has almost severed the bow from the ship. Denley, K., *Advanced Diver Magazine*, pp26-29, Issue 23, 2006.

Perth's "A" 6-inch turret (Kevin Denley, 2006, http://www.perthone.com/pwre.html, accessed 20 September 2015)

"B" Turret points almost directly to port, barrels buried in the sandy bottom. In the foreground is the rim of the AA Tub that fell off the Turret Top and now lies on the sandy bottom. Denley, K., *Advanced Diver Magazine*, pp26-29, Issue 23, 2006.

The base of Seagull V aircraft catapult. Part of the rotating circular base can be seen in the upper centre of the photo. Denley, K., *Advanced Diver Magazine*, pp26-29, Issue 23, 2006.

"X" Turret points directly to starboard. The left barrel appears bent – perhaps because of a shell hit. In the foreground is the AA tub still attached to the turret top. Denley, K., *Advanced Diver Magazine*, pp26-29, Issue 23, 2006.

A shell hole below "X" Turret which has entered what is believed to be the Captain's Day Cabin. Denley, K., *Advanced Diver Magazine*, pp26-29, Issue 23, 2006.

The stern of the ship with the remains of the starboard 0.5 machine gun still standing on the quarterdeck. Denley, K., *Advanced Diver Magazine*, pp26-29, Issue 23, 2006.

Fock, A.W.H and Cannon, P.I., *Report – HMAS Perth (I) Condition of Wreck Part 1*, October 2013a p26)

Perth's "X" Turret, 2010 (Andrew Fock, 2010, accessed 20 September 2015, http://www.perthone.com/pwre.html)

Perth's "A" Turret, 2010 (Andrew Fock, 2010, accessed 20 September 2015, http://www.perthone.com/pwre.html

Perth's bow lying portside down on seabed. (Andrew Fock, 2010, accessed 20 September 2015, http://www.perthone.com/pwre.html)

DCT lying upside down on seabed. The DCT pedestal in background
Andrew Fock, 2010, http://www.perthone.com/pwre.html

Port torpedo tubes lying on the seabed partially obscured by 4-inch gun deck. In the background can be seen the after boiler room vents.
Andrew Fock, 2010, http://www.perthone.com/pwre.html
https://www.rancba.org.au/Sunda_Strait_Dive_Aug2012.htm

Perth's 'X' Turret
(https://www.rancba.org.au/Sunda_Strait_Dive_Aug2012.htm,accessed 20 September 2015)

Bridge Area with shell and shrapnel damage
https://www.rancba.org.au/Sunda_Strait_Dive_Aug2012.htm

Perth's Port No. 2 4-inch gun mounting
(https://www.rancba.org.au/Sunda_Strait_Dive_Aug2012.htm, accessed 20 September 2015)

HMAS *Perth* (I), pre-2013 (http://www.perthone.com/pwre.html, accessed 20 September 2015)

Looking aft towards 'Y' turret, 2013
Fock, A.W.H and Cannon, P.I., *Report – HMAS Perth (I) Condition of Wreck Part 1*, October 2013

Detail of sub-deck structures exposed, 2013
Fock, A.W.H and Cannon, P.I., *Report – HMAS Perth (I) Condition of Wreck Part 1*, October 2013

Forward magazine structure – the forward red line indicates the level of visible damage in Perth seen in the 2013 video. The structure outlined in red is the 4-inch magazine. (Fock, A.W.H and Cannon, P.I., *Report – HMAS Perth (I) Condition of Wreck Part 2*, *- Bow to After Turret Group,* 27 October 2013)

Buckled bow starboard rail – the forecastle deck of *Perth* appears to be absent. (Fock, A.W.H and Cannon, P.I., *Report – HMAS Perth (I) Condition of Wreck Part 2, - Bow to After Turret Group,* 27 October 2013)

Observed damage to HMAS *Perth* (I) in October 2013 (Fock and Cannon, 2013a, p27)

Starboard propeller shaft.
Pak Shinatria Adhityatama (Pusat Penelitian Arkeologi Nasional – ARKENAS)
Varuna – jurnal arkeologi bawah air (Underwater Archaeology Journal) Vol8: 2014

Poor visibility limits clear photos of *Perth*'s wreck site. Depicted here is one of the vessel's starboard propeller shafts. Image: Shinatria Adhityatama / Pusat Penelitian Arkeologi Nasional (ARKENAS), 2014.

Salvage barge apprehended on site of HMAS *Perth* (I), January 2015.
US Embassy, Naval Attaché, Capt. Stackpoole, January 2015

Material observed on apprehended salvage barge, January 2015.
US Embassy, Naval Attaché, Capt. Stackpoole, January 2015

TNI-AL divers with a recovered 4-inch shell from HMAS *Perth*, 2015.
http://www.jpnn.com/news/frogdive-klub-selam-ekspedisi-sejarah-bawah-laut-indonesia

Damaged 6-inch gun house on the *Perth* wreck site, October 2015 (Christopher Perez, Defense Attaché Operations, United States Embassy – Jakarta)

Multi-beam survey of *Perth* (north to right of image) 2015
(Image: Ministry of Marine Affairs and Fisheries, Jakarta)

Side scan sonar image of *Perth* (north up), December 2016 (ANMM / ARKENAS)*Wreck Inspection Survey – HMAS Perth and USS Houston*, Mahesa Prasaya Geoservices, Banten, December 2016)

Multibeam sonar image of HMAS *Perth* (north up), December 2016 (ANMM / ARKENAS) *Wreck Inspection Survey – HMAS Perth and USS Houston*, Mahesa Prasaya Geoservices, Banten, December 2016)

Remains of *Perth*'s forward cable (chain) locker, May 2017. (Image: K. Hosty, ANMM / ARKENAS)

Remains of *Perth*'s collapsed starboard hull, May 2017 (Image: K. Hosty, ANMM / ARKENAS)

Hammer and chisel lying on *Perth*'s disturbed starboard hull, immediately adjacent to a live 4-inch projectile, May 2017. (Image: K. Hosty, ANMM / ARKENAS)

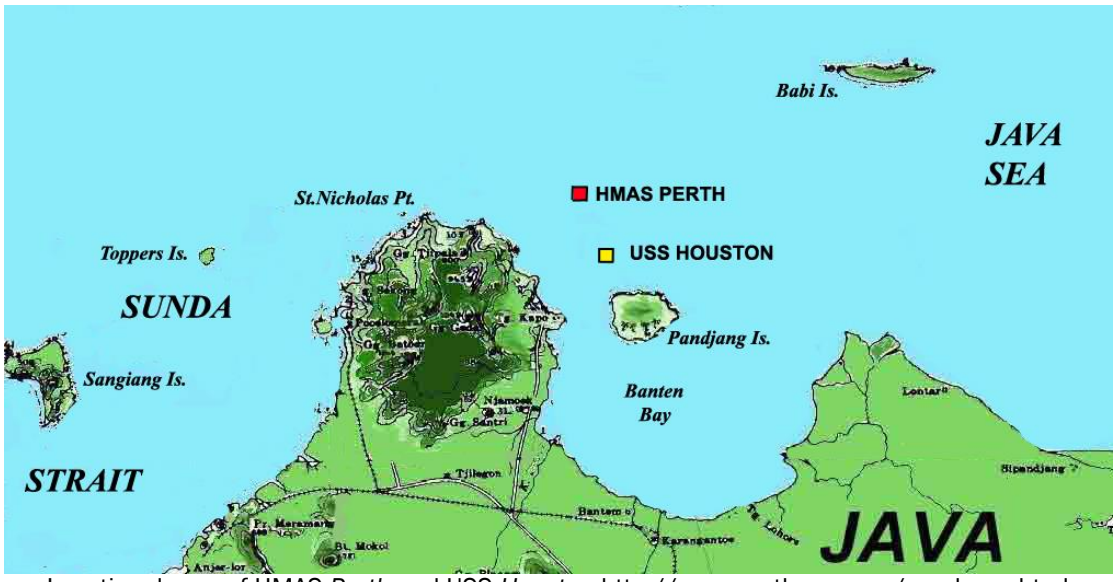
Parsons Geared Turbine Set, 1931 (Grace's Guide to British Industrial History, http://www.gracesguide.co.uk/File:Im1931v151-p700.jpg, accessed 13 July 2017)

Modern chain block located adjacent to the remains of *Perth*'s forward 4-inch shell magazine, May 2017. (Image: K. Hosty, ANMM / ARKENAS)

Artefact deposit resting on the starboard side of the forward 4-inch magazine's lateral bulkhead (Image: J. Hunter, ANMM / ARKENAS)

Artefact deposit resting on the starboard side of the forward 4-inch magazine's lateral bulkhead (Image: J. Hunter, ANMM / ARKENAS)

6-inch shell, cordite cartridge (lower right) and cartridge container (centre right) HMAS *Belfast*. (Source: https://en.wikipedia.org/wiki/BL_6_inch_Mk_XXIII_naval_gun



Locational map of HMAS *Perth* and USS *Houston* http://www.perthone.com/pcarbean.html (accessed 10 August 2015).

1.0 Project Background

In late 2013 recreational divers, who had recently visited the wreck of HMAS *Perth* (I) reported back to the Australian Federal Government that it was being salvaged by unknown entities using surface-supplied divers operating off self-propelled barges equipped with crane-operated grabs.

Salvage crane caught stripping the wreck of a Dutch submarine in October 2013, (ABC News, 13 December 2013)

The divers, who had visited the site on a number of earlier occasions, reported that most of the superstructure along with the two forward 6-inch gun turrets, the catapult, the portside crane and the forward deck had been removed. They also reported that explosives had been used on the hull to allow easier access to the wreck's interior.

Reports of the salvage work subsequently appeared both in national (ABC News 13/12/2014, 26/03/2015, SBS News, 14/12/2014; *Sydney Morning Herald*, 13/12/2013; *The Australian*, *The Daily Mail*, 14/12/2014; *The Herald Sun*, 14/12/2013) and International (Radio New Zealand, 15/12/2013; *The Star*, Malaysia, 23/05/2014; *The Jakarta Post*, Indonesia, 26/05/2014; The Daily News, USA, 09/06/2014; *The Republic*, USA, 19/08/2014; *Imperial Valley News*, California, USA, 18/08/2014; *Tempo*, Indonesia, 2/10/2014) media news outlets.

The Australian Broadcasting Corporation (ABC) http://www.abc.net.au/news/2013-12-13/outrage-as-warship-grave-stripped-by-salvagers/5156320 also interviewed several Indonesian recreational divers who reported:

"The mid-section above deck [of HMAS *Perth* (I)]*, where the bridge was, has been completely removed, the bow guns have been damaged by what appears to be explosives with the barrels missing and the tops peeled of [sic], the bow has collapsed completely*

Although it is hard to be certain, but as the metal that was the superstructure is all missing and is not lying around as debris it looks although we could be wrong like purposeful attempt to salvage the steel.

She [*Perth*] *has been hammered and the once impressive six inch A1 and A2 turrets are gone, the bow is flat and… the wreck is more hazardous than before - even for general swimming around, with lots of live ordinance, wire and overhanging metal.*

The explosions have unearthed a far amour [sic] *of WW2 live rounds and what look like modern explosives (plastic flare shaped things) I assume from the salvage also appear to be lying about, be very careful what you poke in the sand/silt."*

Alarmed at the prospect that salvage operations were disturbing the remnants of a sovereign warship that could contain the remains of some of the more than 300 sailors lost during *Perth*'s engagement with the ships of the Imperial Japanese Navy, Australia's Chief of Navy, Vice Admiral Ray Griggs, wrote to his counterpart the Chief of the Indonesian Navy, Admiral Dr Marsetio regarding the alleged salvage works.

In addition, *Perth*'s wreck site of has great emotional and historical significance for many Australians. Consequently the ANMM– an Australian Commonwealth statutory authority established by the *Australian National Maritime Museum Act* (1990) and responsible to the Australian Minister for the Arts, the Hon. George Brandis. QC – was approached by the Royal Australian Navy and the Department

of the Environment to explore the possibility of leading an archaeological expedition to *Perth* to survey the site and assess the alleged damage.

Representatives of ANMM met with Professor Ronny Rachman Noor, the Education and Cultural Attaché at the Embassy of the Republic of Indonesia in Canberra. Professor Noor informed the Museum that it would need to develop a Memorandum of Understanding (MoU) with a suitable Indonesian research agency or department, obtain a letter of support from that agency or department and then apply for a Foreign Research Permit from the Indonesian State Ministry for Research and Technology prior to visiting Indonesia and inspecting the wreck site.

Subsequent to that meeting in late March 2014, ANMM contacted Professor Kacung Marijan, (Director General of Culture at the Ministry of Education and Culture), Dr Harry Widanto, (Director of Heritage Protection and Museums, Ministry of Culture and Education, Indonesia) and Mr. Judi Wahjudon of the Balai Pelestarian Peninggalan Purbakala (BP3) to discuss the alleged salvage activity on *Perth* and seek their collaboration and support for a proposed joint inspection of the site.

In October 2014 CMDR Cooper at the Department of Defence (Canberra) received information from the Australian Embassy in Jakarta that an Indonesian archaeological team had carried out a series of inspection dives on *Perth*.

Although the report from those dives had not yet been finalised, Captain Bizilj, (Naval Attaché, Australian Embassy, Jakarta), knowing of the Museum's interest in *Perth*, made contact with ARKENAS and Pak Shinatria Adhityatama, the maritime archaeologist affiliated with ARKENAS who led the diving expedition.

Discussions between Captain Bizilj and Shinatria Adhityatama, Agus Sudaryadi and Agni Mochtar from ARKENAS indicated that the most effective way for the ANMM to investigate *Perth* would be through a formal MoU among all parties.

In December 2014 ANMM hosted four representatives from ARKENAS to draft an (MoU) between ANMM, ARKENAS and the Australian Department of the Environment. The purpose of the MoU was to facilitate cooperative maritime archaeological research and underwater cultural heritage management activities, educational opportunities, and capacity building between the parties with an emphasis, in its first year, on the *Perth* shipwreck.

The MoU would support collaborative projects that protect the shared heritage of Australia and Indonesia, increase public awareness of both nations' maritime heritage, undertake scientific research, monitoring, and site exploration, and provide educational programs for the public. In addition, the MoU would support skill sharing and professional development opportunities, hands-on marine educational opportunities, and participation in maritime archaeology and maritime history research and projects.

In August 2015 the joint MoU was signed by Dr I Made Geria, (Director, Pusat Penelitian Arkeologi Nasional), Kevin Sumption, (Director, Australian National

Maritime Museum) and Stephen Oxley, (First Assistant Secretary, Australian Department of the Environment). In addition ARKENAS supplied ANMM with a letter of collaboration supporting the *Perth* project.

In September 2015 the Museum submitted its research proposal, along with letters of support from ARKENAS and the Indonesian Cultural Attaché in Australia, to the Indonesian Ministry of Marine Affairs and Fisheries and the Indonesian Ministry of Research and Technology (RISTEK).

Whilst the Museum's research proposal was being assessed by RISTEK in October 2015, and at the instigation of the Naval Attachés from the Australian, United Kingdom and United States Embassies in Indonesia, representatives from the Museum, ARKENAS, NHHC, and the Indonesian Ministry of Marine Affairs and Fisheries met with Indonesian Navy (TNI-AL) representatives in Jakarta to discuss the ongoing threat to underwater cultural heritage in Indonesian waters and possible solutions to the problem.

In late April 2016 the Museum's research proposal was approved by RISTEK and, after submitting additional paperwork, in early October 2016 the Museum was granted a RISTEK (Foreign Research Permit) and 306 Visa from the Indonesian Embassy in Canberra to undertake research in Indonesia.

The arrival of the Indo-Australian Monsoon in Banten Province in late October 2016 meant that conditions on *Perth* and *Houston* were unfavourable for diving and the underwater component of the survey work was postponed until early-to-mid 2017. As an interim measure, the Museum (with the permission of ARKENAS and the NHHC), contracted Firman Setiawan, S. Kel from Mahesa Prasaya Geoservices in Bandung, West Java, Indonesia to undertake a multi beam sonar survey of both wreck sites.

In early December 2016 Mahesa Prasaya Geoservices completed the survey of both sites and provided accurate information on their respective locations, water depths, and the extent of their surrounding debris fields. *Perth*'s survey data also showed a number of anomalies, including a large blank area amidships, distortion of the bow and stern, and several anomalies adjacent to the surviving articulated hull. The apparent length of the site (90 metres) also did not correspond with *Perth*'s known dimensions--specifically its overall length (171 metres) and length between perpendiculars (160 metres). ANMM staff conducted an assessment of *Perth* in early May 2017, following the end of the 2016-2017 monsoon season.

2.0 Project Partners

The National Research Center of Archaeology (ARKENAS) is an agency within the Indonesian Ministry of Education and Culture. ARKENAS, along with its ten regional offices, is responsible for archaeological research, as well as administration and management of archaeological sites in the Republic of Indonesia.

According to the *Regulation of the Republic of Indonesia Number 11 Year 2010 about Heritage*, any objects, buildings, structures, sites and areas with historical, scientific, educational, religious and / or cultural values - that are older than 50 years- and located on land or in the water, are considered a heritage item, unless proven otherwise.

The archaeological investigation of underwater cultural heritage sites in Indonesia is relatively new, but given that the country is located on many historic maritime trading routes it is known that Indonesian waters contain the remains of many foreign shipwrecks and other items of underwater cultural heritage.

The Department of the Environment (DoE) administers Australia's *Historic Shipwrecks Act* (1976), which protects shipwrecks and associated relics that are older than 75 years. The *Historic Shipwrecks Act* applies to Australian waters that extend from the low tide mark to the end of the continental shelf and is administered in collaboration with Australia's Commonwealth, State, Northern Territory and Norfolk Island Governments. The Commonwealth also administers historic shipwrecks in certain offshore territories, including Christmas Island and the Cocos (Keeling) Islands in the Indian Ocean Region.

The *Historic Shipwrecks Act* is delivered through the Commonwealth Government's Historic Shipwrecks Program. Its objectives are to study, explore, document and protect Australia's historic shipwreck heritage. A key directive of the DoE is to develop policies and programs in support of Australia's national maritime heritage, to provide national leadership and to contribute to the investigation and management of Australian shipwrecks in foreign waters, particularly through capacity building programs and initiatives.

The Australian National Maritime Museum *(ANMM)* was established by *The Australian National Maritime Museum Act* (1990) and its principal objectives are to exhibit or make available to exhibit maritime historical material, to disseminate information relating to Australian maritime history, and to conduct, arrange for and assist research into matters relating to Australian maritime history.

A key focus of the ANMM's archaeological work is to investigate shipwrecks of Australian national significance that are located in either international waters or within the jurisdictional waters of foreign countries. The Museum therefore seeks to collaborate with international partner organisations and share information, resources and skills in order to progress this work.

3.0 HMAS *Perth* (I) Project 2017

3.1 Scope of works and methodology

Working in partnership with the Australian Department of the Environment and ARKENAS, it was the intention of the Australian National Maritime Museum (subject to permit conditions) to conduct a photographic survey and conservation assessment of the wreck site of HMAS *Perth* (I). This work was to be followed up by an ancillary remote sensing survey (side-scan-sonar and multi-beam survey) of the shipwreck site and its surrounding area to confirm its condition, analyse its stability and ongoing corrosion processes, and verify if the site has been impacted by recent salvage events.

It is worth noting that archival information indicates salvage work occurred on the site as early as the late 1960s, as evidenced by the removal of some of the ship's bronze propellers, 4-inch guns, ship's bell and the ship's telegraphs by 1974.

The project's intention was to confirm *Perth*'s location and conduct a minimum disturbance archaeological survey of the site. The survey was carried out in accordance with RISTEK permit conditions and good archaeological practises – as defined in the *Annex to the UNESCO Convention on the Protection of Underwater Cultural Heritage* (Maarleveld, T.J, Guerin, U and Egger, B, 2013). The ultimate goal was to identify the shipwreck's historical and archaeological significance and use this to prepare – in consultation with ARKENAS – a Case for Declaration under The Republic of Indonesia's Cultural Heritage Legislation

This was to be achieved by:

- Conducting a detailed historical study of *Perth*, and paying special attention to any modifications made to the vessel or battle damage sustained by it during its operational life.
- Initiating detailed analyses of existing written, photographic or digital media that provides comparative evidence of more recent site formation processes such as diving or salvage activity.
- Conducting a non-disturbance survey of the actual shipwreck site. This would involve establishment of site baselines, survey and identification of major hull features, documentation of associated cultural material, including cargo, human remains and personal effects. A photographic record, (both still and video imagery) was produced as a means of documenting both the site itself and the work carried out.
- Performing a remote sensing survey of the adjacent waters of the wreck and recording the positions of any anomalies by DGPS; and
- 'Ground truthing' (identifying) any anomalies detected during the remote sensing survey.

4.0 Primary Location: HMAS *Perth* (I)

Locational map showing the geographic area where the wreck sites of HMAS *Perth* (I) and USS *Houston* are located (http://www.perthone.com/pcarbean.html, accessed 10 August 2015).

4.1 Location and Dive site conditions

The wreck sites of HMAS *Perth* (I) and USS *Houston* lie in the eastern approaches of the Sunda Strait between the islands of Java and Sumatra in the Republic of Indonesia. *Perth* lies at 05.51.42S 106.07.52E, or about three nautical miles (5.5 kilometres) northeast of St. Nicholas Point on the northwest tip of Java (http://www.pacificwrecks.com/ships/hmas/perth.html, accessed 10 February 2014).

Discovered and first identified in 1967, *Perth*'s wrecked hull lies on its port side on a relatively flat sandy bottom in about 35 metres of water. The starboard side of the vessel – which is closer to the surface – lies in approximately 21 metres of water. Average diving depth is around 30 metres. Given its relatively shallow depth, good bottom times are possible on *Perth* – using Nitrox - without resorting to prolonged underwater decompression. Currents in the Strait are associated with the Indonesian Through-flow, and can be very strong at times. These currents also have a strong influence on underwater visibility, which varies between 1.0 metres and 5.0 metres.

Due to these currents and poor visibility, it is not uncommon for divers to only manage one or two dives on the site over a three to four-day period (which, incidentally is the average length of dive charters that visit the shipwreck).

4.2 Timing

According to Java Sea Charters – the operators of the only live- aboard dive charter vessel operating on the eastern side of Sunda Strait - the best time of the year to dive *Perth* and *Houston* is the end of the dry season. This period lasts from July through to early September, and produces the best visibility and reduced currents (www.Javaseacharters.com, accessed 10 February 2014).

David Ross, a professional dive operator based in the Philippines who runs regular technical diving charters in Sunda Strait (including dives on *Perth* and *Houston*) also recommends both sites can be visited during the latter half of the year from August through to early October (dave@techasia.ph, pers. comms.8 February 2014).

Dr Andrew Fock, RANR, Head of Hyperbaric Medicine at the Alfred Hospital in Melbourne, is a regular visitor to the *Perth* and *Houston* sites and one of the first divers to officially report changes / damage to *Perth*. He also recommends July through to end of September as the optimum time to visit *Perth* and *Houston* (andrewfock@icloud.com, pers comms 1 April 2014).

These colloquial accounts are supported by oceanographic studies of the 'Indonesian Through-flow', the principal cause of strong currents that affect diving in Indonesia. The Indonesian Through-flow is strongest during the South-west monsoon (June-July-August), with currents in Sunda Strait reaching up to eight knots. The current's strength is significantly reduced during the North-west monsoon (December- February) (http://www.indonesianthroughflow.com/ and http://en.wikipedia.org/wiki/Indonesian_Throughflow, accessed 8 February 2014).

Despite these recommendations, the results of the remote sensing survey of *Perth*'s wreck site in December 2016 prompted ANMM and ARKENAS to visit the site at the end of the wet season in May 2017. Fortunately, conditions were ideal and the team managed two dives a day for four consecutive days.

5.0 The HMAS *Perth* Project Team

ANMM provided two maritime archaeologists for the fieldwork component of the *Perth* project and to produce the written report of investigations.

The Project Director was Kieran Hosty, Manager of the Museum's Maritime Archaeology Program. He is the former Commonwealth Shipwrecks Officer for The Victoria (Australia) Archaeological Survey (1987 - 1993), has extensive experience in maritime archaeology and cultural resource management and is an Australian Diver Accreditation Scheme certified diver with endorsements for commercial SCUBA on air and nitrox and commercial Surface Supplied Breathing Apparatus. Mr Hosty was assisted by Dr James Hunter, ANMM's Curator of Royal Australian Navy (RAN) Archaeology and a specialist in the archaeology of historic naval vessels.

ANMM staff were joined by three Indonesian archaeologists: Shinatria Adhityatama from ARKENAS, Turmudi M.Hum from the BPCB (Serang), and Yusuf Arief Afandy from the Ministry of Marine Affairs and Fisheries (KKP). In addition, Pak Busro, a security officer from the *Tentara Nasional Indonesia* (TNI -- Indonesian National Armed Forces) and Samsul, a local dive guide, accompanied the dive team during the survey work. Indonesian team members contributed archaeological and diving expertise, as well as community liaison, communication and logistical skills and assistance.

The team's work platform was the Banten Bay-based fishing vessel *KM Srilungguh II*, captained by Fauzi and assisted by crewmembers Puri, Kasir, Fahad and Lnofur.

6.0 Standards of Work

All survey work was carried out in accordance with the permits issued by Indonesia's Secretariat of Foreign Research Permits, The Indonesian Ministry of Research and Technology and The National Research Centre for Archaeology (ARKENAS).

The work was carried out to the standards required under the Maritime Archaeology Guidelines of the Australian National Maritime Museum, the Code of Ethics of the Australasian Institute of Maritime Archaeology (AIMA), the Maritime Archaeology Guidelines of the International Council of Maritime Museums (ICOMM), the general principles of the International Council on Monuments and Sites (ICOMOS) and the General Principles and Annex of the 2001 UNESCO *Convention for the Protection of the Underwater Cultural Heritage*.

6.1 Authorship Statement and Production of Project Report

The *HMAS Perth Project 2017, Sunda Strait, Republic of Indonesia* was written by ANMM staff members Kieran Hosty (Manager, Maritime Archaeology Program) and Dr James Hunter (Curator, RAN Maritime Archaeology), as well as Shinatria Adhityatama from ARKENAS

In accordance with the conditions of project permits, a draft report was submitted to ARKENAS and Indonesia's Secretariat of Foreign Research Permits prior to Australian team members leaving Indonesia in May 2017. This final report was produced within six months of completion of the survey and copies forwarded to The Secretariat of Foreign Research Permits, Indonesian Ministry of Research and Technology, ARKENAS, the Embassy of the Republic of Indonesia (Canberra, Australia) and the Australian Department of Environment (Canberra, Australia) in mid July 2017.

A précis of the expedition's findings will be published in the *Bulletin of the Australasian Institute of Maritime Archaeology* and presented at the annual national conference of the Australasian Institute of Maritime Archaeology, or international conference of the Society for Historical Archaeology.

A plain language version of the report will also be published in *Signals*: *The Journal of the Australian National Maritime Museum* in September 2017.

6.2 Artefact Management Plan

Whilst the recovery of archaeological material from *Perth* and its removal from the Republic of Indonesia was not proposed or recommended, in line with good archaeological practise, an Artefact Management Plan was developed in conjunction with ARKENAS and RISTEK.

If the decision was taken to recover archaeological material from the site this was only to occur with the written permission of ARKENAS and Indonesia's Secretariat of Foreign Research Permits. Further, removal of archaeological material from the Republic of Indonesia would only proceed after submission and approval of a Material Transfer Agreement.

Any future recovery of archaeological material from the *Perth* wreck site and its subsequent removal from the Republic of Indonesia will only occur if all necessary permits and Material Transfer Agreements – as outlined in *Research Permit Procedures*, The Ministry of Research and Technology, The Republic of Indonesia, 2010 – have been obtained.

The Australian National Maritime Museum will meet best practise conservation procedures in stabilising, packing, transporting, documenting and analysing and conserving all wet archaeological material recovered from *Perth*. All conservation, examination, scientific investigation, treatment and documentation activities will be conducted in line with the Code of Practice of the Australian Institute for Conservation of Cultural Material (AICCM) (http://www.aiccm.org.au/, accessed 25 June 2013)

ANMM also agreed to undertake ongoing conservation and collection management of any recovered artefacts in perpetuity. The only exception to this arrangement would be if another collecting institution with suitable conservation and collection management capacity accepts these objects into their collections with the requisite permission of the Indonesian Government.

To reiterate, no artefacts were recovered during the course of the project, and no artefacts were removed from the Republic of Indonesia or accessioned into the collections of the Australian National Maritime Museum.

7.0 Permit and Visa Requirements

Indonesian Government Decree No: 41/2006 stipulates that all foreign universities, research and development institutions, foreign entities and foreign nationals are required to apply for a Foreign Research Permit (RISTEK) from the Indonesian Ministry of Research, Technology and High Education prior to arriving in Indonesia. Any research conducted without the RISTEK permit is considered illegal and punishable by imprisonment and or deportation. (The Ministry of Research, Technology and Higher Education, *Foreign Research Permit Guide*, 2017;

In order to obtain the necessary RISTEK Permit the Museum first drafted a Memorandum of Understanding regarding the proposed archaeological investigation of *Perth* with ARKENAS in November 2014.

In August 2015 the MOU was formally signed and a counterpart letter issued by ARKENAS to the Museum allowing the Museum to submit a formal research proposal to the RISTEK Research Committee.

In September 2015 the research proposal was submitted and in April 2016 the Museum was formally told by Indonesian Ministry of Research, Technology and High Education that they may apply for the RISTEK permit and 315 Visa by submitting via RISTEK supporting documentation including

- A copy of the approved Research Proposal
- A copy of the signed MOU
- A copy of the Indonesian Counterparts Letter of Support
- A Supporting Letter from the Indonesian Cultural Attaché
- A Supporting Letter from the Indonesian Military Attaché
- An Abstract of the research proposal
- Scanned copies of the applicant's passports
- Scanned copies of applicant's CV's
- Material Transfer Agreement which covers the disposition of any recovered material
- Authorship and Copyright Agreement stipulating the joint ownership of any data obtained.
- Joint Publication Statement stipulating the joint authorship of any publications resulting from the fieldwork
- Two letters of recommendation from applicant's supervisors and senor scientists
- Official letter of recognition from applicant's institution or university
- Letter of Acceptance from Indonesian Research Institute
- Letter Guaranteeing Sufficient Funds to cover research and living expenses
- Applicant's bank details and financial statements
- Health Certificates

- Public indemnity, health and travel insurance documentation and
- A list of research equipment that will be brought into Indonesia

In October 2016 Kieran Hosty and Dr James Hunter (as applicants) were granted a Research Permit and 315 Visa to enter Indonesia and conduct research on *Perth* but the arrival of the 2017 Monsoon postponed the fieldwork component until May 2017.

In May 2017 Hosty and Hunter arrived in Indonesia and subsequently applied for and were granted

- Research Permit (SIP) from RISTEK
- Travelling Permit (SKJ) from Indonesian National Police
- Limited Stay Permit (KITAS) from Department of Immigration
- Research Notification Letter from Ministry of Home Affairs and
- National Security Clearance from the Ministry of Defence.

In addition prior to any fieldwork being conducted the Museum and ARKENAS arranged for observers from:

- The Ministry of Marine Affairs and Fisheries
- The Ministry of Education and Culture (Serang) and
- The Ministry of Defence – Navy (TNI-AL)

to participate in the fieldwork and be present aboard the dive vessel during survey operations.

8.0 Diving Operations, Regulations and Risk Assessment

Scuba diving operations during the HMAS *Perth* Shipwreck Project expedition were conducted under occupational diving regulations (AS 2299 and AS2815) with all participants having adequate diving qualifications (ADAS or equivalent) and up to date (less than 12 months old) diving medical certificates.

All divers presented documents to verify their diving qualifications, proof of recent diving experience and experience to a particular level prior to the expedition commencing.

As there are risks associated with entering and working in and on any body of water and additional risks existing in shipwreck environments. All expeditionary will be made aware of these issues and actively participate in the diving risk assessment process that will be conducted by each diving group prior to any diving or snorkelling activity taking place.

All divers participating in the Project completed the *ANMM Diving Register Personal Questionnaire*, read the HMAS *Perth* Shipwreck Project *Risk Management Assessment* and *Emergency Assistance and Evacuation Plan* and attended the various expedition briefings, site induction and dive protocol briefings prior to participating in any diving or snorkelling activities during the Project.

The Australian National Maritime Museum has a *Scientific Diving Operations and Procedures Manual* and *Scientific Code of Practice* in place. Copies of these two documents along with the Museum's Maritime Archaeology Policy and HMAS *Perth* Project 2017 Risk Assessment were supplied upon request.

For additional information on diving operations please see Appendix Two.

8.1 Medical Facilities

Given the depth of water over the site (21-35m) along with the poor visibility and strong currents the HMAS *Perth* Shipwreck Project *Risk Management Assessment* for the Project indicated a slight possibility of decompression sickness.

The Republic of Indonesia has a number of suitable recompression chambers within a relatively short distance from Banten Bay.

These are located at

Bali: Sanglah General Hospital (in Indonesian language) USUP Sanglah Denpasar Jl. Diponegoro, Denpasar 80114 Bali, Indonesia: Phone 62-361-227911 through -15 ext. 232 (Hyperbaric Medical Department) Fax 62-361-22426 Run by Dr. Antonius Natasamudra and Dr Etty Herawati

Manado (Sulawesi): At the Malalayang Hospital (chamber for 3 to 4 persons) Phone: 0812-4302970 / Dr Glen Hawkins HP +61 407700701 / Dr Sosiawati HP 0812 467 2923 / Dr Hanry Takasenseran HP 0813 4000 0840

Makassar (Sulawesi): Rumah Sakit Umum Wahidin Sudirohusodo. Contact person: Pak Daniel Address: Jl. Perintis Kemerdekaan Km. 11, Tamalanrea Kampus UNHAS Indonesia TEL:++ 62 - 0411 (584677) , 584675.

Jakarta (Java): Rumah Sakit Angkatan Laut (Navy Hospital) in Jl. Bendungan Hilir No.17, Central Jakarta

Surabaya (Java): Rumah Sakit Angkatan Laut (RSAL) (Military Marine hospital) Jl. Gadung No. 1, Surabaya: Phone 031-45750 and 41731, 031-838153 and fax 031- 837511.

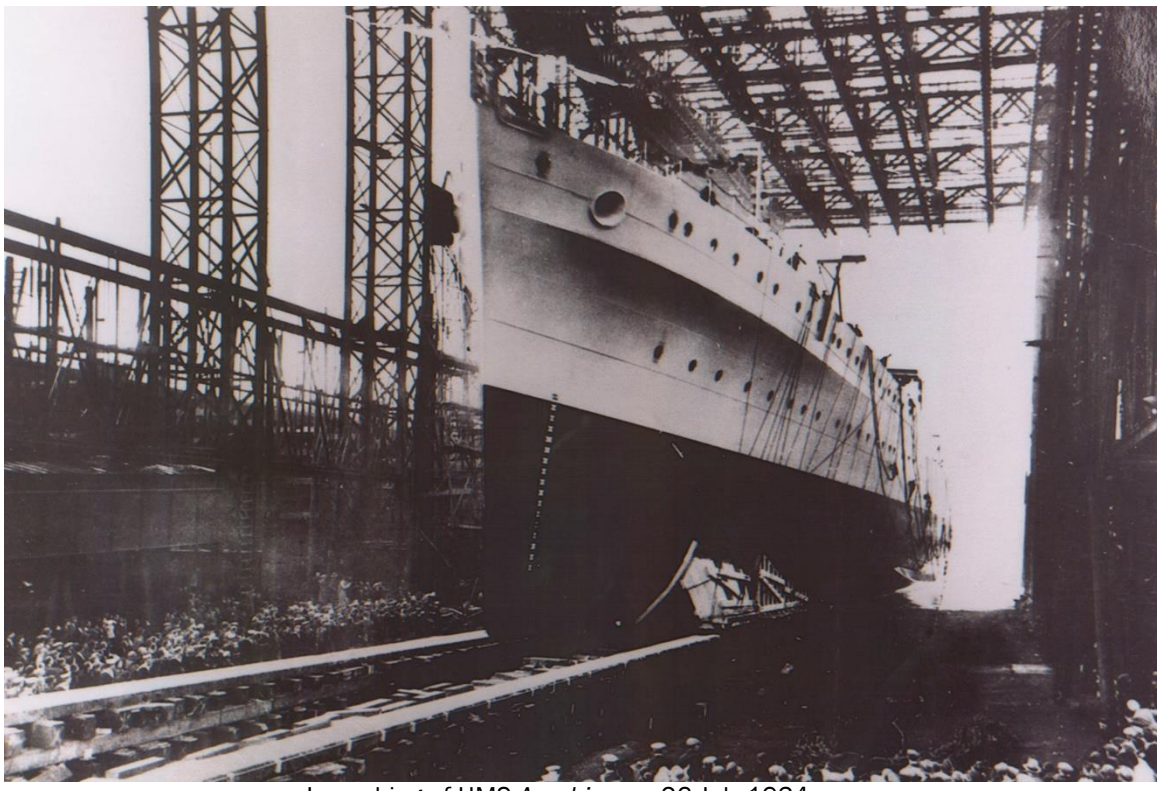
Kalimantan: Rumah Sakit Pertamina Balikpapan, Jl Jendral Sudirman No 1, email: aspb@rspb.co.id, Tel: +62542 734020, 734020, 734024. Contact person: Dr Lukman Hatta, Sp.PD, Sp.KL

9.0 Project Field Dates

Taking into account non-diving days caused by site conditions (1 in 3 days), the inability to fly due to the risk of decompression sickness after diving (1 days), travel time to and from the site of HMAS *Perth* from Jakarta (1 days each way) and the number of estimated dives needed to properly assess the wreck (8 to 10 dives at 2 dives a day) it was estimated the project team would need four to five days on site.

Sunday 7 May	Depart Sydney for Jakarta
Monday 8 May	Arrive Jakarta proceed to RISTEK for Research Permits and Letters of Introduction.
Tuesday 9 May	Police Headquarters
Wednesday 10 May	Police Headquarters and TNI-AL
Thursday 11 May	Indonesian Public Holiday / meeting with Australian Embassy
Friday 12 May	Discuss diving, archaeological and emergency procedures briefings with ARKENAS
Saturday 13 May	Depart Jakarta for Serang
Sunday 14 May	Arrive site of HMAS *Perth*, Banten Bay – site buoyed, site familiarisation, build up dives and safety procedures
Monday 15 May	Initial survey underway of HMAS *Perth*
Tuesday 16 May	Photographic survey underway of HMAS *Perth*
Wednesday 17 May	Photographic survey underway of HMAS *Perth*
Thursday 18 May	Photographic survey underway of HMAS *Perth*
Friday 19 May	Briefing with Australian Embassy and Banten Provincial Government. Depart Serang for Jakarta
Saturday 20 May	Briefing Australian Embassy
Sunday 21 May	Depart Jakarta for Sydney
Monday 22 May	Arrive Sydney

10.0 Historical Background - HMAS *Perth* (I)



Launching of HMS *Amphion* on 26 July 1934
(http://www.navy.gov.au/hmas-perth-i, accessed 20 March 2014)

Following the end of the First World War, the Allied forces initiated a series of talks and treaties to limit the number, armament and size of significant naval assets such as battleships and cruisers. Despite the Washington Naval Treaty of 1921/22 and the subsequent London Treaty of 1936, rapid advancements in naval technology and subsequent build-up of warships around the world – particularly in Germany, Italy and Japan - created significant unease in post-war Australia.

With only two heavy cruisers [HMAS *Australia* (II) and HMAS *Canberra* (I)], two submarines (HMAS *Oxley* and HMAS *Otway*) and a small handful of outdated destroyers and sloops comprising its principal fleet, the Australian Government believed it could not meet its own defence requirements, let alone its commitments to its allies. These feelings were exacerbated by Australia's isolation from its major allies (Great Britain and the United States) by vast expanses of ocean, and dependence upon long sea routes for the majority of its trade.

Acting on the advice of Great Britain, Australia commenced a three-year program of naval expansion that resulted in the acquisition of three modified *Leander* Class light cruisers (HMS *Phaeton*, HMS *Apollo* and HMS *Amphion*) from British naval yards. HMS *Amphion* was renamed HMAS *Perth* (I), and commissioned into Royal Australian Navy (RAN) service on 29 June 1939. The other modified *Leander* Class vessels were renamed HMAS *Sydney* (II) and HMAS *Hobart* (I) (Pfennigwerth, 2007).

Perth left Portsmouth, England on 26 July 1939 on its delivery voyage to Australia. It voyaged via New York, the Caribbean and the Panama Canal, and was cruising of the coast of Venezuela near the islands of Trinidad, Aruba and Tobago when war with Germany and its allies was declared on 3 September 1939.

Pending the arrival of Royal Navy vessels to the region, *Perth* was ordered to remain on station off the South American coast and search for German shipping while also offering protection to Allied oil tankers sailing between Trinidad and Venezuela. In order to confuse potential German sympathisers on the Caribbean islands, *Perth*'s crew fitted the ship with a collapsible dummy third funnel that could be erected before entering port. This was done in an effort to make it appear there were at least two Allied cruisers operating in the area. A few months later, *Perth* was repainted a darker grey colour as its peacetime light grey paint scheme was considered too conspicuous at night (http://www.perthone.com/pcarbean.html, accessed 10 August 2015).

Perth remained on station in the Caribbean until early March 1940, when it completed its delivery voyage to Australia. The light cruiser arrived at Garden Island, Sydney on 31 March 1940 to a tumultuous welcome (http://www.navy.gov.au/hmas-perth-i, accessed 10 August 2015)

HMAS *Perth* arriving Port Jackson, Sydney, NSW in March 1940
(Australian War Memorial #301166)

Upon arriving in Sydney, *Perth* went into dry dock for fitting of its heavy aircraft catapult mechanism and, later, embarkation of its first aircraft, a Walrus Seagull V. The vessel was subsequently employed in reconnaissance patrols and convoy escort work around Australia.

In August 1940, *Perth* was back in Sydney being fitted with degaussing coils around its hull. The coils were used to reduce the ship's magnetic signature by passing an electrical current through them. The current reduced the natural magnetism generated by *Perth*'s steel hull as a result of the processes used to construct it. The degaussing system provided some protection against magnetic mines, which were designed to detonate when changes in the earth's magnetic field caused by an iron or steel ship passing by were detected. (Pfennigwerth, 2007)

On 28 November 1940, *Perth* departed Fremantle in Western Australia for the Yemeni port of Aden. It was charged with escorting transport ships that made up Convoy US7 (Australia to Suez Canal No 7). After a relatively uneventful voyage *Perth* and its convoy arrived safely at Aden on 16 December 1940. The light cruiser re-embarked its aircraft and proceeded north to the Suez Canal with a second convoy. It then moved on to Alexandria, Egypt to the British Mediterranean Fleet Base, where it was replenished and painted with its first camouflage scheme. Perth subsequently it took up duty in the Mediterranean as a naval unit of the 7th Cruiser Squadron, which included two unmodified *Leander* Class light-cruisers, HMS *Ajax* and HMS *Orion* (Carlton, 2010, Pfennigwerth, 2007).

For the next 10 months *Perth* saw considerable action. It was involved in the Battle of Greece (March, 1941), the Battle of Cape Matapan (March, 1941), the Battle of Crete (May, 1941) and the Syria-Lebanon Campaign. The vessel sustained some damage to its hull plating, oil tanks, starboard propeller shafts and its aftermost turret (Y-Turret) from a near miss during an air raid in Malta.

The damage highlighted the inability of *Perth*'s anti-aircraft defences to cope with German Stuka aircraft. Consequently, they were strengthened with the addition of a single 40mm 'pom-pom' anti-aircraft gun mounted amidships between *Perth*'s funnels. The new gun had a range of just over 1000m and rate of fire of 100 rounds per minute. It was complimented by several captured Italian Army Breda anti-aircraft guns that were fitted at either side of the after end of the catapult platform. Another was mounted in a tub on the quarterdeck (Pfennigwerth, 2007: 99). The pom-poms and Bredas were removed from *Perth* prior to its departure from the Mediterranean and later replaced in Sydney with 20mm Oerlikon guns atop the turrets and 0.5-inch machine guns at the extreme after end of the vessel's weather deck.

Perth sustained additional damage during the Battle of Crete in May 1941. The ship endured several days of near-continual air attacks, and suffered splinter- and projectile holes in its hull and superstructure that fractured ventilation trunking, damaged communication wiring, and rendered the ship's 6-inch and 4-inch control tables inoperable. The control tables provided range and bearing information for *Perth*'s main and secondary armament. In addition to the aforementioned, the liners of the ship's 4-inch guns were burnt out.

On 30 May 1941 *Perth* was hit by a bomb just abaft the foremast which penetrated the galley and blacksmith's shop before entering 'A' Boiler Room and detonating. The bomb killed two cooks and two sailors, as well as nine soldiers of 1188 Allied troops that were being evacuated from Sphakia on Crete. With the

boiler room and forward engine room out of action *Perth* was only able to proceed at 20 knots, and it was targeted by several more concentrated aerial attacks prior to the arrival of Allied air support from Alexandria. (Pfennigwerth, 2007)

In Alexandra, preliminary inspection of the damage revealed the forward boiler room was effectively destroyed, while deformation of the ship's hull had opened plate seams and created a number of leaks. The ship's gyro compass was blown off its mountings and the starboard inner propeller shaft was bent. *Perth* also had no blacksmith shop or galley, there was a substantial hole in its main deck, and many of the ship's electrical systems—including the degaussing coils—were defective or inoperable. Given that the damage was substantial and could not be effectively repaired in Alexandria, *Perth* was replaced with HMAS *Hobart* (I) and departed the Mediterranean for much needed repairs in Sydney.

On 12 August 1941 *Perth* arrived in Sydney (via Fremantle in Western Australia), and the ship was moved the following day to Number 1 (or Sutherland) Dock at Cockatoo Island for an extensive refit. At the same time, the first groups of the ship's crew departed for four weeks' leave. Despite Captain Bowyer-Smyth's attempts to keep his well-trained crew together, about 200 members of the ship's company were subsequently posted to other RAN vessels, including HMAS *Canberra* (I), HMAS *Australia* (II) and HMAS *Lolita*. Boyer-Smyth himself was transferred back to the Royal Navy and Acting CMDR Charles R. Reid, RAN, assumed command on 1 September 1941 before he too was replaced by Captain Hector M.L. Waller, D.S.O and Bar RAN, on 24 October 1941 (http://www.navy.gov.au/hmas-perth-1, accessed 15 July 2015).

The refit to *Perth* was considerable – the starboard propeller shafts had to be drawn out and realigned, and the 'A' frames and palm plates (the structural components that supported the shafts outside the hull) were realigned as well. Stern plating and internal frames were replaced and armoured belting in the vicinity of the after shell room was and the hull plating beneath it repaired.

All of *Perth*'s weapons were surveyed and additional armament (most likely 0.5-inch machine guns) and associated ready-use lockers were fitted atop the turrets and on the quarterdeck. The boilers were refurbished, the steam turbines re-bladed, and the 4-inch fire control table replaced with one taken from the Gunnery School at the Flinders Naval Depot.

Other work carried out included replacement of the port generator's bed plate, repairs to both masts, reinstatement of the aircraft retrieval catapult, repair and replacement of *Perth*'s degaussing coils and additional repairs to wiring looms and piping in the boiler rooms.

The ship's old but functional Type 286 radar system was also removed, and despite Waller's numerous requests, never replaced. This shortcoming in *Perth*'s ability to detect approaching enemy warships was to have a significant effect on the vessel's battle capability in March 1942. (Pfennigwerth, 2007: 181) Although the radar was never replaced, several new items were fitted to the ship, including splinter-resistant steel plating that was installed over the electrical cable, and communication links between the bridge and the ship's two gun directors. In

addition, light armour plating was fitted to vital communication equipment – most likely that installed in the wireless office and bridge.

Perth's hull was cleaned and anti-fouling reapplied. Following advice from the Technical Director of Camouflage, the ship's camouflage paint system was changed, with the starboard side painted in a disruptive two-tone grey pattern whilst the port side was painted dark-blue grey.

After completing its refit on 22 November 1941, *Perth* carried out sea trials and training exercises before returning to Sydney for orders and possible redeployment. The cruiser was still in Sydney on 5 December 1941 when news reached Australia of the co-ordinated Japanese attacks on Malaysia and Pearl Harbor. More bad news followed: the Renown-class battle cruiser HMS *Repulse* and battleship HMS *Prince of Wales* were sunk off Kuantan on the east coast of Malaya on 10 December with the loss of more than 850 lives.

NB: The wreck sites of HMS *Repulse* and HMS *Prince of Wales* were designated as Protected Places in 2002 under the *Protection of Military Remains Act* (1986). Unfortunately, the designation does not appear to have deterred illegal salvage operations, as *The Daily Telegraph* reported in October 2014 that both sites had been extensively damaged. (*The Daily Telegraph*, Celebrated British Warships being stripped bare for scrap metal, 26 October 2014).

Although *Perth* was scheduled to remain in Australian waters and replace HMAS *Canberra*--which was undergoing a refit -- the worsening situation in Malaysia and Netherlands East Indies (now the Republic of Indonesia) convinced the Australian Government's War Cabinet to agree to a request from the United States to redeploy *Perth* to what was known as the American-British-Dutch-Australian Area (ABDA) to the north of Australia.

On 31 January 1942 *Perth* sailed from Sydney bound for Fremantle in Western Australia, where it was ordered to escort a convoy of four empty oil tankers and two cargo vessels. The flotilla was bound for the Netherlands East Indies, where it would salvage as much oil and military equipment as possible prior to the anticipated Japanese invasion.

However, on 15 February 1942, shortly after *Perth* sailed from Fremantle, ABDA's principal port and defensive stronghold in Asia, the British Colony of Singapore, was captured by the Imperial Japanese Army. With the convoy's destination port of Palembang on the island of Sumatra now under threat from Japanese forces in Singapore, the convoy was ordered back to Fremantle.

Perth escorted the convoy back towards Fremantle, and was joined *en route* by two Dutch ships (S*wartenhondt* and *Karsik*) fleeing the Netherlands East Indies. When *Perth* arrived within 700 nautical miles of Fremantle, it turned around to join the remaining ABDA forces at Tanjong Priok, the principal port of Batavia (present day Jakarta) on the northern coast of Java (http://www.navy.gov.au/hmas-perth-i; accessed 15 August 2015). The ship arrived in port on 24 February 1942 and was subsequently attacked by Japanese aircraft– but did not sustain any damage.

On 25 February 1942 *Perth*, in company with HM Ships *Exeter*, *Jupiter*, *Electra* and *Encounter*, was ordered to proceed to Surabaya to rendezvous with the ABDA fleet under the command of Dutch Real-Admiral Doorman. The fleet consisted of USS *Houston*, HNLMS *De Ruyter*, HNLMA *Java*, HNLMS *Kortenaer*, HNMLS *Witte de With*, USS *Alden*, USS *John D. Edwards*, USS *John D. Ford* and USS *Paul Jones*. It was charged with intercepting a Japanese invasion fleet consisting of two heavy cruisers, two light cruisers, 14 destroyers and 10 transports (http://www.navy.gov.au/hmas-perth-i; accessed 15 August 2015).

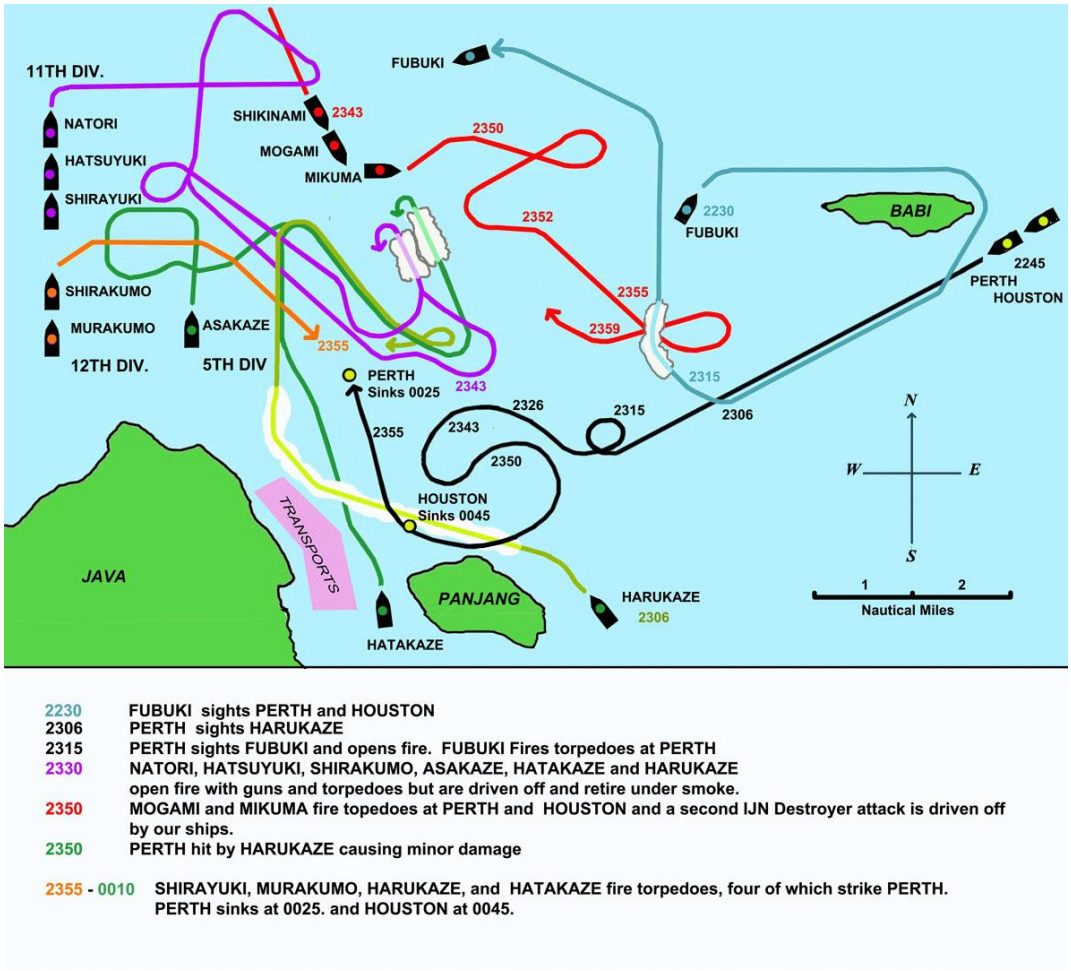
The Japanese fleet was encountered and engaged on the afternoon of 27 February 1942. Although both fleets were evenly matched in terms of firepower, the ABDA force was hampered by language problems, communication difficulties, and lack of air cover. In addition, only six of *Houston*'s 8-inch guns were operable because its aft turret was damaged during an earlier Japanese air raid. The Japanese also possessed superior torpedo technology, and the engagement, now known as The Battle of the Java Sea, proved a disaster for the multinational ABDA force (Pfennigwerth, 2007: 206-218).

Within seven hours, *De Ruyter*, *Java*, *Kortenaer* and *Jupiter* were sunk. *Exeter* was badly damaged and attempted to make for Sri Lanka accompanied by *Encounter*. *Pope* and the four American destroyers were out of ammunition and had headed for Surabaya to rearm (Pfennigwerth, 2007: 206-218).

Perth and *Houston* were the only two large Allied ships to survive the Battle of the Java Sea, and retreated to Tanjong Priok where *Perth* – due to fuel shortages – could only take aboard 300 tons of additional fuel bringing its total stowage to just over half its usual compliment of fuel. The other major problem was that only some 4-inch ammunition was available for both ships, and no 6-inch or 8-inch shells. Van Oosten, quoted in Pfennigwerth (2007: 219), states that *Houston* only had 300 8-inch shells and *Perth* only 120 6-inch shells when they departed Tanjong Priok (http://www.navy.gov.au/hmas-perth-i; accessed 15 August 2015; Pfennigwerth, 2007: 218-219).

The two ships, along with the Dutch destroyer *Evertson*, were ordered to make for the port of Tijlatjap on the southern coast of Java via Sunda Strait between the islands of Sumatra and Java. Due to communication issues *Evertson* remained behind at Tanjong Priok. *Houston* and *Perth* departed the port at 1900 hours on 28 February 1942 and set a course for Sunda Strait. Reconnaissance indicated the Strait was free of enemy vessels and the only ships that were expected to be encountered were Australian corvettes (http://www.navy.gov.au/hmas-perth-i; accessed 15 August 2015; http://en.wikipedia.org/wiki/HMAS _Perth_ (D29); Pfennigwerth, 2007: 218-219).

Unfortunately for *Perth* and *Houston*, a second Japanese invasion fleet – consisting of five cruisers, twelve destroyers, one light carrier, one seaplane carrier, one minelayer and 58 troopships - had already assembled at Bantam Bay.



Map showing vessel movements during the Battle of Sunda Strait, 1 March 1942.
(Image: http://www.perthone.com/images/sun-sundbatmap.jpg, accessed 15 August 2015)

At around 2300 *Perth* and *Houston* were sighted by the IJN destroyer *Fubuki*, which notified the Japanese fleet. A short time later, *Perth* sighted an unidentified vessel (probably the Japanese destroyer *Harukaze*) about five miles (8 kilometres) ahead, off St Nicholas Point on the northwest tip of Java. When challenged, the ship made an unintelligible reply by lamp, and fired nine Type 93 Long Lance torpedoes at the two Allied vessels. Waller responded immediately, and ordered *Perth*'s forward turrets to open fire on the fleeing destroyer. Shortly thereafter, multiple Japanese warships appeared and surrounded *Perth* and *Houston*. (http://www.navy.gov.au/hmas-perth-i; accessed 15 August 2015; http://en.wikipedia.org/wiki/HMAS _Perth_ (D29); Pfennigwerth, 2007: 218-219).

Under fire from the Japanese cruisers and destroyers, *Perth* and *Houston* steamed in a giant semi-circle and attempted to evade their antagonists. However, with little 6-inch and 8-inch ammunition remaining on board the two Allied ships, Waller attempted to force a passage though Sunda Strait. He ordered full speed and altered course for Toppers Island; these commands were carried out, but *Perth* (and *Houston*) began to take substantial hits from the Japanese, who were aided by longer range spotlights and aerial reconnaissance.

Little damage was caused to HMAS *Perth* until 2350 (28 February 1942) when a shell entered the Ordinary's Seamen's Messdeck from the starboard side, forward near the waterline. At the same time the 4-inch gundeck, catapult and the after superstructure were also reported to be on fire. (National Archives of Australia [hereafter NAA]-MP1185/8, 1932/2/20)

A short time later, *Perth* was struck on the starboard side by a torpedo that damaged the forward 'A' Boiler Room, Forward Engine Room and destroyed the forward damage control position (Forward Repair Party). The blast also upset the forward gyrocompasses, vital to the guidance of the ship's main armament, from their gimbals. This was followed soon afterwards by a second torpedo strike to the starboard hull under 'A' turret. The resulting explosion destroyed the magazine and shell room, caused a hull breach near the bridge, and trapped crewmen working in the 4-inch magazine.

A third torpedo struck well aft on the starboard side beneath 'X' turret, and dismounted both 6-inch barrels from their trunnions. Shortly thereafter, a fourth and final torpedo hit *Perth*'s port side. The ship, which by this time was listing to starboard, briefly righted itself then heeled over to port and sank around 0025 on 1 March 1942. (Pfennigwerth, 2007: 224-225; NAA-MP1185/8, 1932/2/20)

With his ship badly damaged, Waller gave the order to abandon ship just after the first torpedo struck. Many of *Perth's* crew got off between the second and third torpedo strikes, but it is doubtful any of the ship's boats were successfully launched. However, a number of Carley floats and wooden life rafts were deployed and used by escaping crewmen. (NAA-MP1185/8, 1932/2/20)

USS *Houston* fought on alone for a brief period, but it too was struck by a series of torpedos and sank just two miles (3.7 kilometres) from where *Perth*'s sank.

At the time it was lost, *Perth's* crew comprised 681 officers and ratings. This number included 671 naval personnel, six RAAF personnel and four civilian canteen staff. Three-hundred fifty-three crew were killed in the Battle of Sunda Strait. Of the 328 survivors, 324 were later captured and imprisoned by the Japanese as prisoners-of-war (POWs). One-hundred and six *Perth* POWs died in captivity, and the remaining 218 survivors returned home to Australia after the war.

Crew of HMAS *Perth*, Fremantle, Western Australia, August 1941
(Australian War Memorial, Canberra, P0395.002)

11.0 Technical Background - HMAS *Perth* (I), 1933-1942

The light-cruiser HMS *Amphion* was built at Portsmouth Naval Dockyard, Hampshire, England and launched in July 1934. The cruiser saw Royal Navy service on the North American and West Indies Stations before it was purchased by the Australian government and commissioned into the Royal Australian Navy (RAN) as HMAS *Perth* (I) on 29 June 1939. *Perth* was the last cruiser-type warship acquired by the Royal Australian Navy.

Perth was a 6,830-ton (Payne [1978: 38] states 6890-ton) modified *Leander*-class light cruiser that was almost identical to two other modified *Leander*-class cruisers acquired the Royal Australian Navy: HMAS *Sydney* (II) and HMAS *Hobart* (I). At the time it was constructed, *Perth* had an overall length of 562 feet, 3.8 inches (171.39m), a length between perpendiculars of 530 feet (160m), and beam of 56 feet, 8 inches (17.27m). Its draught was 19 feet, 7 inches (5.97m).

There is some argument about Perth's actual dimensions, with several online sites, such as http://ww2db.com/ship_spec.php?ship_id=C461 (accessed 10 August 2015) and http://www.navy.gov.au/hmas-perth-i (accessed 10 August 2015) stating the vessel had an overall length of 555 feet (169.16m), beam of 56 feet, 8 inches (27.31m), and draught of 15 feet and 10 inches (4.81m).

When first commissioned into the RAN, *Perth* had a complement of 646 (35 officers and 611 ratings), but at the time of its loss in Sunda Strait there were 681 crew aboard. This number included 671 naval personnel, six Royal Australian Air Force personnel (No. 9 Squadron) and four civilian canteen staff.

Designed for commerce protection and convoy work, *Perth* was armed with eight 6-inch (152mm) breech-loading Mk XXIII naval guns mounted in twin Mk XXI 95-ton turrets. Turrets 'A' and 'B' were mounted forward and Turrets 'X' and 'Y' were positioned aft. *Perth*'s main battery could fire a 51kg shell to a maximum range of 24,500 yards (22,400m). A well-trained crew could sustain a rate of fire of eight rounds per minute. The guns had a maximum elevation of 60 degrees but could only be loaded at an angle of 10 degrees or less. Each turret had its own shell room with a maximum capacity of 400 shells, but shared either the fore or aft magazine - which held *Perth*'s 1600 cordite charges – with the other turret in its battery (Pfennigwerth, 2007).

Initially, naval architects planned to modify *Perth*'s fore and aft 6-inch turrets to allow for an additional 6-inch Mk XXIII naval gun. These modifications were later cancelled due to concerns over their potential impact on the vessel's speed and fire control efficiency.

The cruiser's main secondary armament originally consisted of four 4-inch (101mm) QF Mk XVI naval guns mounted in single turrets http://www.perthone.com/pamphion.htm, accessed 10 August 2015).

The single 4-inch guns were later replaced with eight 4-inch Quick Firing (QF) Mk XVI naval guns mounted in Mk XIX twin turrets. This modification occurred during a significant refit in December 1938 and before *Perth* was handed over to the

RAN. The new 4-inch gun mounts were positioned around the aft funnel, with two located to starboard and two to port. They could be elevated to 80 degrees, fired a 16kg shell at a rate of 15 rounds per minute, and had a range of 20780 yards (19,000m). *Perth* had magazine stowage for 800 rounds per gun, as well as ready-use lockers located on the gun deck that contained an additional 30 rounds (Pfennigwerth, 2007).

Perth's supplementary defensive weaponry consisted of 12 50-calibre machine guns in three quadruple mounts. These were located abaft the mainmast and to either side of the bridge. The ship was also outfitted with ten .303 machine guns and eight 21-inch torpedo tubes. The torpedo launchers were mounted approximately amidships and each fired four Mark IX torpedoes (Pfennigwerth, 2007).

Fire control for *Perth*'s 6-inch guns was attained via 4.6m optical range finders on a single Director Control Tower (DCT) mounted above and abaft the bridge. An associated transmitting station was located below the waterline directly below the DCT. The guns could be fired either from the DCT, transmitting station, or individual turrets. A proposal to fit a second DCT abaft the second funnel to provide more redundancy in the gun control system was discussed, but not acted on during *Perth*'s construction (Pfennigwerth, 2007). The 4-inch guns were directed and controlled from a High-Angle Control Station (HACS) located on a separate tower just abaft the DCT.

The RAN state http://www.navy.gov.au/hmas-perth-i (accessed 10 August 2015) that *Perth* was also armed with four 3-pounder and four 2-pounder saluting guns, 10 depth charges mounted in racks at the stern, an Asdic Type 132 sonic transducer for submarine hunting, and medium- and high-frequency radio direction finding equipment mounted on the ship's foremast. The latter could home in on radio traffic up to 50 nautical miles away (http://www.perthone.com/pamphion.htm, accessed 10 August 2015: Pfennigwerth, 2007).

Perth was equipped to carry a catapult-launched amphibious aircraft. Initially, the cruiser was assigned a Supermarine Seagull V, but this was later replaced with a Supermarine Walrus. The Walrus was a single engine biplane reconnaissance aircraft with a fully retractable main undercarriage and completely enclosed crew accommodation. Its all-aluminium fuselage supported stainless steel-sparred, wooden-ribbed, fabric-covered wings. The aircraft's armament usually comprises two .303 Vickers K machine guns mounted in the nose and rear of the fuselage. It could also carry bombs and depth charges.

Because the Walrus and its cordite-powered catapult system were mounted between the funnels on *Perth*'s 4-inch gun deck, it proved easily damaged by the muzzle blasts from the forward 4-inch guns. As a preventative measure, the Walrus was removed from the ship and was restricted to operating from shore bases during *Perth*'s deployment to the Mediterranean. Ultimately, the plane was brought back on board for *Perth*'s return voyage to Australia in 1941, and was present during the ship's final hours in Sunda Strait (Pfennigwerth, 2007).

As befit its designation as a modified *Leander*-class light cruiser, *Perth*'s machinery and propulsion system was housed in two self-contained spaces. Each was outfitted with two Parsons geared turbines and two Admiralty three-drum boilers that allowed the ship to continue operations even if one engine space was disabled or destroyed. The separation of engine spaces gave *Perth*, *Sydney* and *Hobart* a distinctive twin-funnel profile. It also resulted in the length of the vessel's side armour belting being extended from 26 to 43 metres (84 to 141 feet) in an added effort to protect both propulsion spaces.

Although it provided some advantages over the funnel arrangement of standard *Leander*-class light cruisers, twin funnel arrangement of modified *Leander*-class vessels had one big drawback: The distance between the two funnels provided an attacking enemy, armed with optical rangefinders, a very easy means of calculating the range to their target (Pfennigwerth, 2007: 23). This problem was so obvious that *Perth* was fitted with funnel blinds (to break up the pattern of the funnel) following the outbreak of the Second World War.

Perth's four steam turbines – drawing on a bunker capacity of 1768 tons of fuel oil - produced 72,000 shaft horsepower (54,000kW) to the vessel's four propellers, giving it a maximum speed of 31.5 knots (58.7km/h). At top speed the light-cruiser had a range of 1,780 nautical miles (3,300km), whilst its normal cruising speed of 22.7 knots (42km/h) produced a maximum range of 6,060 nautical miles (11,220km).

The ship's principal electrical power came from steam driven turbo-generators, as well as auxiliary diesel- and motor-driven power generators. As the auxiliary generators did not run on bunker oil, *Perth* also carried 250 tons of diesel fuel for the generators, along with a small quantity of aviation fuel for the Walrus aircraft (Pfennigwerth, 2007).

According to Pfennigwerth (2007: 33-34), although *Perth* was a relatively well-armed and equipped warship for the mid-1930s, it had a number of significant weaknesses that would become more and more evident following the outbreak of war in 1939.

The Washington Naval Treaty of 1921 – 22 theoretically restricted the number, size, armament, and speed of the signatories' operational naval vessels. The subsequent London Treaty of 1936 limited the size of capital warships to less than 35,000 tons and the calibre of their primary armament to 14-inch projectiles. However, research relevant to warship design, construction and armament continued at a rapid pace. Italy built the 45,000 ton / 15-inch battleships *Vittorio Veneto* (1934-37) and *Littorio* (1934-37), followed shortly thereafter by the German 41,000-ton / 15-inch battleships *Bismarck* (1936-1939) and *Tirpitz* (1936-41). Japan followed suit and constructed the 72,000-ton / 18-inch battleships *Yamato* (1937-1941) and *Musashi* (1940-1942) (Carlton, 2010; https://en.wikipedia.org/wiki/Japanese_battleship_Musashi, accessed 10 August 2015).

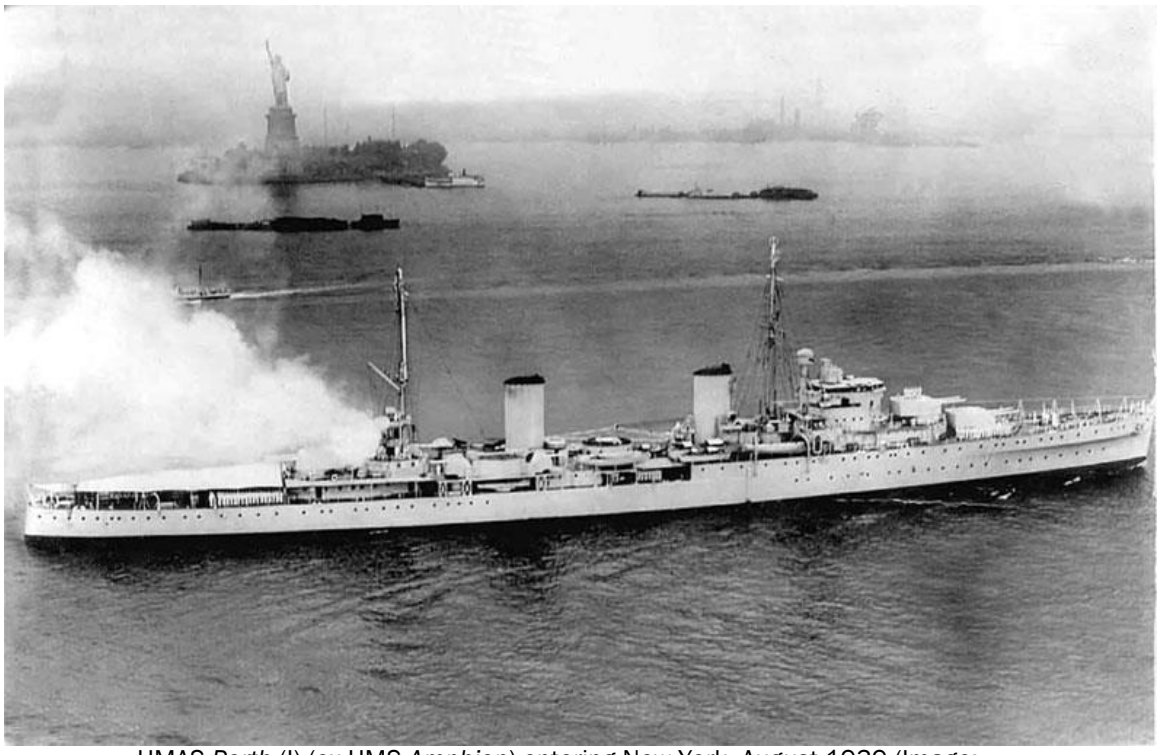
As potential enemy warships were getting larger and better armed, *Perth* appeared obsolete by comparison. The light cruiser was fitted with relatively poor-

quality optical range finders and built prior to the development of gunnery radar, gunnery operations rooms, and plan position indicators. It also carried insufficient quantities of ammunition for protracted naval engagements. *Perth,* like many other pre-war fighting vessels, relied upon a gunnery method known as 'up ladder groups' in which shells were fired at pre-set ranges that were steadily increased until the target was straddled. This type of naval gunnery was very ineffective; Pfennigwerth (2007: 35) cites one instance in which two Royal Navy 6-inch cruisers fired more than 2,500 shells at the German pocket battleship *Admiral Graf Spee* and recorded only 57 hits.

Great technological breakthroughs had also been made in torpedo technology, optical range finding and gunnery control. The Imperial Japanese Navy (IJN) invented the Long Lance torpedo, which was powered by hydrogen-peroxide, carried a 450-kg warhead, and could cruise at a speed of 50 knots for up to 20km. IJN surface vessels had also developed the capacity to reload torpedoes effectively at sea. Some IJN cruisers were capable of launching up to 40 torpedoes; by comparison, *Perth*'s was only able to launch eight torpedoes. The superiority of Japanese torpedoes is evident when one considers that both *Perth* and *Houston* were sunk not by shellfire, but multiple torpedo strikes.

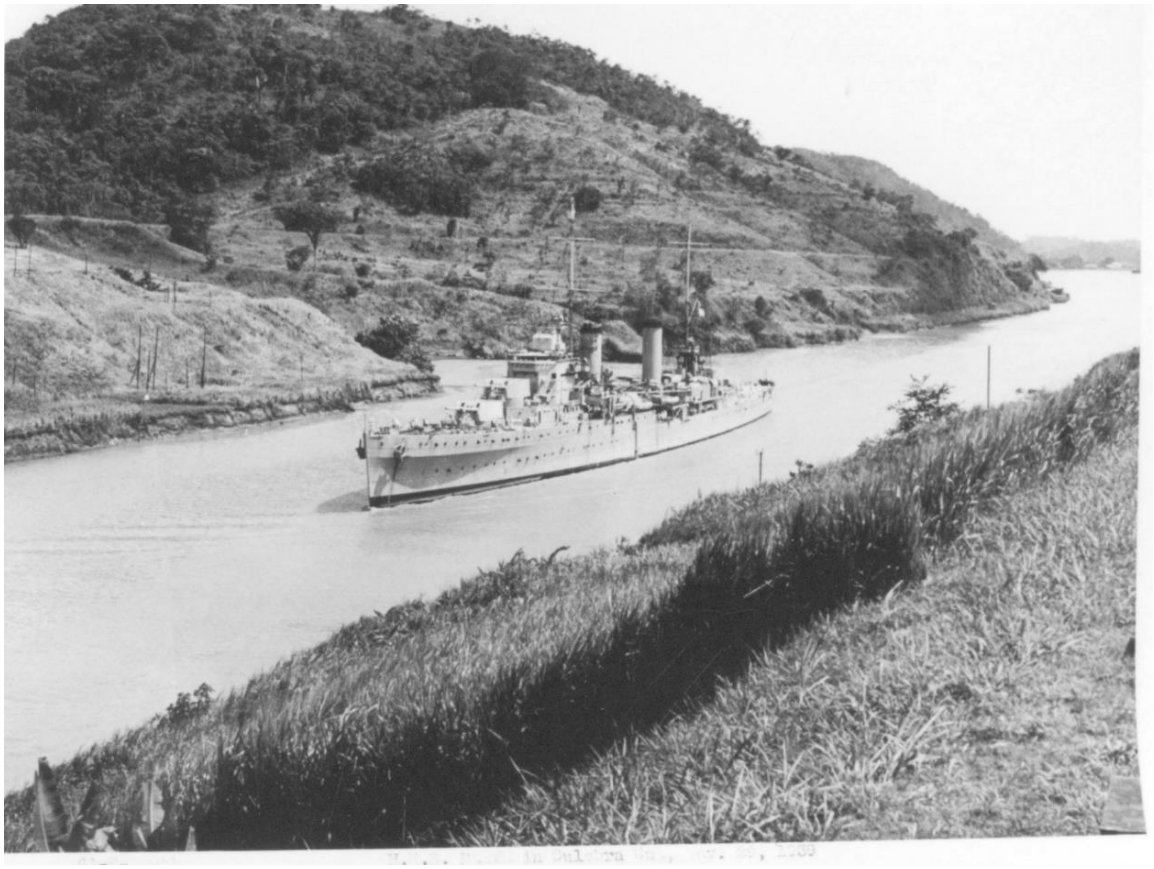
HMS *Amphion*, 1935, http://www.perthone.com/pamphion.htm, accessed 10 August 2015

HMS *Amphion*, 1937 (Image: http://www.perthone.com/pamphion.htm, accessed 10 August 2015).



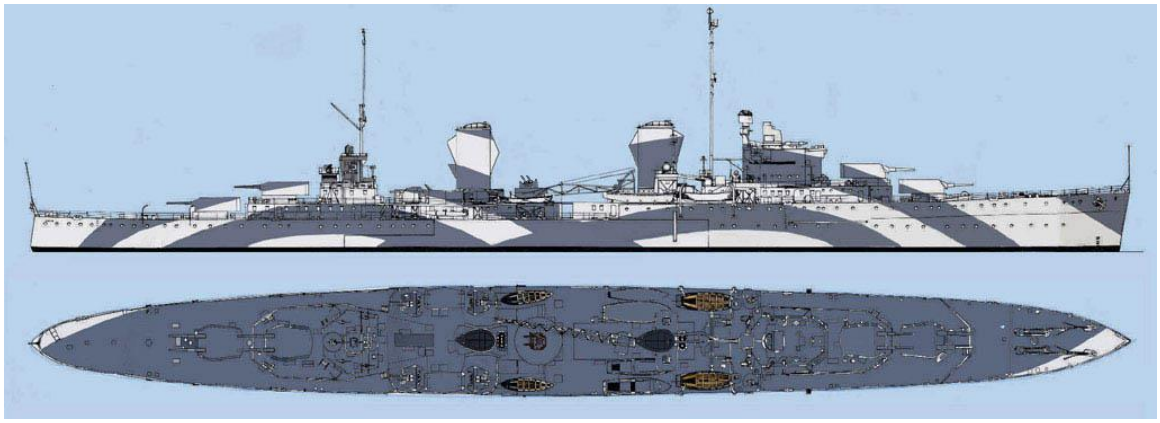
HMAS *Perth* (I) (ex-HMS *Amphion*) entering New York, August 1939 (Image: http://www.perthone.com.htm, accessed 15 August 2015).

HMAS *Perth* (I) in Jamaica, August 1939 (Image: http://www.perthone.com.htm, accessed 15 August 2015).

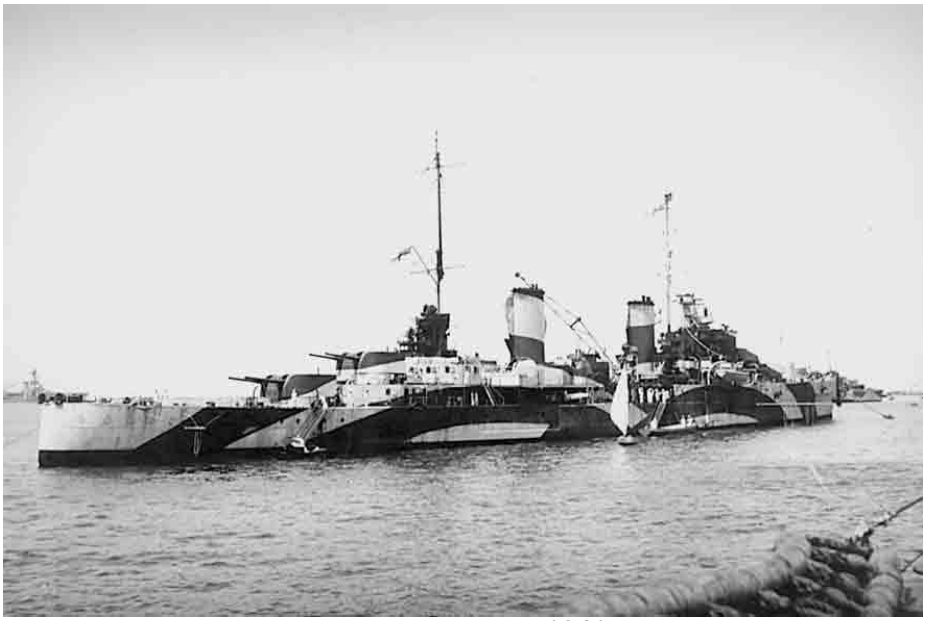


Perth on delivery voyage to Australia, Panama Canal, November 1939
(Image: Australian National Maritime Museum).

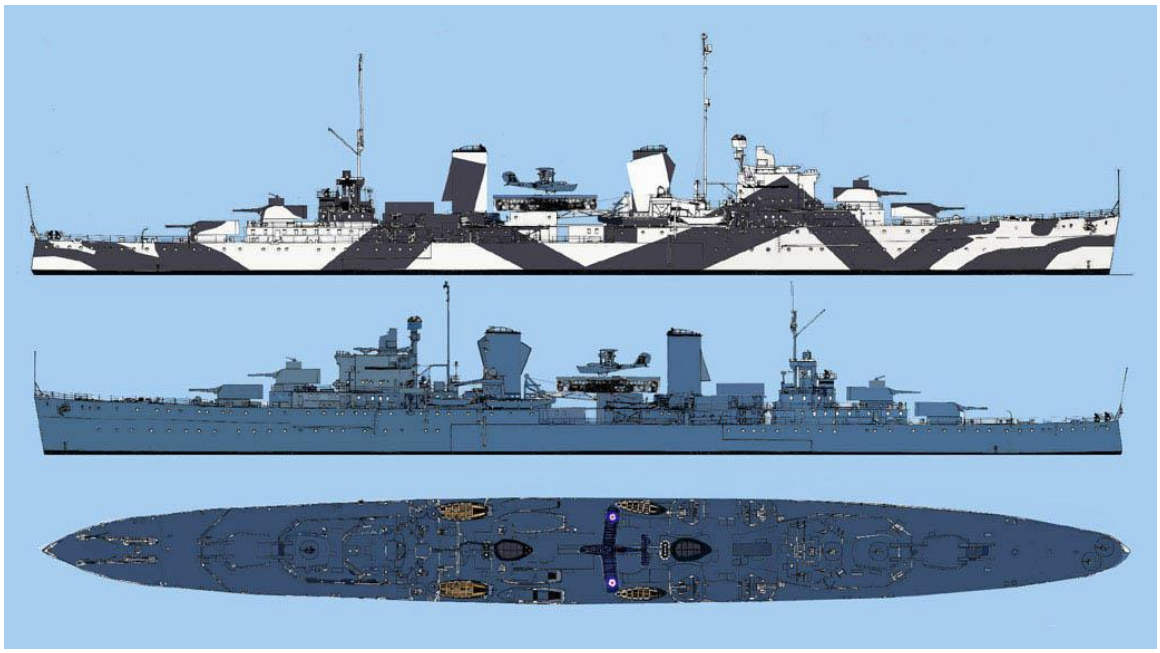
Perth at Gatun Locks, Panama Canal, late 1939 or early 1940
(Image: http://www.perthone.com.htm, accessed 15 August 2015).



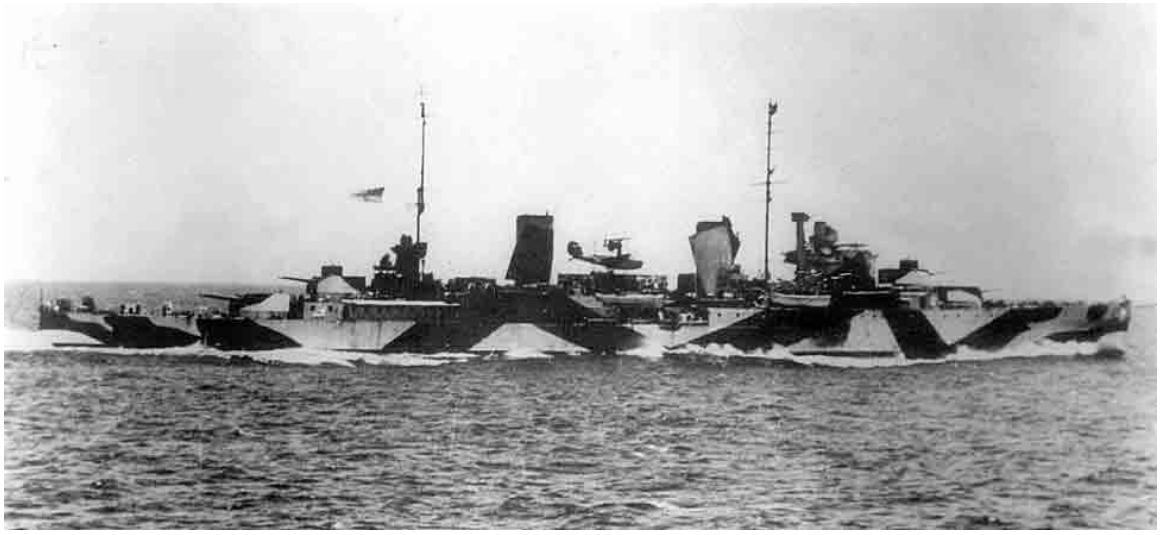
A schematic of *Perth*, showing the vessel's first Camouflage Pattern (December 1940 – November 1941) (Image: http://www.perthone.com.htm, accessed 15 August 2015).



Perth at Alexandria, 1941
(Image: http://www.perthone.com/pamphion.htm,accessed 15 August 2015).



A schematic of *Perth*, showing the vessel's second Camouflage Pattern (November 1941-1st March 1942) (Image: http://www.perthone.com.htm, accessed 15 August 2015).



Perth painted in its second Camouflage Pattern, late 1941
(Image: http://www.perthone.com.htm, accessed 15 August 2015).

11.1 HMAS *Perth* (I) - Refits, Modifications and Additions

September 1935: HMS *Amphion* painted in Admiralty Light Grey also known as RN 03 or AP 507c.

December 1939: *Amphion*'s single 4-inch guns are replaced during a significant refit in Portsmouth with eight 4-inch QF Mk XVI naval guns mounted in Mk XIX twin turrets – two starboard aft and two port aft.

1939: HMAS *Perth* (I) has the Aerial Recognition Letters 'PR' painted in white on its B and X turrets

August 1939: *Perth* fitted with funnel flaps at Kingston, Jamaica.

September 1939: *Perth* fitted with a dummy funnel

16 October 1939: Hurricane off Bermuda damages *Perth*'s depth charge rack, smoke floats and stern rails. The port cutter is washed overboard.

20 October 1939: *Perth* repaired in Bermuda and repainted a darker grey. At the same time its Aerial Recognition Letters are changed to 'PA'.

November 1939: *Perth* fitted with adjustable aerial recognition boards on the forward and quarter decks.

April 1940: Perth undergoes a major refit at Garden Island, Sydney.

27 December 1940: *Perth* repainted at Alexandria, Egypt in disruptive camouflage pattern 'Harbour Bridge'. Colours used are Royal Navy Dark Black Grey (507a) and Light Grey (507c). The vessel's deck is painted dark blue that is slightly offset at the bow and stern to confuse attacking aircraft as to its true course. Tops of the turrets are also painted dark blue.

16 January 1941: *Perth*'s starboard propeller shaft is bent, oil tank seams split, X and Y turrets partially blown off their roller bearings, and shell room and magazine lobby flooded following a near miss from three 1000lb bombs. The bombs detonate between HMS *Illustrious* and *Perth* whilst both are anchored in Grand Harbour, Malta.

10-19 February 1941: *Perth* repaired and repainted in same camouflage pattern during a refit at Alexandria and fitted with a Type 286 radar system. In addition, two 20mm Breda guns are fitted onto the catapult base.

May 1941: A four-barrel Pom-Pom machine gun from HMS *Liverpool* is fitted onto *Perth*'s catapult base. The gun is removed in July 1941 and transferred to HMAS *Hobart* (I).

30 May 1941: *Perth* is attacked by German aircraft and a bomb strikes the vessel, killing four sailors and four soldiers that are being evacuated from Sphakia on Crete.

June 1941: *Perth* undergoes repairs at Alexandria, but the damage is so severe it is withdrawn from the Mediterranean Theatre and sent to Sydney for a major refit.

August 1941: *Perth* enters Cockatoo Dock, Sydney, and undergoes an extensive refit. Included in the refit are the installation of two quadruple .50-calibre machine gun mounts on the quarter deck, and single 20-mm machine guns in armoured tubs atop 'B' and 'X' turrets. During this refit the vessel's Type 286 radar is removed and not replaced.

24 September 1941: *Perth* departs Cockatoo Dock and transfers to Garden Island, Sydney, where it is fitted with a new catapult for the Walrus aircraft.

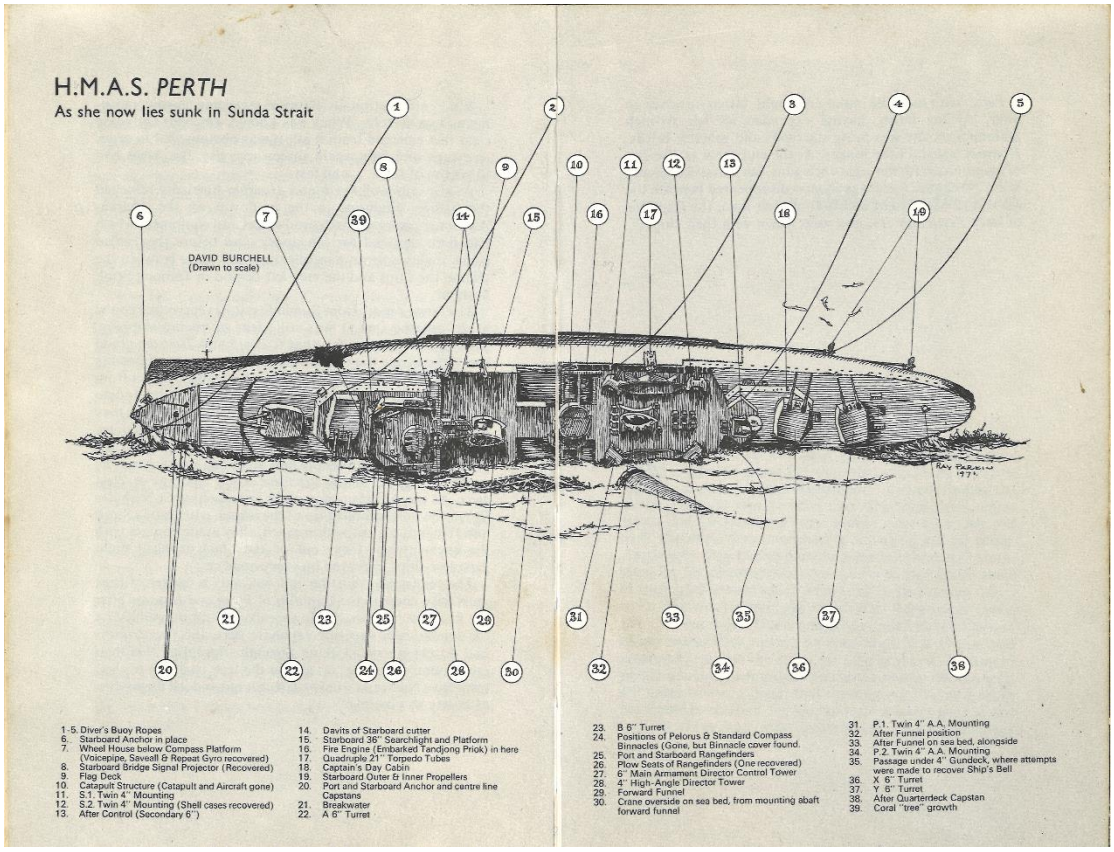
November 1941: Following camouflage trials, recommendations are made that *Perth* be repainted. The vessel's starboard side is painted in a pattern using Royal Navy Light Grey (507c) and Dark Grey (507A). False bow and stern waves are added in white. *Perth*'s port side carries no pattern and is instead painted in two tones of Dirty Blue-Grey. The deck is painted dark blue with white patches.

1 March 1942 *Perth* takes part in the Battle of Sunda Strait and is struck by three Japanese torpedoes on its starboard side and one torpedo on its port side. The vessel also suffers numerous 4-inch and 6-inch shell hits. *Perth* sinks at 0025 on 1 March 1942. Its loss location is east-northeast of St Nicholas Point on the western shore of Indonesia's Banten Bay. USS *Houston* sinks nearby shortly thereafter.

12.0 HMAS *Perth* (I) – Timeline of events

1939	13 May	HMAS *Perth* (I)'s Australian Commissioning crew departs Sydney for Portsmouth, England aboard SS *Autolycus*.
	10 July	HMH the Duchess of Kent re-names the light cruiser HMS *Amphion* HMAS *Perth* (I)
	26 July	*Perth* departs Portsmouth for New York
	16 August	*Perth* departs New York for Kingston, Jamaica
	21 August	*Perth* arrives at Kingston, Jamaica, and following outbreak of war is ordered by the Admiralty to remain on the North American and West Indian Stations until relieved.
1940	29 February	*Perth* leaves Kingston for Australia
	31 march	*Perth* arrives in Sydney, New South Wales
	24 December	*Perth* arrives at Alexandria, Egypt
1941	27 March	*Perth* participates in the Battle of Matapan off Crete
	14 July	*Perth* departs Alexandria for Australia
	6 August	*Perth* arrives in Fremantle, Western Australia
1942	14 February	*Perth* departs Fremantle for the Netherlands East Indies (modern-day Indonesia)
	24 February	*Perth* Arrives at Tanjong Priok, Batavia (modern-day Jakarta) and joins ABDA
	27 February	*Perth* participates in the Battle of the Java Sea
	1 March	*Perth* and *Houston* are sunk by IJN in Banten Bay
1960		Japanese salvage company approach Australian Government for permission to salvage HMAS Perth. Permission is refused.
1967		*Perth*'s wreck site discovered by Australian diver David Burchell
1974		Salvage work commences on *Perth* shipwreck site
2009		*Perth*'s bow section is reported to be breaking away from the rest of the ship's surviving hull.
2013		Extensive salvage work removes *Perth*'s remaining superstructure and partially removes its forward 6-inch gun turrets
2015-2016		Extensive salvage work removes *Perth*'s entire stern section, much of the vessel's starboard hull plating, the two remaining 6-inch gun turrets, three of the ship's steam turbines, and all four boilers.

13.0 Previous Investigations of HMAS *Perth* (I)



HMAS *Perth* (I) shipwreck site, Sunda Strait, as it appeared between 1967 and 1971.
(Image: Burchell, D., *The Bells of Sunda Strait*, 1971, pp22-23

1967

The shipwreck sites of HMAS *Perth* (I) and USS *Houston* were discovered by Australian diver David Godwin Burchell (1924-2009). Burchell made his discoveries in 1967, and was subsequently awarded the British Empire Medal and made an Honorary Citizen of the City of Houston, Texas. (https://en.wikipedia.org/wiki/David_Godwin_Burchell#Discovery_of_the_wrecks_of_HMAS_Perth_and_USS_Houston, accessed 15 August 2015)

In his book *The Bells of Sunda Strait*, Burchell reported that *Perth* lay on its port side on a relatively flat sandy bottom in about 35 metres of water. The starboard side of the vessel – which is uppermost and closer to the surface – was located in approximately 21 metres of water.

Burchell noted a massive hole below the waterline on the starboard side of the ship. The opening, which was situated beneath the approximate location of 'A' turret, measured approximately 40 feet (12m) across. By contrast, the rest of *Perth*'s starboard side appeared undamaged and its numerous portholes were intact.

Perth's starboard side propeller shafts and propellers were still in place, as were the vessel's four 6-inch gun turrets. 'A' turret was trained forward, and 'B' turret –

with its armoured hatch open – was trained hard to port with most of the length of its gun muzzles buried in the silty seabed. 'X' and 'Y' turrets were both aimed approximately 45 degrees to starboard and towards the surface. In the ship's forward section, the anchors were still in place and *Perth*'s distinctive cruiser bow swept down to the keel in one clean and unbroken line. The Walrus seaplane was gone but its retrieving crane--with its open-web steel work--was lying on the seabed beside the ship.

Lieutenant R. I. Sumantri with one of the HMAS Perth exhibits. The dummy is dressed in Mr Burchell's wet suit.

Relics for memorial

Australian naval relics from the cruiser HMAS Perth, that have been 180 feet deep in Indonesian waters since World War II, will today be presented to the Australian War Memorial.

Salvaging the wreck of the cruiser sunk in the Sunda Strait 25 years ago, was the work of a one-legged South Australian skindiver and a 32-year-old Indonesian naval officer.

Both men, Mr David Burchell of Adelaide and Lieutenant R. I. Sumantri will attend the presentation today in the Memorial's 1939-1945 naval gallery at 11.30am.

Survivors from the crew of the cruiser are also expected to attend.

Relics tell story of Perth's last stand. — Page 9.

*The Canberra Time*s, 14 November 1967

On the 4-inch gun deck the barrels of the guns pointed in different directions and the aft starboard 4-inch turret (S2) showed clear signs of a direct hit. Complete shell cases and live rounds for the 4-inch guns lay scattered around the gun deck

Perth's port torpedo tubes were observed lying underneath the port side of the ship, and the starboard side tubes were trained outboard, with all their torpedoes discharged or missing.

The superstructure and bridge deck were still relatively intact, attached to the main deck, and their exterior port sides were suspended approximately one metre above the seabed. The bridge showed signs of severe shell and shrapnel damage; numerous holes and torn plating were evident, and the standard compass and most of *Perth*'s navigational instruments were missing (Burchell, 1971, pp87-90)

1967 - 1992

Perth was subjected to limited salvage work during the 1970s and early 1980s. These actions resulted in removal of the vessel's 4-inch guns and their associated turrets, as well as both starboard propellers.

Perth bell

JAKARTA, Sunday (AAP Reuter). — The bronze bell of the cruiser HMAS Perth, which sank with the loss of 353 lives after a battle with Japanese invasion forces off Java in 1942, was handed over to the Australian Embassy in Jakarta on Friday. The bell was recovered recently by an Indonesian salvage company. It will be displayed in the National War Memorial in Canberra.

The Canberra Times, Monday 25 November 1974

1993

With the advent of SCUBA diving and cheaper international airfares, *Perth* and *Houston* became popular technical diving attractions. Several hundred divers visited both sites on an annual basis, and many published imagery of their visits in diving magazines such as *Scuba Diver*, *Triton* and *Advanced Diver Magazine*. However, others chose to keep their visits to *Perth* and *Houston* confidential out of concern that what they were doing violated each shipwreck's sanctity as a 'war grave':

When I dived Perth back in 1993, we kept it quiet because of that concern and because wrecks like Perth or Repulse and POW [Prince of Wales] were then off limits. They now feature as regular dive trips; if they're war graves, then they should be off limits. Indonesia's a poor country and having spent 15 years living in Asia, I've seen many examples of foreigners pillaging historical Asian wrecks, as well as souvenirs from the Perth and other Allied war grave sites like K17. We shouldn't be too self-righteous about this.
https://www.youtube.com/watch?v=f06Ag75OSe4 – anonymous comment posted December 2016

February 2002

In February 2002, David Faltot (david.c.faltot@accenture.com) reported diving *Perth* and *Houston* as part of a 60th anniversary commemorative event (see: http://www.asiaticfleet.com/diving_in_the_sunda_strait.htm).

Faltot and another diver, Kelly Cope, received support from the USS *Houston* Association and assembled a group of divers that mirrored the national composition of the American British Dutch Australian (ABDA) task force. The divers intended to document the battle damage on each vessel and place commemorative plaques at the event's conclusion.

Diving commenced on 1 March 2002. *Houston* was visited first, followed by *Perth* three days later. Faltot made the following observations regarding the visit to *Perth*:

*We eventually un-fouled ourselves from the ship [*Houston*] below and set out to find the Perth. We had the coordinates but used our depth finder to pinpoint the wreck. We found it on the first try, dropped anchor and suited up for the dive. The Perth was deeper than the* Houston *and it seemed like we were descending forever. Finally we saw what looked like large pipes point toward us. As we moved closer we saw that they were the twin 6 inch guns mounted in each turret that were now pointing directly toward the surface. We swam the length of the ship but didn't have much time due to our depth.*

We returned to the surface and attempted to raise the anchor chain and found it fouled on the wreckage below. Steve Rogers and I suited up to make the dive to unfoul the anchor. Upon reaching the bottom we found that it was fouled in several areas; on a deck cleat, around the bridge and around the mainmast. Steve worked on unfouling it from the mainmast and I worked on the bridge and deck cleat. We finally finished our job and returned to the surface. We again tried to raise anchor and found that the chain had fouled a second time. Two more divers went down to recover the anchor and we were finally able to get underway to return to port.

X Turret, HMAS *Perth*, 27/02-2/03 2002 (David Faltot, http://www.asiaticfleet.com/diving_in_the_sunda_strait.htm, accessed 20 March 2016)

November 2002

In November 2002, Indonesian (?) diver Surya Prihadi visited *Perth* and reported:

The barrels of B turret are pointing into the sand and the AA tub has fallen off. The after funnel and the aircraft crane-jib have fallen off and lie besides the ship. X turret faces out to starboard with the barrels pointing towards the surface. Major shell hits are visible on the starboard front corner of the bridge, on the superstructure underneath X turret, and on the face of X turret.

All 4" gun turrets are missing, it is known that the No 2 starboard side 4" gun received a direct hit and was blown over the side. It is not known what happened to the other three turrets. Many items have apparently been removed from the wreck by salvagers

Surya Prihadi, November 2002 (http://perthone.com/pwre.html ,accessed 10 August 2015).

HMAS *Perth* 6 inch gun turret, 16 November 2002 (Surya Prihadi, http://perthone.com/pwre.html, accessed 20 September 2015)

HMAS *Perth* Y gun turret, 16 November 2002 (Surya Prihadi, http://perthone.com/pwre.html, accessed 20 September 2015)

February 2004

In February 2004 Sean Robertson, Patrick Fortier, Jen Hart, Rhonda McLellan, and Muchib Razak departed Pulo Kali Harbour, Indonesia on board the dive boat *KM Omega Jaya* to visit *Perth*'s wreck site. (*HMAS Perth Wreckpedition* Uploaded on Jan 14, 2012, Sean Robertson, Sea Monkey Productions, *Scuba diving on the wreck of the HMAS Perth, sunk on March 1, 1942.* https://www.youtube.com/watch?v=f06Ag750Se4)

At the time of their visit, *Perth*'s depth profile ranged between 22m and 35m. The cruiser's bow was intact and attached to the rest of the ship's hull, but a large split had started to form from a point on the starboard hull. From its point of

origin, the split extended towards the keel for a distance of between 10m and 12m.

The uppermost starboard hull was still intact at this point, but ample evidence existed of active hull plate corrosion and thinning. Despite this corrosion damage, the ship's frames—where exposed—were still robust and intact. *Perth*'s forward superstructure was intact and in many places accessible, and both 6-inch forward turrets ("A" and "B") were intact and closed up. The mid-ships superstructure was intact, but the bridge deck area appeared to have collapsed and was now lying on the seabed. All forward starboard boat davits were still in place, as were the catapult turntable and torpedo tubes.

Whilst some of the ship's portholes remained *in situ*, there was evidence many had been removed by divers. The bilge keels (or possibly the ship's degaussing belt) along with the armored belting on the starboard side, were intact. Both starboard propeller shafts were in place as were the two aft 6-inch ('X' and 'Y') turrets. Extensive shell and/or torpedo damage was noted aft of "Y" turret, but the Captain's Day Cabin superstructure was intact.

June 2004

In June 2004 David Faltot and Brian Dinsley led a team of British and Australian divers to the wrecks of *Houston* and *Perth* (see: *Diving for the USS Houston in the Sunda Strait; Part II*, http://www.asiaticfleet.com/faltotca30_2.html).

Conditions were far from ideal, and large seas and strong current were prevalent. The team's charter boat was also attacked by pirates whist anchored over *Houston*. Faltot and Dinsley shared their thoughts and observations about the visit to *Perth*:

…Conditions that day on the Houston were poor and our group decided to move to the wreck of the Perth (3 nautical miles distant) to see if things were any better. We left the buoy on the Houston, motored off and found the Perth with no problems. Conditions gradually improved throughout the day and our group completed three dives on the Perth. The Perth is also a heavy cruiser although not quite as large as the Houston. It is deeper than the Houston, about 135 feet, and is laying on its port side with its now silent guns pointing toward the surface. Visibility was much better here and there was virtually no current.

I am sure that all the guys harboured their own special thoughts of what the ship's crew must have gone through that terrible night 62 years ago. It is one of the worst war tragedies in view of loss of life for Australia. The same or similar can be said about the USS Houston. The loss of life on both ships was very high…well into the 600 - 700 plus for each.

We could see a lot of shell damage to the hull and of course the damage the torpedoes caused was obvious. The ship took a massive battering and is more broken up than the USS Houston. The Houston also experienced a massive loss of life but was perhaps more sturdy in its construction as it appeared much more intact, especially in the main body of the ship…

With each dive the Houston and Perth reveal even more of themselves to us. We know that some divers have taken advantage of these wrecks to loot them and sell their wares on the black market. These vessels are war graves and should be treated with the utmost respect. As we continue to dive the Houston and if we find anything of note, we will send those items to the Houston Survivors Association and US Navy museum and so that a tangible memento will exist to bear witness to the sacrifice of its crew…

January 2006

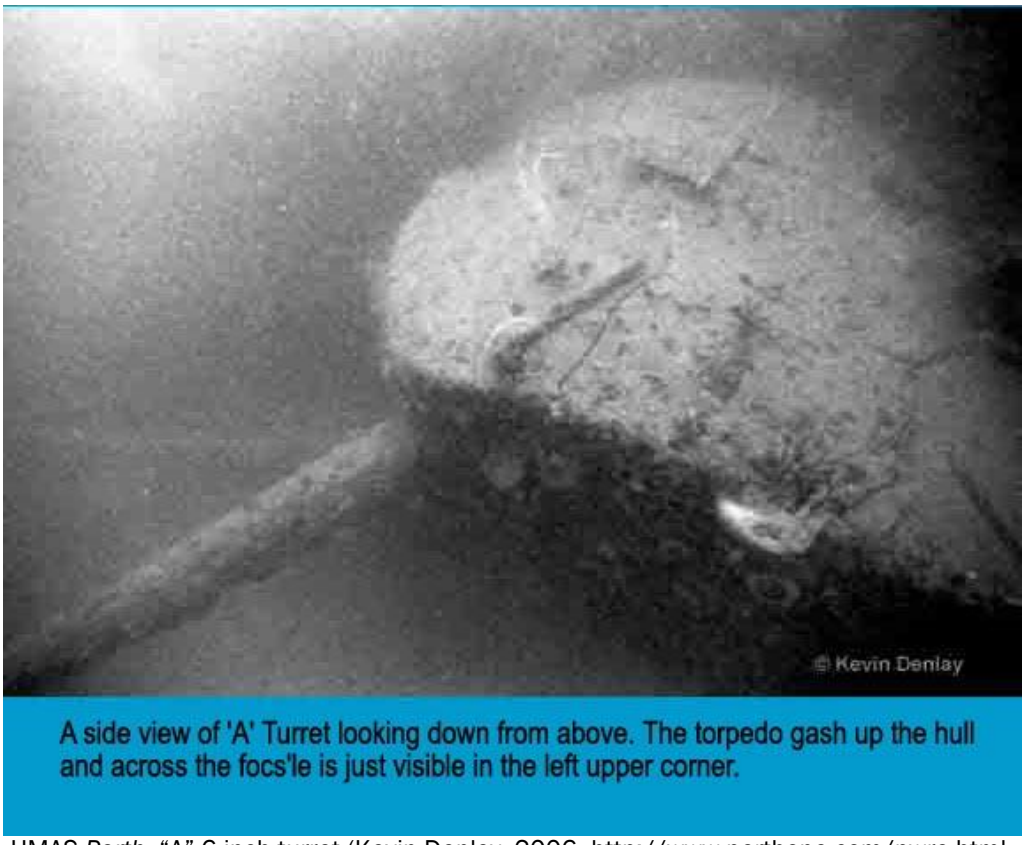
In January 2006 technical diver and underwater photographer Kevin Denley visited both *Houston* and *Perth*. He accessed the sites via the charter vessel *Cecelia Ann*. Denley published an account of his visit in *Advanced Diver Magazine* (see Denley, 2006: 26-29).

In his article Denley states:

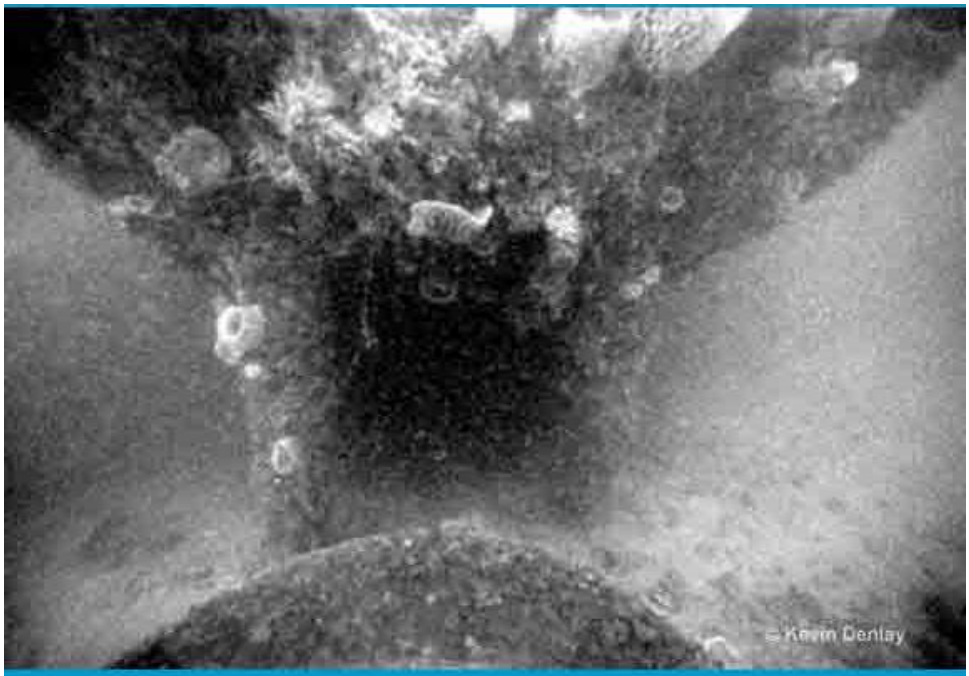
The wreck of the Australian light cruiser Perth*, the lead ship at the time of the action, now rests on her port side just to the east of and the closer of the two wrecks to - the northern entrance of Sunda Strait. A large break, no doubt from a torpedo hit, almost separates the very bow from the rest of the wreck. Her forward or #1 6*[inch] *dual main guns point forward, barrels askew, while the next or #2 6*[inch] *gun mount points off to port, the twin barrels buried deeply into the seabed. Penetration to the innards of the ship in this forward area is possible from the gash in the foredeck or under the gun mounts. Moving aft, one passes the coral encrusted open bridge, and then comes to the remains of the fore funnel, aft of which the remains of the crane and aircraft catapult can be seen.*

Interestingly, it appears both her starboard dual 4[inch] *secondary gun mounts have been completely removed in the intervening years since her sinking. As a matter of fact, much salvage work is evident on Perth, though the remains of her collapsed starboard quad torpedo tubes can still be viewed just aft of amidships. Further aft, her #3 6*[inch] *dual guns point defiantly off to starboard as do her aftermost or #4 6*[inch] *guns. The coral covered remnants of lighter anti-aircraft weapons can be seen on her fantail, where pelagic fish often congregate above the wreck. Coming back along the hull, one can see that her accessible propellers have been removed/salvaged, while the bottom of the hull under the rear 6 guns is completely blown out - presumably from a torpedo hit - allowing easy penetration to this aft area. Another large lengthways gash just under the bridge is also evident - but much smaller in comparison to the others in her hull - either from an unexploded torpedo hit or a large calibre shell hit. Schooling pelagic fish are prolific at times on the wreck, as are smaller reef-like fish, while soft coral and barrel sponges can be seen in various locations; however, this is really a wreck dive, not a sea life dive.*

HMAS *Perth*, "A" 6-inch turret (Kevin Denley, 2006, http://www.perthone.com/pwre.html, accessed 20 September 2015)



HMAS *Perth*, "A" 6-inch turret (Kevin Denley, 2006, http://www.perthone.com/pwre.html, accessed 20 September 2015)



B Turret points almost directly to port, barrels buried in the sandy bottom. In the foreground is the rim of the AA Tub that fell of the turrettop and now lies on the sandy bottom

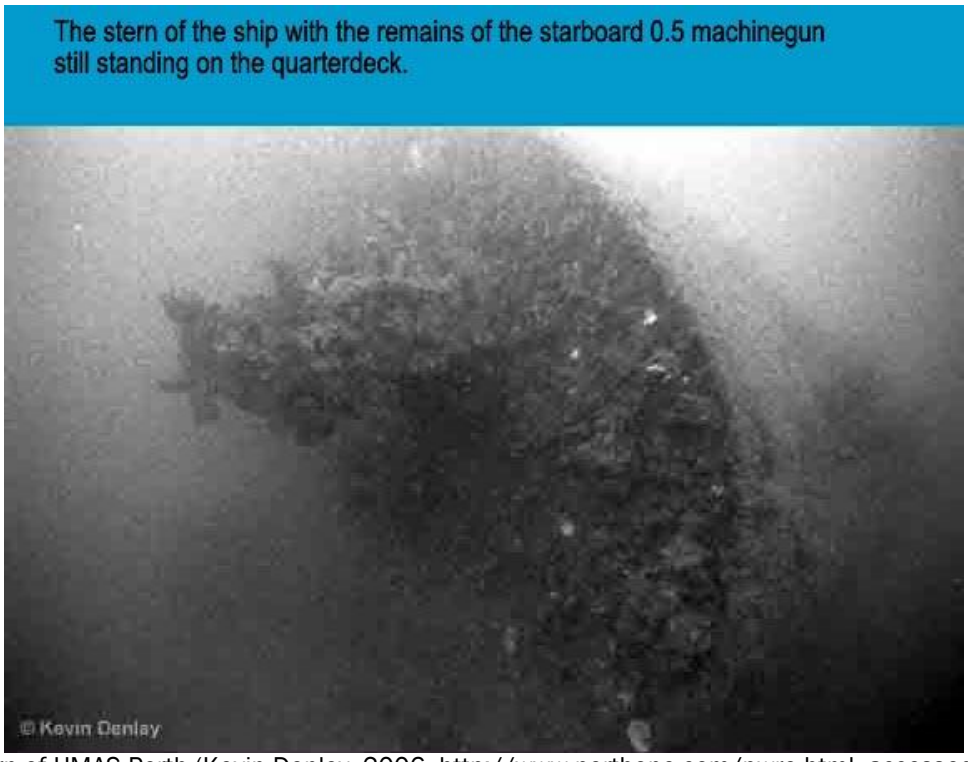
HMAS *Perth*, "B" 6-inch turret (Kevin Denley, 2006, http://www.perthone.com/pwre.html, accessed 20 September 2015)

The base of the Seagull V aircraft catapult. Part of the rotating circular base can be seen in the upper centre of the photo

HMAS *Perth*, aircraft catapult (Kevin Denley, 2006, http://www.perthone.com/pwre.html, accessed 20 September 2015)

HMAS *Perth*, "X" 6-inch turret (Kevin Denley, 2006, http://www.perthone.com/pwre.html, accessed 20 September 2015)

HMAS *Perth*, "X" 6-inch turret (Kevin Denley, 2006, http://www.perthone.com/pwre.html, accessed 20 September 2015)



Stern of HMAS Perth (Kevin Denley, 2006, http://www.perthone.com/pwre.html, accessed 20 September 2015)

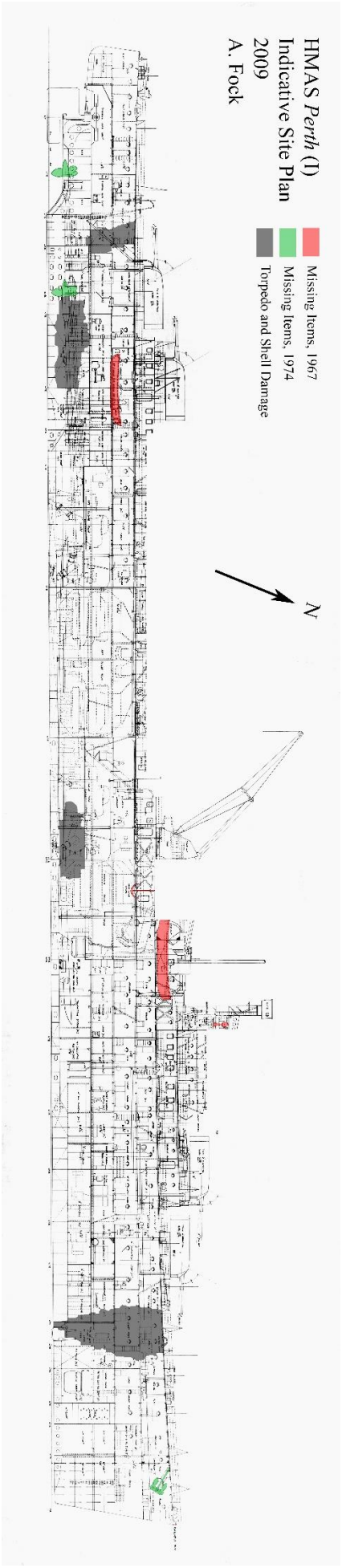
August 2009

In August 2009, Java Sea Charters – the operators of live- aboard dive charter vessel *Cecelia Ann* – advised potential customers that they could:

….explore the wrecks of the famous HMAS Perth and USS Houston on their final resting sites in Banten Bay on the Eastern approach to the Sunda Straits. These two sites are only accessible by experienced divers due to the depth of the wrecks and the strong currents that are common in this area…

The HMAS Perth, located 3 Nm from the USS Houston, is a much more reliable dive. Sitting in 36 meters of water with deck level at about 21 meter, the sediment here is sand, resulting in less sediment and better visibility. Again much of the ship is intact, however having been hit by many torpedoes there is heavy hull damage. In fact there is one point where a large hole has been blasted from Port to Starboard allowing you see right through the superstructure of the ship. The 6 guns of the Perth are still mounted and make a spectacular sight.

www.javaseacharters.com/pseribu_01.php (accessed 15 August 2015) and http://www.diveoz.com.au/index.php/diveoz-discussion-forums/dive-destinations-overseas-diving-destinations/24875-dive-original-hmas-perth-sunda-strait-indonesia.html (Accessed 15 August 2015)


HMAS Perth (I)
Indicative Site Plan
2009
A. Fock
Missing Items, 1967
Missing Items, 1974
Torpedo and Shell Damage
N

2009

In 2009 Dr Andrew Fock visited *Perth* and published the following description of the wreck site in a report to the Royal Australian Navy and the Naval Attaché at the Australian Embassy in Jakarta.

At the time of the 2009 survey, the bow of Perth *was virtually severed from the rest of the ship on the starboard side and the stern was in the process of detaching. Whilst the area in front of 'A' Turret from the breakwater to the capstans appeared decimated, much of this must be subsequent collapse; if this level of damage had been sustained at the time of her sinking then the bow would have separated as with HMAS Sydney and would not now lie in congruity with the rest of the ship. Furthermore, the lateral denting of the stem to starboard is consistent with collision with the seabed while still moving forward, further indicating that the bow was still attached at the time of sinking.* (Fock and Cannon, 2013)

The damage observed in 2009 indicated the following torpedo damage:

a. Hit at approximately Frame 23 starboard side; catastrophic damage.
b. Hit at approximately Frame 45 port side at keel level; extensive damage.
c. Hit at approximately Frame 90 port side; moderate damage.
d. Hit at approximately Frame 100 starboard side below the armour belt; moderate damage.
e. Hit at approximately Frame 180 starboard side at keel level; extensive damage.

The above damage assessment is in no way exhaustive as conditions at the time precluded a thorough survey. Nor does it exactly match either the Australian or Japanese records, general consensus among Perth survivors noting four, not five hits and more historical research and or survey work is required. Of particular note, the damage forward of 'A' Turret is devastating and may have been compounded by structural collapse whilst resting on the bottom. Primarily relevant to current investigations is that in 2009 the upper deck aft of 'X' Turret was observed to be split almost down to the seabed with a further horizontal split between 'X' and 'Y' Turrets. (Fock and Cannon, 2013)

Condition of the Wreck, 2009

In essence, the ship was complete with battle damage associated splits in the hull at approximately Frames 23 and 180 from presumed torpedo hits. All 6-inch turrets were in place and the gunhouses were intact in 2009.

'A' Turret was trained dead ahead on the centreline with the sighting ports shut and the turret closed up. The left-hand gun was at approximately 15 degrees elevation and the righthand gun was at maximum elevation (approximately 50 deg.) in keeping with the accounts of it being hit by shell fire. The Forecastle Deck surrounding 'A' Turret was split but intact forward of the turret for approximately the length of the barrels.

'B' Turret was also completely intact and trained to Red 90. Both 6-inch barrels were forced into the seabed with only a small gap between the seabed and the

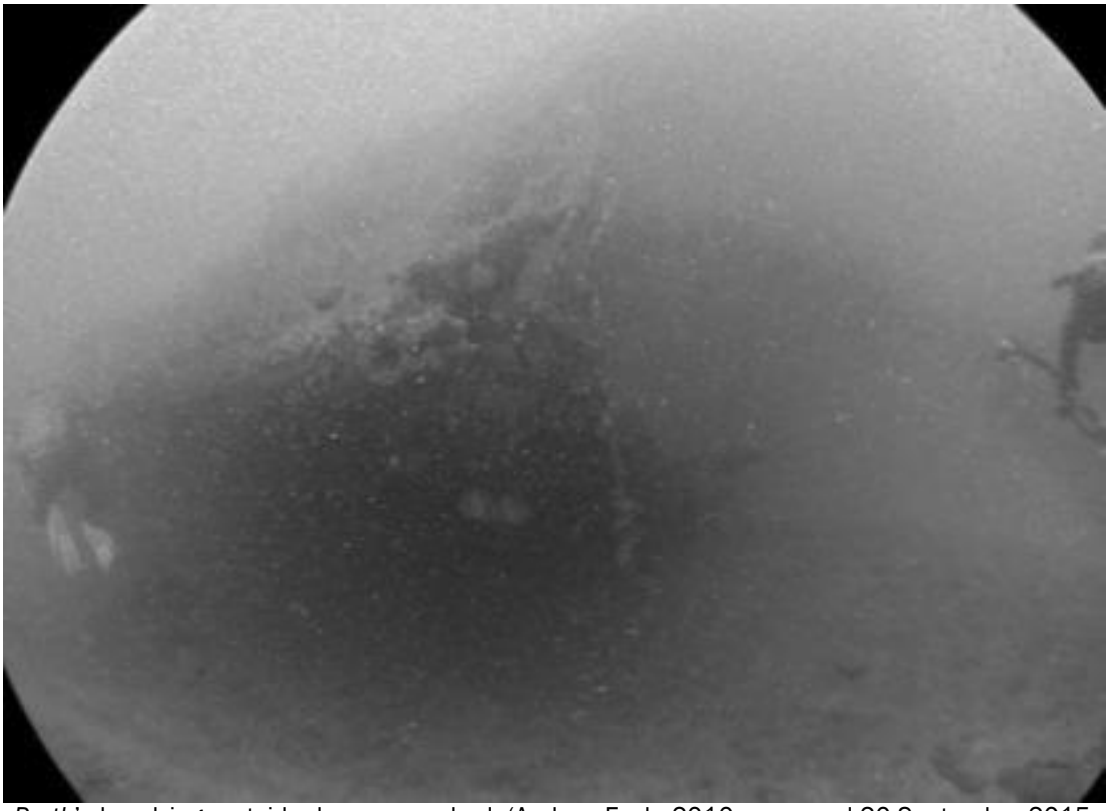
turret face. A hole had been cut into the turret roof and the circular tub for the single Oerlikon machine gun had fallen off or had been removed. The breeches of both 6-inch /50 BL Mark XXIII guns as well as the loading trays and all internal turret structures and mechanisms were visible and in good order.

The bow forward of the torpedo damaged split in the hull was intact forward of the capstans (both of which had been blown up out of the deck) and the hawse pipes etc. were all in place. The Forecastle Deck appeared to be solid
The superstructure aft of 'B' Turret was intact including the presence of hawser reels. The bridge area had undergone some salvage in the 1960's and 1970's and was stripped of most of its equipment, voice pipes, rangefinders etc. as well as its outer shell which contained 15 and 20lb bullet-proof plating, but it retained the Director Control Tower (DCT) pedestal (with the DCT lying upside down on the seabed next to it) and the High Angle Director Tower (HADT) (Fig.4). The HADT itself was missing.

Heading aft, the foremast, aircraft crane and catapult were all in situ as were the port torpedo tubes (Fig. 5). The 4-inch Gundeck was present but the twin Mark XIX mountings had been removed as had the After Control position and searchlight platform. The Admiral's accommodation area forward of 'X' Turret was in situ but as with the forward superstructure had suffered considerable shell damage. 'X' and 'Y' Turrets were both trained to approximately Green 90 and were fully intact with their sighting ports open. (Fock and Cannon, 2013a)

HMAS *Perth* "X" Turret, 2010 (Andrew Fock, 2010, accessed 20 September 2015, http://www.perthone.com/pwre.html)

HMAS *Perth* "A" Turret, 2010 (Andrew Fock, 2010, accessed 20 September 2015, http://www.perthone.com/pwre.html)



Perth's bow lying portside down on seabed. (Andrew Fock, 2010, accessed 20 September 2015, http://www.perthone.com/pwre.html)

DCT lying upside down on seabed. (Andrew Fock, 2010, accessed 20 September 2015, http://www.perthone.com/pwre.html)

Port torpedo tubes lying on the seabed partially obscured by 4inch gun deck. In the background can be seen the after boiler room vents. (Andrew Fock, 2010, accessed 20 September 2015, http://www.perthone.com/pwre.html)

October 2010

In October 2010 a group of Australian divers visited *Perth* to lay a plaque commemorating the death of Leopold Albert Harward--also known as 'Lofty'--who died aboard the vessel on 1 March 1942.

A review of the video and still footage that recorded the event (see: https://www.youtube.com/watch?v=DqzAngxg4Y8) indicates the uppermost starboard hull was largely intact, although a number of plates had been hollowed out by corrosion. The hull could easily be penetrated via the three large holes on the starboard side caused by torpedo strikes.

Perth's main deck was largely intact, but several plates had completely corroded away. The 4-inch gun deck was present but no evidence remained of the guns or 4-inch shells or shell casings that were noted during previous dives. *Perth*'s aircraft turntable and catapult were present, as was the bridge and forward superstructure, both of which bore evidence of significant shell and shrapnel damage. All 6-inch guns and turrets were present as were the vessel's anchor cables and hawse pipes.

April 2012

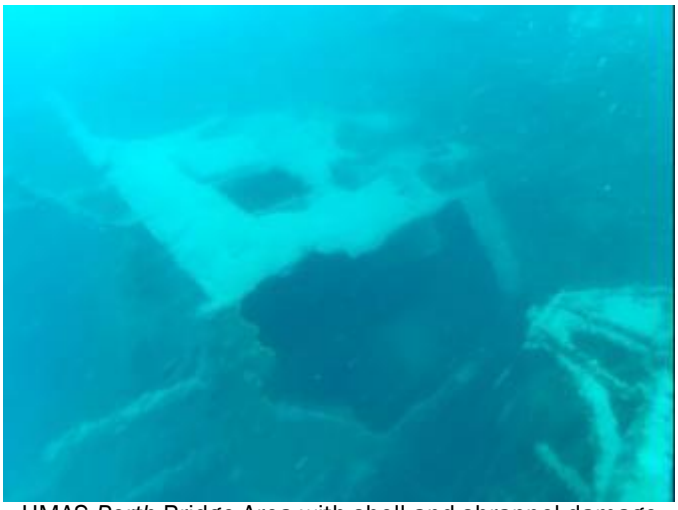
In April 2012 a Channel 7 Australia documentary team visited Perth. They were accompanied by author Mike Carlton and Matt Grant, the great-grandson of one of *Perth*'s former crewmen. The resulting television program was titled *The Bravest Warship* (see: https://www.youtube.com/watch?v=h1Luo2GPlTc; accessed 25 May 2017).

Operating from the dive charter boat *Cecelia Ann*, the dive team used closed-circuit rebreather dive equipment to penetrate inside *Perth*'s hull. The resulting footage indicates the uppermost starboard hull was largely intact, save for several corroded hull plates and existing torpedo damage. The ship's main deck and superstructure were still present as were the aft "X" and "Y" 6-inch guns and turrets. *Perth*'s interior featured numerous hull fittings and light bulkheads, but no obvious evidence of small artefacts.

August 2012

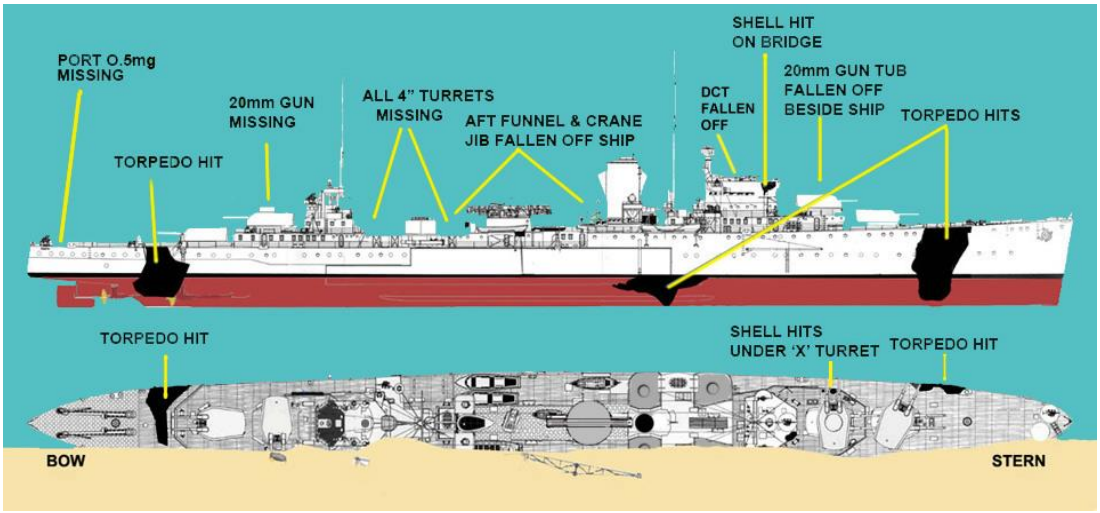
In August 2012 members of The Royal Australian Navy Communication Branch Association conducted a series of dives on the *Perth* wreck site. Over the course of four days, they examined the bow, "A" and "B" turrets, the bridge, 4-inch gun deck, Captain's Day Cabin, "X" and "Y" turrets, and the starboard stern quarter, including the propeller shafts and aft deck. All 6-inch gun turrets were intact, although there was significant battle damage evident (see: https://www.rancba.org.au/Sunda_Strait_Dive_Aug2012.htm).

HMAS *Perth* 'X' Turret (https://www.rancba.org.au/Sunda_Strait_Dive_Aug2012.htm,accessed 20 September 2015)



HMAS *Perth* Bridge Area with shell and shrapnel damage
(https://www.rancba.org.au/Sunda_Strait_Dive_Aug2012.htm,accessed 20 September 2015)

HMAS *Perth*, Port No2 4-inch gun mounting
(https://www.rancba.org.au/Sunda_Strait_Dive_Aug2012.htm, accessed 20 September 2015)



HMAS *Perth*, pre 2013 (http://www.perthone.com/pwre.html, accessed 20 September 2015)

Anecdotal and published accounts state that prior to 2013, and most likely prior to 1993, the two uppermost (starboard side) phosphor-bronze propellers had been removed along with all 4inch guns and associated turrets.

After 1993 and prior to 2013, divers reported that a number of the 0.50-calibre machine guns and turret-mounted 20mm guns had also been removed. They also noted aft funnel, along with the crane and jib had fallen off and were lying on the seabed.

As divers could penetrate the hull through the three large holes created by the torpedo strikes at the stern (under 'X' turret), mid-ships (abaft the forward engine room) and bow (forward of 'A' turret), numerous small items, including shell casings, portholes, ceramics, and engine room fittings were also removed from the wreck. *Perth*'s bow was also collapsing in the vicinity of 'A' turret as a result of the adjacent torpedo damage.

2013

In 2013, technical divers Andy Dyer, Sam Collett, Glenn Carberry, Alex Kuhl, Frank Craven and Brian King (www.ragstwo.com / info@ragstwo.com) visited *Houston* and *Perth*. Their visit was staged from the dive charter vessel *Cecelia Ann* as part of a trip organized by Tech Asia (www.asiadivers.com). Images from the visit were posted by Mr. Scubadiva on You Tube on 24 September 2013 (https://www.youtube.com/watch?v=RMjSo0sdinQ, Accessed 15 November 2016).

Conditions at both *Houston* and *Perth* were less than optimal; very poor visibility and strong currents hampered efforts to obtain wide angle / distance shots of either wreck site.

The port anchor chain was observed during these dives and extended across the starboard hull, which appeared to be substantially intact. Minor tearing and hollowing of hull plates caused by corrosion was also noted. The capstan drum was visible at the bow, as were a number of 4-inch shell casings. The dive team reported that *Perth*'s bow was starting to break away from the rest of the hull.

Footage from these dives include several interior views of the hull, indicating penetration by the team into internal compartments. *Perth*'s forward gun supports and forward gun houses appear intact, the door and sighting hatches were open, and several shell casings are depicted littering the interior. One of the starboard propeller shafts is shown, as are numerous rifle, machine gun, and 50-caliber cartridges.

September 2013

In October 2013, Dr Andrew Fock and Peter Cannon submitted a report to the Royal Australian Navy and the Naval Attaché at the Australian Embassy in Jakarta (Fock and Cannon, 2013a). The report provides an assessment of Perth's condition at the time based on video footage and verbal descriptions obtained from Indonesian-based technical diver Mike Hortin in September 2013-

With Perth lying on her port side at 90 degrees to the seabed, it commences in the debris field on the deck side of the 4-inch Gundeck. It appears that new debris has been exposed here including either live 4-inch fixed ammunition or empty cartridge cases partially buried and a steel helmet. Some recently damaged plating is evident by exposed rusting surfaces. This debris would appear to be close to the deck of the ship, which is just visible in the distance; estimated at 3 metres given the visibility and the wide-angle lens.

The video then cuts to 'X' Turret, where the circular gun tub for a single 20mm Oerlikon machine gun which had previously been in evidence, has evidently fallen off and now lies just forward of the turret on the seabed.

Built around 'X' Turret's revolving structure, commonly called the barbette, was an after superstructure providing accommodation at Upper Deck level. The actual barbette extended the short distance from the Forecastle Deck to the bottom of turret itself atop the accommodation superstructure.

On the starboard side of this accommodation, beneath the 6- inch barrels now pointing towards the surface, were the Admiral's Sleeping Cabin, Admiral's Day Cabin and Admiral's Dining Cabin. This superstructure, despite showing significant shell damage and heavy corrosion was still present in 2009. The video has been edited at this point but is suggestive that this accommodation area is no longer complete forward of 'X' Turret aft to forward. As the divers ascend it can be seen that the marine growth has been swept off the starboard side of 'X' Turret and the deck / barbette junction is now exposed….The divers then move in to the area between 'X' and 'Y' Turrets. This area appears to be devastated with a substantial amount of torn metal and large plates…

HMAS *Perth*, 2013, looking aft towards 'Y' turret (Fock and Cannon, 2013a))

HMAS *Perth* 2013, detail of sub-deck structures exposed (Fock and Cannon, 2013a)

Further to the significant damage to the wreck in the vicinity of 'X' and 'Y' Turrets is a range of debris in the general vicinity. Whilst it appears that some artefacts may have been released through the ruptures in the hull, more perplexing and of concern is the appearance of live fixed 4-inch ammunition as well as empty cartridge cases. Mike Hortin's impression is that the shells and other items had been deposited on the bottom from previously intact structures with a debris field of some 10 to 20 metres adjacent to the hull with numerous different items involved. The 4-inch shells and casings are all within a 10 metre radius adjacent to the damage between 'X' and 'Y' Turrets and are loosely scattered across the bottom. They do not appear to have come from an intact RU locker or similar stowage. Photographs of some of these shells prove that live rounds, as many as 10 in number, are presently visible in the debris field. They retain their forged-steel projectiles which are heavily corroded and swollen through salt water ingress into the metal.

Mr. Hortin has also noted and enquired about a range of steel cables lying loose around Perth's bows. He has noted that these cables lacked the expected corrosion and marine growth for cables belonging to the ship. Such cables were not observed in the 2009 survey. Other noted items lying on the seabed apparently include gauges, boiler bricks and a steel helmet, further adding to the impression that recent human activity may be responsible for the condition of the wreck.

Evidence currently available indicates that:

a. The wreck of HMAS Perth I is undergoing a period of accelerated natural collapse, but that no major salvage attempt has been made on the site.
b. Sand movement or collapse has exposed or released a number of artefacts including live 4-inch ammunition that may present a hazard.
c. There is some suggestion that there may be ongoing human interference with the wreck site (Fock and Cannon, 2013a)

October 2013

Given *Perth*'s substantial size and water depth, Hortin only had a limited amount of bottom time during his initial inspection and was unable to survey the entire wreck. On 20 October 2013 he returned to *Perth* and was able to record the remaining areas of the site that he missed on his previous dive.

In late October 2013, Fock and Cannon submitted a second report to the Royal Australian Navy and the Naval Attaché at the Australian Embassy in Jakarta (Fock and Cannon, *HMAS* Perth *(I) Condition of Wreck Part 2 – Bow to After Turret Group*, 2013b). Like the first report, it was based on additional video footage and verbal descriptions provided by Mike Hortin:

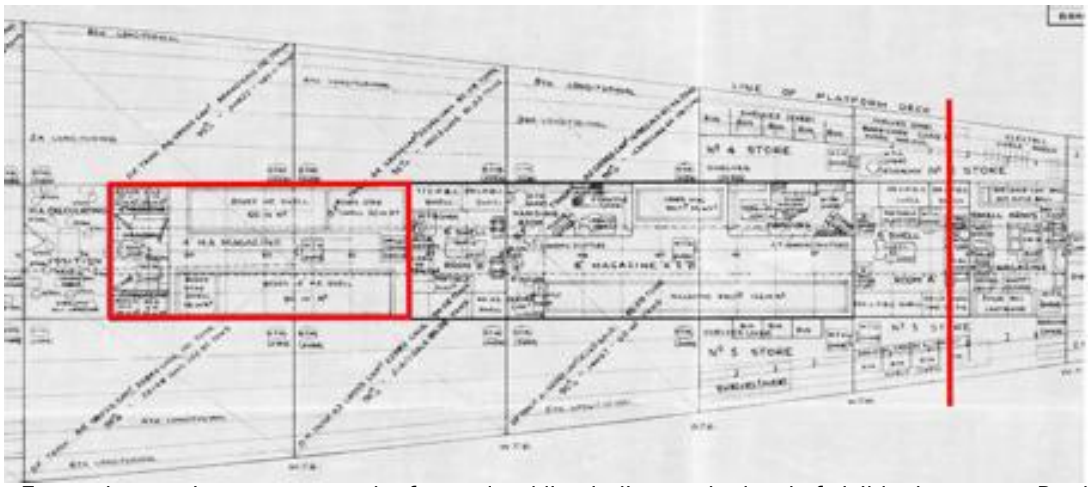
The video commences just aft of 'B' Turret. The exact structures are difficult to identify but are almost certainly the roof of the after section of 'B' Ammunition Lobby. The area shows considerable ripping-type damage. The divers then move forward and 'B' Turret comes into view. The floor of the gunhouse remains in situ with both 6-inch guns in their cradles with the breeches intact and electric locks closed. The roof and the port side of the 1-inch splinter shield has been removed exposing the elevating and training wheels for the left-hand gun. The turret roof and side have not fallen off and are not located nearby. The gunhouse floor shows considerable damage with the heads of the cordite hoists sheared off. The shell hoists and other machinery between the guns have been mangled and ripped. The remaining starboard splinter shield is separating from the gunhouse floor.

The divers then move around the starboard side of 'B' Turret. The rear of the forward splinter shield, (Turret face) of 'A' Turret then comes into view. The entire roof, rear and starboard side of the turret have been removed and do not lie in the immediate vicinity as debris. Both guns have been violently removed from their cradles, ripping the gun apertures in the splinter shield in the process. The gun cradles remain in situ. The heads of the cordite hoists remain in place on the

gun-house floor. No human remains were in evidence although they may reasonably be expected in this location according to some accounts. Both sighting ports remain closed and their opening mechanism is visible. All of the control cabinet apparatus, including local director sight, between the two barrels is either missing or part of the tangled debris between the gun cradles.

The divers then move forward of 'A' Turret. The Forecastle Deck here has been completely removed along with the starboard side of the hull. The barbette and circular compartment containing the revolving structure of 'A' Turret is completely visible extending down into the armoured ammunition lobby at Lower Deck level. Due to the visibility, the shell and cordite hoists below this along with 'A' Shell Room and 'A' and 'B' 6-inch Magazine are not visible (as would be expected given their substantial armoured construction) and are assumed to no longer be intact.

One of the most concerning aspects regarding the state of the wreck is the presence of live 4-inch ordnance. It is estimated that in excess of 1100 rounds of 4-inch fixed High Explosive ammunition went down with the ship. The footage of wholesale destruction and apparent salvage of the forward hull section suggests that sections of the hull beneath, and possible aft of, 'A' Ammunition Lobby have been breached or destroyed.



Forward magazine structure – the forward red line indicates the level of visible damage to *Perth* depicted in the 2013 video. The structure outlined in red is the 4-inch magazine.
(Fock and Cannon, 2013b, p13)

Further examination of the hull is required to ascertain this but the 4-inch Magazine is only just aft of the areas now obviously missing. The magazine in Perth extended from Frames 58 to 72 in the Hold. The forward end of 'A' Ammunition Lobby was at Frame 30. [The image] *above shows a drawing of Sydney's hold (A good quality version of Perth's is not available but has been checked against what is available). The red line passing transversely through the hull is the approximate position of 'A' Ammunition Lobby which was two decks above and the most forward part of the intact hull remaining visible in the footage. The state of the structure below this lobby remains to be determined. If the hull has been destroyed back to Frame 58, then anything is possible regarding the current state of the ship's remaining 4-inch ammunition; ammunition which will be highly unstable according to unofficial advice received.*

The video then crosses the torpedo damaged area to the bow. The Forecastle Deck appears to be missing as are the capstans and other major structures. The chain locker is open to the sea and Admiralty pattern bar chain is seen to be spilling out onto the seabed. With the forecastle supporting deck removed and the battle damage in this area, the remaining starboard hull plates are collapsing down towards the seabed.

Buckled starboard rail in *Perth*'s bow section – the forecastle deck appears to be absent.
(Fock and Cannon, 2013b, p14)

The video moves aft back past the remains of 'A' and 'B' Turrets. In Video 2, the 'B' Ammunition Lobby comes into view indicating that all of the structure of the Forecastle Deck behind 'A' Turret is absent. Indeed, the forward superstructure and bridge as well as the starboard Forecastle Deck aft to its conclusion (the "break" in the Forecastle) at Frame 110 appear to have been removed. In Video 2 the diver ascends above the starboard rail, where the shell plating has now collapsed to port without the support of the Forecastle Deck. The starboard plates appear bent about the level of the Upper Deck.

The 6.7 ton crane support now stands proud as a pillar, all the surrounding superstructure having been removed. The crane, the catapult and the catapult mounting have been completely removed. These structures were seen to be lying on the seabed in 2009 and could not have moved without intervention. Video 1 ends at this point but Video 2 continues Aft towards the after turret group. As the divers move further aft it can be seen that the remaining set of torpedo tubes and the 4-inch gun deck have also been removed along with all of the after superstructure. Essentially the ship has been stripped down to the Upper Deck

The divers move into the debris field abaft the 4-inch Gundeck/'X' Turret. Numerous 4- inch rounds can been seen embedded in the mud with their bases uppermost. Of particular note is one round located adjacent to 'X' Turret. This round could not have been present in 2009 as it would appear in the 2009 survey video. This round is again buried projectile down implying that it is live and has been dropped from a height to end up heavy-end first in the mud. Other debris comes into view including fragmented plate and supporting structures as well as expended 4-inch brass cases. A wash basin was also noted early in Video 2 abaft the bridge area.

Despite previously assessed damage aft indicating natural collapse, footage of the forward end of the ship now available indicates that the wreck of Perth (I) is presently being, or has recently undergone extensive salvage operations. These operations have removed most of the Forecastle Deck and the gunhouses of both forward turrets including the guns of 'A' Turret. It is most likely that this salvage has been conducted using a grab operating from a salvage barge. The continued presence of the guns of 'B' Turret may only be due to the difficulty of extracting them from the seabed as the turret was likely breached with this object in mind.

The appearance of live 4-inch ammunition in the debris field near 'X' Turret indicates that it is possible that the 4-inch HE magazine has been breached and live ordnance has been pulled up during the salvage of the forward part of the ship. The change in the seabed topography noted in ref D would be consistent with this change being due to the dumping of sand and non-salvageable materials (including live ammunition) from the salvage vessel positioned directly above the wreck. The coincidence of seeing both live ammunition as well as empty cartridges may be due to small quantities of expended brass from earlier firings having been stowed somewhere prior to the Battle of Sunda Strait. Even during wartime it was preferable to return such brass to the depot for recycling than to throw it over the side. It cannot be ascertained where the brass may have been stowed; if struck down into the magazine, the occurrence of such items would lend weight to the theory that the 4-inch magazine has been destroyed. However, it is entirely possible that they were stowed within a compartment in the vicinity of the 4inch Gundeck (there were a number of small store rooms and other out of the way compartments on the Upper Deck at that point). Whilst interviews with former 4-inch guns crew support both of these hypothesis, they do not confirm them.

It is probable that the remains of members of 'A" Turret gunhouse crew and possibly the crew of the 4-inch Magazine have been disturbed and dumped. It is likewise possible that this has also occurred to remains situated in 'A' Shell Room, 'B' Shell Room, 'A' and 'B' Magazine, the Sick Bay and Sick Bay Flat area as well as the Signal Distributing Office.

It is probable that the damage previously seen on the faces of 'X' and 'Y' Turrets has been caused by a grab rather than falling deck plating as previously thought. The damage between 'X' and 'Y' turrets may be the result of either salvage or collapse as a result of destabilisation caused by nearby salvage. It is probable that unless action is taken the salvers will return and continue to pull apart the wreck, especially if their previous efforts have been remunerative. Items of particular value would include:
a. Condensers;
b. Boiler tubes;
c. Port propellers (Starboard have already been taken), and
d. Armour plating

It should be noted that any attempt to remove the exposed starboard armour belt would likely involve its supporting structure and prove catastrophic to the integrity of the remaining hull structure. The best way to remove boiler tubes, condensers

similar components is to use explosives to blast the machinery space and then retrieve the wreckage with a grab once the disturbed sediment has settled. Whilst all personnel escaped 'B' Boiler Room and the After Engine Room, not all of them made it to the upper deck before she foundered. Both action watches on duty in 'A' Boiler Room and the Forward Engine Room perished as a result of a single torpedo strike on the starboard side which opened both compartments to the sea.

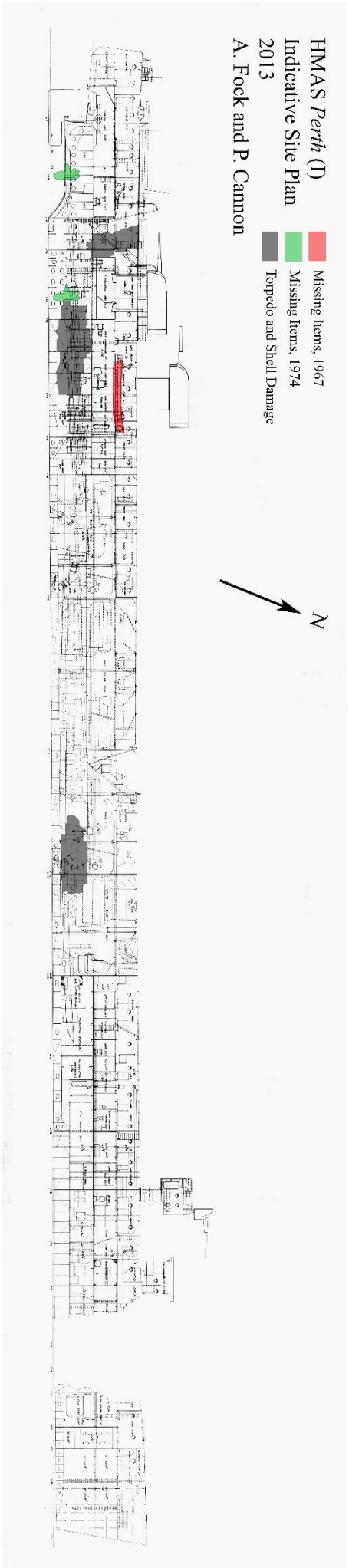
It is likely that any further salvage will result in the release of an indeterminable amount of fuel oil, but potentially up to 790 tons, that could result in significant local environment damage.

Further diving operations for assessment will become increasingly difficult as the year ends due to the seasonal current and weather patterns. Furthermore, while the local divers have performed admirably, they are limited by the photographic equipment available to them, lack of Diver Propulsion Vehicles (DPVs) and a suitable dive platform.

While the Australian media has focused on the stories of HMAS Sydney (II) and AE2, the Battle of Sunda Strait in which HMAS Perth (I) was lost was one of the most gallant actions in the history of the RAN. The wholesale desecration of the War Grave of 353 Australian servicemen would not be tolerated were it to occur on land.

The matter of the purported salvage of Perth (I) has already been actively discussed in both on-line forums and Facebook. Due to the discretion of Mr. Hortin and his team the matter had not yet been reported to the media and attempts have been made to dampen speculation until the facts can be ascertained. However, this situation is unlikely to continue. The kind of uninformed media involvement currently being advocated by unnamed individuals would be aimed at the Indonesian Government and possibly the RAN for a perceived lack of action to protect the wreck. Mr. Hortin has been exceedingly helpful and has responded to every request from both authors for specific information. His efforts to date and discretion are to be commended.

In light of the damage already suffered and the likelihood of further interference the following is proposed that urgent action be initiated to prevent further wholesale destruction of the wreck of Perth (I). Further, a full photographic and video hull survey should be conducted as soon as is possible. Such a survey should endeavour to not only document the current state of the wreck but also capture any remaining evidence of historical significance.
(Fock and Cannon, 2013b)


HMAS *Perth* (I)
Indicative Site Plan
2013
A. Fock and P. Cannon
Missing Items, 1967
Missing Items, 1974
Torpedo and Shell Damage
N

November 2013 – Media Reports

In late 2013, recreational divers who had recently visited *Perth* site reported to the Australian Federal Government that the wreck was being salvaged by unknown salvage companies using surface-supplied divers operating off self-propelled barges equipped with crane-operated grabs (ABC News, 13 December 2013).

The Australian Broadcasting Corporation (ABC) http://www.abc.net.au/news/2013-12-13/outrage-as-warship-grave-stripped-by-salvagers/5156320 also interviewed several Indonesian recreational divers who reported:

The mid-section above deck [of HMAS *Perth*]*, where the bridge was, has been completely removed, the bow guns have been damaged by what appears to be explosives with the barrels missing and the tops peeled of [sic], the bow has collapsed completely."*

Although it is hard to be certain, but as the metal that was the superstructure is all missing and is not lying around as debris it looks although we could be wrong like purposeful attempt to salvage the steel.

She [HMAS *Perth*] *has been hammered and the once impressive six inch A1 and A2 turrets are gone, the bow is flat and... the wreck is more hazardous than before - even for general swimming around, with lots of live ordinance, wire and overhanging metal."*

"The explosions have unearthed a far amour [sic] *of WW2 live rounds and what look like modern explosives (plastic flare shaped things) I assume from the salvage also appear to be lying about, be very careful what you poke in the sand/silt."*

'EXTENSIVE' WRECK DAMAGE REPORTED BY DIVERS

Several salvage barges have been spotted in the area, and one was photographed in October dredging up the carcass of a Dutch submarine - the O-16 - which sank off the coast of Malaysia.

Sam Collett, a professional diver based in the Philippines, told the ABC he last visited the wreck in September.

"Compared to previous trips I had made, the extent of commercial-scale salvaging was immediately obvious," he said.

"On the boat trip back to the marina in Anyer we passed a salvage barge with a crane and claw and a large pile of what appeared to be wreckage on the deck."

Andrew Fock, an expedition diver with a keen interest in HMAS Perth, said there was "extensive damage".

"As best we can tell from the video footage supplied, most of the superstructure - if not all of it - is gone, the guns from the forward turret, the A-turret are missing.

"The gun houses for the two front turrets are missing, and most of the upper deck... is missing. "The catapult has been removed, the bridge has been removed, the crane has been removed."

An official report was lodged with the Department of Defence in October detailing the damage. The report, seen by the ABC, said there was a strong possibility that human remains still exist within sections of the ship and that they risk being disturbed.

It warned action must be urgently taken to prevent further mass salvaging.

"It is probable that unless action is taken the salvers will return and continue to pull apart the wreck, especially if their previous efforts have been remunerative," the document said.

"It should be noted that any attempt to remove the exposed starboard armour belt would likely involve its supporting structure and prove catastrophic to the integrity of the remaining hull structure."

The ABC has seen other reports of the use of explosives by salvagers to break up the ship and make it easier to dredge.

In September, an Indonesian-based diver wrote: "The mid-section above deck, where the bridge was, has been completely removed, the bow guns have been damaged by what appears to be explosives with the barrels missing and the tops peeled of [sic], the bow has collapsed completely."

"Although it is hard to be certain, but as the metal that was the superstructure is all missing and is not lying around as debris it looks although we could be wrong like purposeful attempt to salvage the steel."

The Defence report also made specific mention of risks posed by the fuel oil and ordnance on board the Perth.

The Indonesian-based diver did a second dive in September to confirm his findings. In an email, he reported that the vessel is now too "unstable" to allow divers to penetrate the interior of the ship

"She has been hammered and the once impressive six inch A1 and A2 turrets are gone, the bow is flat and... the wreck is more hazardous than before - even for general swimming around, with lots of live ordinance, wire and overhanging metal."

"The explosions have unearthed a far amour [sic] of WW2 live rounds and what look like modern explosives (plastic flare shaped things) I assume from the salvage also appear to be lying about, be very careful what you poke in the sand/silt."

ABC 24 *HMAS* Perth *Wreck Being Salvaged for Scrap Metal* – Colin Bancroft - Dec 13 2013 https://www.youtube.com/watch?v=UVGAbhXv5OY (accessed 20 September 2015)

2014

Following reports of illegal salvage on *Perth* in early 2014, Shinatria Adhityayama from the Indonesian National Research Centre of Archaeology (ARKENAS) carried out an exploratory dive on the wreck site the results of which were published in Indonesia's *Varuna – jurnal arkeologi bawah air* (Underwater Archaeology Journal) (Adhityayama, 2014).

Adhityatama's report indicated that whilst there were obvious signs of disturbance to *Perth*'s bow and superstructure, the midships and stern sections were intact, as were the two aft 6-inch gun houses. The uppermost starboard hull was buckled and damaged, and several hull plates had been removed to allow access to the ship's internal compartments. (Adhityatama, 2014).

Poor visibility limits clear photos of HMAS *Perth*'s wreck site. Depicted here is one of the vessel's starboard propeller shafts. Image: Shinatria Adhityatama, Pusat Penelitian Arkeologi Nasional (ARKENAS), 2014.

June 2014

In June 2014 the U.S. Navy (USN) and Indonesian Navy (TNI-AL) conducted a joint dive operation on *Houston*'s wreck site as part of Cooperation Afloat Readiness and Training (CARAT) Indonesia 2014. Whilst the primary target of these operations was *Houston*, the combined naval dive team also briefly visited *Perth*.

Nineteen in-water dives were conducted on *Houston*, as well as several deployments of underwater Remotely-Operated Vehicles (ROVs). Published reports (see: U.S. Naval History and Heritage Command, 2014) state that the survey indicated unauthorised disturbance of *Houston* and signs of salvage activity. The latter included the presence of diving equipment, a water dredge, and salvage tools, including one specifically designed to remove port holes. Other forms of evidence included systematic but limited removal of hull rivets and plating to enable access to the interior of the wreck, and stockpiling of shells and ordnance on *Houston*'s port (upward-facing) side in preparation for their recovery Underwater Archaeology Branch, Naval History and Heritage Command, Department of the Navy, 2014).

January 2015

In January 2015, the US Embassy in Jakarta was informed that the TNI-AL had apprehended a dive / salvage barge (Registration Number SKK – 20018GDT – F) operating on the *Houston* and *Perth* shipwreck sites. The barge was loaded with salvaged steel and iron, including hull plating, engine room components, and hull framing. For the most part, these items lacked corrosion and ferrous concretion typical of iron items exposed to seawater for a protracted period, and were clearly recovered from an anaerobic marine environment (i.e., buried in the seabed, or located in a zone of low- or no oxygen content).

The barge's crew claimed they had documentation that granted them permission to carry out salvage and underwater work in Banten Bay. That permission was reportedly granted by *Kementerian Perhubungan – Direktorat Jenderal Perhubungan Laut* (the Directorate General of Sea Transportation). However, examination of the provided documentation revealed it was incomplete and only granted the barge's owner the right to *transit through* Banten Bay's waters. At the time of writing (July 2017), the authors have been unable to confirm if any judicial action has been initiated against the barge's owners and/or operators.

Salvage barge apprehended on site of HMAS *Perth*, January 2015.
US Embassy, Naval Attaché, Capt. Stackpoole, January 2015

Material observed on apprehended salvage barge, January 2015.
US Embassy, Naval Attaché, Capt. Stackpoole, January 2015

Material observed on apprehended salvage barge, January 2015.
US Embassy, Naval Attaché, Capt. Stackpoole, January 2015

March 2015

In March 2015, technical divers Leon Boey, Kate Magpantay, Gemma Thomas, Maita Aque, Chammika Udalagamma and Hoh Yiling made several exploratory dives on *Perth* and recorded their visits in a series of short videos made for S.E. Asian diving company Living Seas (see: www.livingseas.com.sg / www.livingseas.asia / www.facebook.com/livingseas.sg).

Four homemade documentary videos--*Deep inside The HMAS Perth* (https://vimeo.com/138584098), *Coming into the Light*

(*https://vimeo.com/138584094*), *The fate of HMAS Perth* (https://vimeo.com/139828029) and *HMAS Perth – Behind the Camera* (http://vimeo.com/138584081)-- show the team successfully traversing *Perth*'s full 171m length from both inside and outside the wreck.

The series of videos reveal that *Perth*'s starboard hull, whilst still intact from just aft of the forward 6-inch guns to the stern, shows signs of ongoing hull plate corrosion and hollowing, plate buckling, and obvious hull plate removal. In the latter instance, removal appears to follow rivet lines.

Many of *Perth*'s internal lightweight steel and timber partitions are missing, likely as a consequence of the passage of time and battle damage. By contrast, the vessel's more substantial watertight bulkheads and armoured belts are present and still largely intact.

Whilst the videos' commentary indicates *Perth*'s boilers and engines are missing, at least one--if not more--steam turbines are visible in the footage. It appears the film producers were expecting large triple- and quadruple-expansion steam engines rather than smaller, less obvious steam turbines. The videos show several steam condensers as well as a large 'torpedo hole' in one of the engine rooms (the specific engine room is not made clear).

The footage also reveals *Perth*'s bow has collapsed and only part of one of the forward gun houses appears to be present. A number of recently exposed 6-inch shell casings are evident, as is electrical wiring, water and steam tubing, light fittings and steam and fuel line valves. Surprisingly, none of videos show the aft 6-inch gun turrets – two of *Perth*'s most obvious and appealing features.

June 2015

In June 2015 FROGdive DevGru, a military-based diving organisation operated within the TNI-AL, conducted a series of dives on *Perth* and *Houston*. Two videos produced during the visit were later being uploaded to You Tube (see: Wreck of HMAS *Perth* – Sunda Strait – Java, Published June 16 2015: https://www.youtube.com/watch?v=yTGCpFBQI08; *FROGdive Ops Houston 2 – Wreck HMAS Perth, Sunda Strait*, https://www.youtube.com/watch?v=JfYo5QmlxmM).

Footage from both videos shows that *Perth*'s starboard hull plating has been torn upwards and removed in a number of places. In addition, the armour belt on the vessel's starboard hull has started to subside and / or buckle in places (at between 150 to 180lbs per square foot, the armour belt is extremely heavy and once the structural integrity of the hull is weakened would exacerbate collapse of any weakened or unsupported hull sections).

An increased amount of observable salvage debris is evident along the uppermost starboard hull, including displaced firebricks, 4-inch shell casings and small artefacts. In addition, ample evidence of flash rusting is visible on much of the surviving hull remnants. The TNI-AL team observed a number of live 4-inch and 6-

inch projectiles and recovered several 4-inch rounds as evidence of ongoing salvage activity at the site.

A comment posted on You Tube by one of the TNI-AL divers states the site contained a significant amount of well-preserved munitions:

> *John Delta1 year ago*
> *+james haney as what you said sir, it is true. when we go under we found that proof, and we report it to local naval base commander. and we also retrieve some "well preserved" munition from the site and gave it to the local naval base (pangkalan Laut Banten) as proof that this ship still has lots of well-preserved munition that we afraid it will be miss used* (https://www.youtube.com/watch?v=RMjSo0sdinQ).

TNI-AL divers with a recovered 4-inch shell from *Perth*, June 2015. (Image: http://www.jpnn.com/news/frogdive-klub-selam-ekspedisi-sejarah-bawah-laut-indonesia)

October 2015

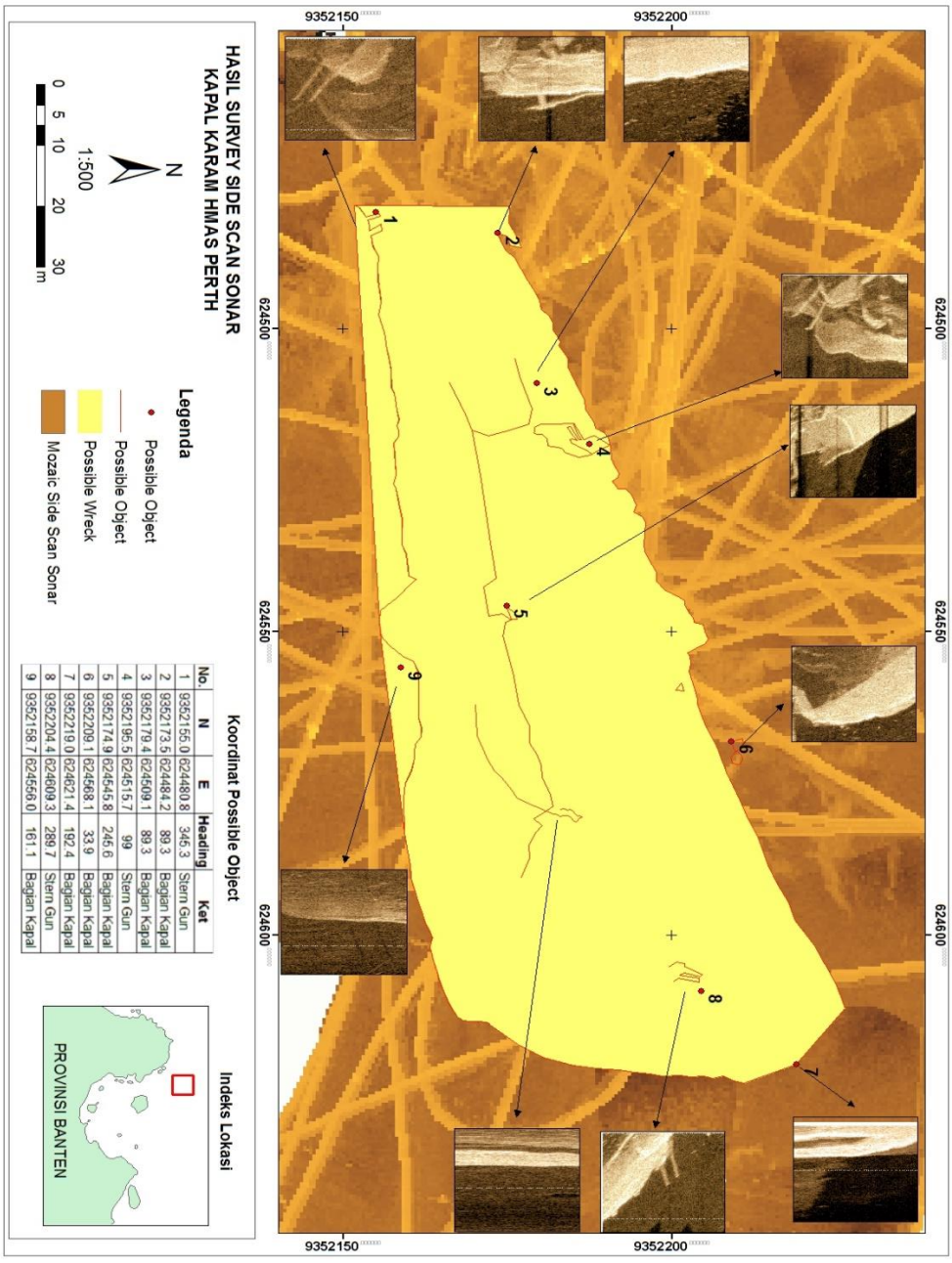
On 19 October 2015 the U.S. Navy and TNI-AL conducted several survey dives on the *Perth* wreck site as part of DIVEX 2016. The results of the dive were discussed at the International Conference on World War Two Maritime Heritage hosted by the Australian, British and United States Embassies in Jakarta later that month.

Chief Navy Diver Seth Hill, assigned to Explosive Ordnance Disposal Mobile Unit 11, Mobile Diving Salvage (MDS) 11-7, and Indonesian Navy divers performed an underwater survey of *Perth*. The data collected was intended to assist both NHHC and the US Embassy in Indonesia to determine the current state of *Perth* and *Houston*.

Video footage acquired during the DIVEX 2016 survey shows torn and buckled plating and several large breaches along *Perth*'s starboard hull, as well as damage to the forward 6-inch gun housings, and significant deposits of small artefacts. The upper deck was still intact, but no evidence remained of the vessel's superstructure. Both 'X' and "Y' turrets were still intact, and at least one starboard side propeller shaft and hanger remained *in situ* at the vessel's stern. However, some hull plates were torn and/or missing along the main deck at the stern near the starboard fairlead. (*USN & TNIAL Divex HMAS Perth I, 19 October 2015*, *HMAS Perth B – Roll*, Christopher Perez, Defense Attaché Operations, United States Embassy – Jakarta)

Damaged 6-inch gun house on the *Perth* wreck site, October 2015 (Christopher Perez, Defense Attaché Operations, United States Embassy – Jakarta)

Coinciding with the International Conference in Jakarta the Kementerian Kelautan Dan Perikanan (Indonesian Ministry of Marine Affairs and Fisheries) conducted a multi-beam survey of the wreck site of HMAS *Perth*. Whilst large seas meant conditions on site were far from ideal the survey did indicate that both the 'X' and 'Y' 6-inch turrets were still extent at the stern along with a single 6-inch turret at the bow.



No.	N	E	Heading	Ket
1	9352156.0	624480.8	345.3	Stern Gun
2	9352173.5	624484.2	89.3	Bagian Kapal
3	9352179.4	624509.1	89.3	Bagian Kapal
4	9352195.5	624515.7	99	Stern Gun
5	9352174.9	624545.8	246.6	Bagian Kapal
6	9352209.1	624568.1	33.9	Bagian Kapal
7	9352219.0	624621.4	192.4	Bagian Kapal
8	9352204.4	624609.3	289.7	Stern Gun
9	9352158.7	624566.0	161.1	Bagian Kapal

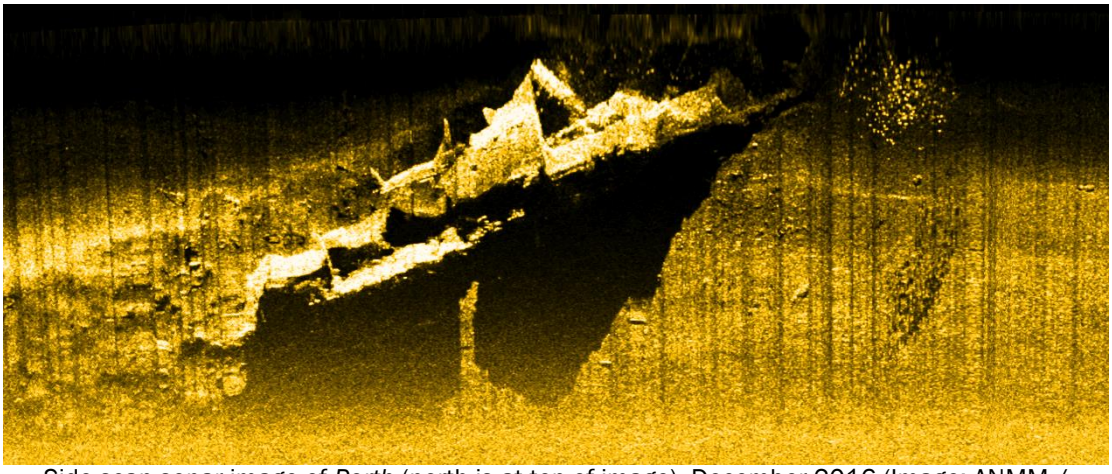
Multi-beam survey of *Perth* (north to right of image) 2015
(Image: Ministry of Marine Affairs and Fisheries, Jakarta)

December 2016

Working in partnership with ARKENAS, ANMM intended to conduct an in-water photographic survey and conservation assessment of *Perth* in late October 2016. The survey was to be followed by an ancillary remote sensing survey of the wreck site and its surrounding area (utilising side-scan-sonar and magnetometer). The remote sensing investigation was intended to confirm *Perth*'s overall condition, analyse the site's stability and ongoing corrosion processes, and verify the extent of damage/interference from recent salvage activities.

The early arrival of the 2016-17 monsoon season created unfavourable conditions on the *Perth* and *Houston* wreck sites. Consequently, the underwater component of the survey was postponed until mid-2017.

In mid-November 2016, ANMM contracted Firman Setiawan and S. Kel from Mahesa Prasaya Geoservices in Bandung, West Java, Indonesia to undertake multi-beam sonar surveys of *Perth* and *Houston*. The survey was conducted with the advice and guidance of ARKENAS, as well as with the permission of NHHC.



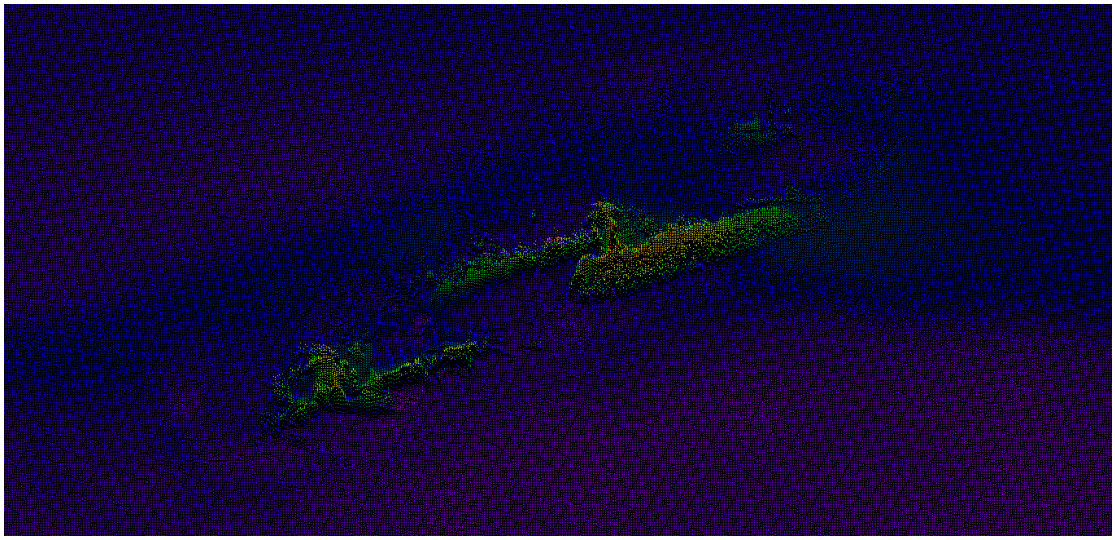
Side scan sonar image of *Perth* (north is at top of image), December 2016 (Image: ANMM / ARKENAS)

On 10 December 2016, Mahesa Prasaya Geoservices completed the remote sensing surveys of both sites. ANMM and its research partners (including ARKENAS) received the final draft of the report on 28 December 2016.

The multi-beam sonar survey:

- Confirmed the precise location of both shipwrecks with DGPS. This information was a requirement of Indonesia's Ministry of Marine Affairs for both sites to be protected by a declared marine reserve;
- Enabled ANMM / ARKENAS to calculate the surviving extent of each wreck site, including its associated debris field and any material dragged off site during salvage activities;
- Allowed the team to identify the principal features of each site, including gun turrets and superstructure;

- Provided accurate water depth measurements across both sites (to assist with diver safety and verify depth clearance for vessels transiting through the area);
- Provided the means to create a current 'mud map' of each site that was later adapted as a diver's familiarisation / orientation guide and;
- Contributed comparative data to an assessment of each site's surviving hull structure



Multi-beam sonar imagery of HMAS *Perth* (north is at top of image), December 2016
(Image: ANMM / ARKENAS)

Whilst it confirmed *Perth*'s location and site extents, the side scan and multi-beam imagery also indicated the presence of a 60-meter long linear void within the surviving ship's hull. Although this anomaly could have been caused by a build-up of seabed sediments, it also potentially indicated structural collapse or the complete absence of structure. The site's overall dimensions were also smaller than anticipated, and suggested that either a 60m hull section had become completely buried by sand or sediment, collapsed onto the seabed, or was removed as a result of salvage activities (Setiawan and Kel, 2016)

14.0 HMAS *Perth* (I) SURVEY RESULTS MAY 2017

14.1. Location

HMAS *Perth* (I)'s wreck site is located within the eastern approaches of Sunda Strait. The surviving hull's midships is located at 05.51.42S, 106.07.52E, or approximately three nautical miles (5.56 kilometres) northeast of St. Nicholas Point on Java's northwest tip. *Perth*'s bow (05.51.40S, 106.07.54E) faces towards the northeast, whilst the remains of its stern face southwest at 05.51.43S, 106.07.51E.

Perth rests on its port side on a relatively flat sandy / silty bottom in approximately 37 metres of water. The starboard (uppermost) side of the vessel is closer to the surface in 21 metres of water. The site's size, orientation and relief generates a strong echo sounder anomaly.

Currents associated with the Indonesian Through-flow were strong at time of the 2017 survey and greatly influenced underwater visibility, which varied between 1.0m and 5.0m.

The team conducted is survey from the commercial fishing boat *KM Srilungguh II*, which operates out of the small port of Karangantu, 11 kilometres north of Serang City in western Java's Banten Province.

GPS data was used to direct *Srilungguh II*'s captain to *Perth*'s location; however, upon arrival the survey team found the site marked by a makeshift buoy (consisting of an old lifejacket and several water containers). The buoy line was tied off (not anchored or shotted) to a midships water tight bulkhead at Frame 86, just forward of *Perth*'s forward boiler room.

The makeshift buoy was removed at the end of the survey. It is worth noting that the site's approximate position is also marked by intermittent slicks generated by bubbles of oil / aviation sprits leaking from the wreck.

14.2 Jurisdiction

Perth lies within the territorial seas of the Republic of Indonesia. While the wreck and its associated remains are claimed as a Sovereign Vessel owned by the Commonwealth of Australia, it falls under the legal jurisdiction of the Republic of Indonesia.

14.3 2017 Fieldwork and Site Description

The survey team - consisting of representatives from ANMM, ARKENAS, the Indonesian Ministry of Marine Affairs and Fisheries, Indonesian Preservation Office (Serang), TNI-AL (Indonesian Navy) and a Banten-based dive operator -- conducted eight dives over the course of four days between 14 and 17 May 2017.

Remains of *Perth*'s forward cable (chain) locker, May 2017. (Image: K. Hosty, ANMM / ARKENAS)

The vessel's bow was identified by the remains of the starboard cable (chain) locker and associated anchor chain. It has largely collapsed onto the seabed, likely due to the effects of a Japanese torpedo strike on this section of the ship during the Battle of Sunda Strait. The remains of the bow structure, consisting of deck and hull plating, steel hull frames (floors, side brackets and margin plates) and remnants of the starboard deck capstan, lie scattered on the seabed north of the surviving articulated hull.

Other than the cable locker, no evidence exists of intact internal compartments such as the lower mess, shipwright's store, paint store, lamp room, aviation spirit compartment or the compressor room.

Moving aft, the starboard hull is relatively intact in places, and rises between six and eight metres off the seabed. *Perth*'s two forward 6-inch turrets ('A' and 'B') and their respective guns and gun houses (which were partially removed in 2013) have now completely disappeared from the site. Their absence is undoubtedly the result of deliberate acts of industrial-level salvage that occurred sometime after 2013 and before 2015.

No evidence was noted of forward internal compartments such as the Stokers Mess, Auxiliary Wireless Office, or the heavily-armoured 6-inch and 4-inch magazines, ammunition lobbies and shell rooms. However, numerous 4-inch projectiles and one 6-inch projectile were observed either atop or adjacent to surviving hull plating, suggesting the magazines and/or ammunition lobbies and shell rooms have been breached.

Subsequent to the 2015 U.S. Navy inspection, and prior to the 2016 ANMM/ARKENAS side scan and multi-beam sonar survey, approximately 60 percent of *Perth*'s starboard hull plating was removed. This covers an area from just below the main deck to immediately above the turn of the bilge (Frame 76 – 151). The zone of missing hull plating roughly corresponds with the portion of starboard hull [141 feet (43 metres) long, and 26 feet, 3 inches (8metres) high] that was originally protected by a belt of 3-inch (76-millimetre) thick armour plate. This armour plating was installed over 1-inch (25-millimetre) thick hull plates in the ship's machinery spaces, and 2-inch (50-millimetre) thick armour plating covered 1-inch (25-millimetre) thick hull plates below the waterline. The latter armour belt was designed specifically to protect *Perth*'s 6-inch shell rooms and magazine.

Perth's armour belt was strategically placed to protect its magazines and shell rooms, lower steering positions, forward and aft steam turbine (engine) rooms, and boiler rooms from damage. It also prevented direct access to any of the above compartments once the vessel sank in Sunda Strait.

Remains of *Perth*'s collapsed starboard hull, May 2017 (Image: K. Hosty, ANMM / ARKENAS)

Deliberate removal of *Perth*'s armour belt, underlying hull plating, and most of the vessel's internal steel frames has now exposed internal compartments to direct

diver access. These areas and structures include the remaining armoured, oil and watertight bulkheads, as well as the steam turbine rooms and boiler rooms.

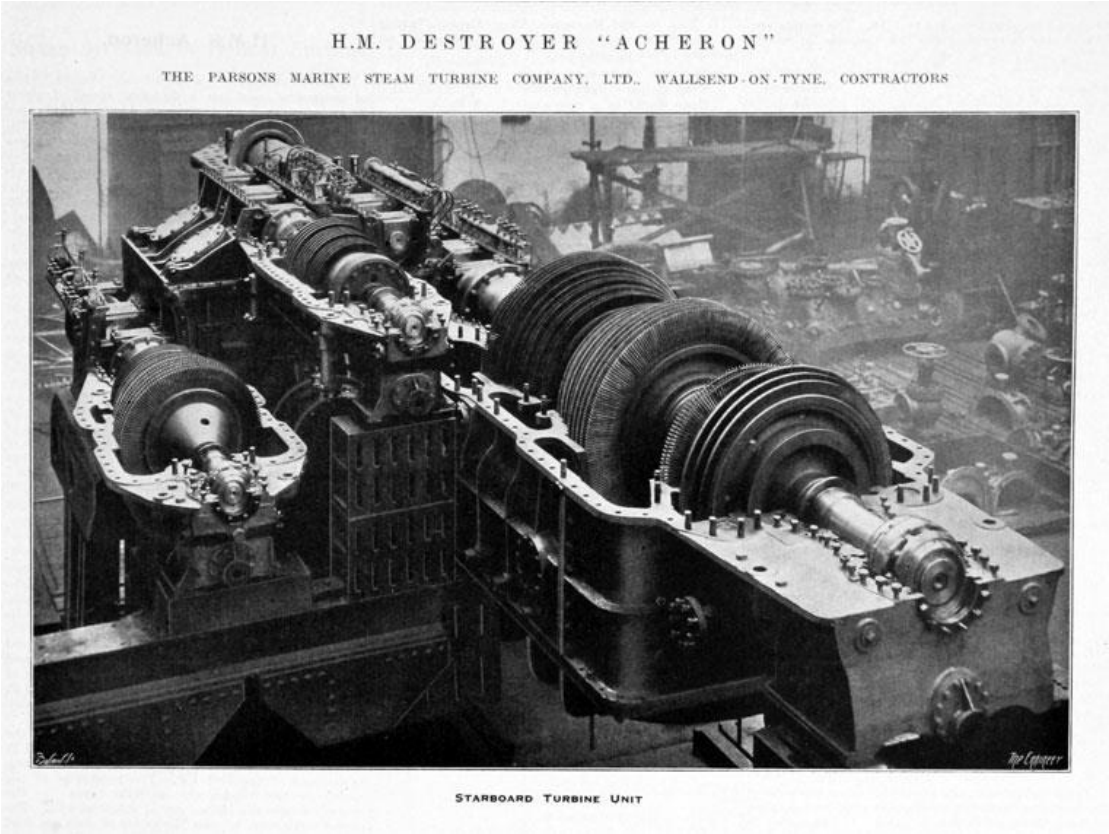
This has radically altered the overall appearance of the site from a relatively intact and recognisable ship's hull to a three sided box. It is now possible to descend directly from the surviving outer starboard hull plating in 21 metres of water to the inner port hull plating in 37 metres of water. During this transit, one passes through the gutted remnants of the ship's internal compartments and cellular double bottom.

Whilst corrosion and battle damage could account for some missing armour belting and hull plating, the majority of absent hull components have been deliberately removed by commercial salvage. The most likely explanation is that they were targeted for their steel content. Similarly, small areas of what appear to be stockpiled copper and copper-alloy cable and piping were noted atop the surviving starboard hull. These items appear to have been systematically removed and set aside for later recovery. Again, the most likely rationale is that these items are being removed for their metallic content. Because *Perth*'s internal architecture has been so detrimentally affected, its surviving deck plating is starting to peel away from existing bulkheads, and will very likely collapse to the seabed at some point in future.

Hammer and chisel lying on *Perth*'s disturbed starboard hull, immediately adjacent to a live 4-inch projectile, May 2017. (Image: K. Hosty, ANMM / ARKENAS)

Since 2015, *Perth*'s internal compartments have been systematically salvaged,

and its bulkheads, decks and internal fittings removed. Additionally, three of the vessel's four Parsons geared steam turbine sets (consisting of a low-pressure astern turbine, a high-pressure turbine and a cruising turbine), as well as three condensers and four Admiralty-type three drum boilers, have been salvaged. Individually, these are extremely large and heavy pieces of machinery that would have required considerable resources and effort to displace and recover. There is no possibility whatsoever that they could have been completely removed via natural processes; consequently, they must have been deliberately removed through salvage activities.



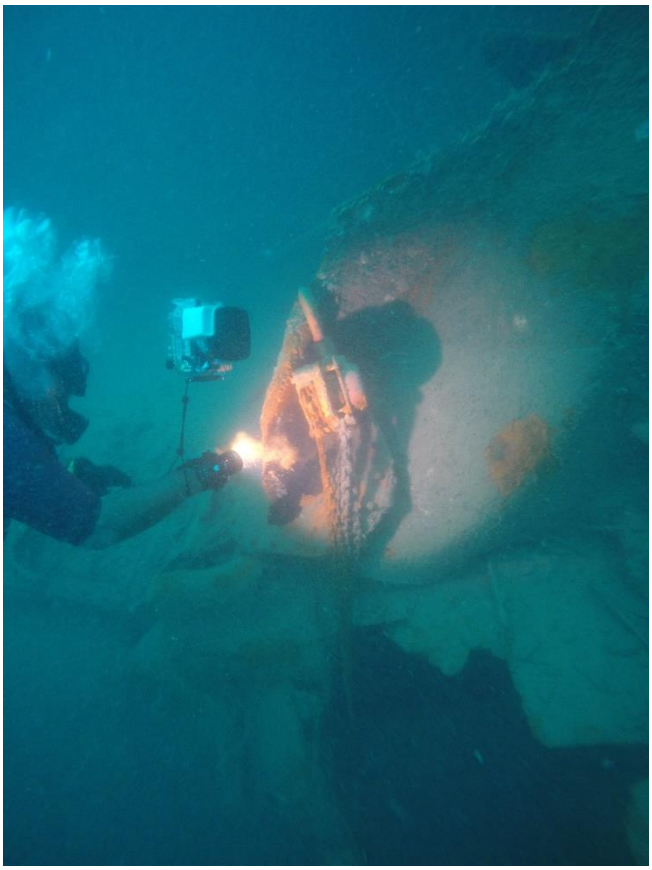
Parsons Geared Turbine Set, 1931 (Grace's Guide to British Industrial History, http://www.gracesguide.co.uk/File:Im1931v151-p700.jpg, accessed 13 July 2017)

Approximately 70 metres of *Perth*'s articulated stern has also disappeared since October 2015 -- a section of hull extending from the stern post through to the aftermost engine room bulkhead (Frame 151). Absent too are the vessel's four propeller shafts, two aftermost 6-inch gun turrets ('X' and 'Y'), 6-inch shell magazines, ammunition lobbies, officers' wardroom and cabins, gyro room, and steering gear compartment. Again, the removal of these elements of armament and ship's architecture is clearly a deliberate act of salvage and must have been carried out using substantial equipment, such as crane-operated grab mounted on a barge.

Since 2013, both of the ship's 4-inch and 6-inch shell magazines and associated cartridge magazines have been breached, and some of their contents (estimated between 1000 and 1200 shells) have been salvaged or dispersed elsewhere throughout the site.

Nonetheless, the site still retains a significant quantity of exposed 4-inch and some 6-inch shells. Their dispersal indicates human rather than natural intervention. Some of the shells are also leaching picric acid – a chemical component of the fuse used to detonate them – which makes them not only toxic to handle but also highly unstable.

Evidence of ongoing small-scale salvage was also noted in the form of lifting slings (wrapped around various hull components), a chain block, water dredge hose, and a hammer and chisel. However, these activities, while damaging, are relatively small scale when compared to the industrial-scale salvage that has also occurred, and would not have caused the vast majority of damage observed by the survey team

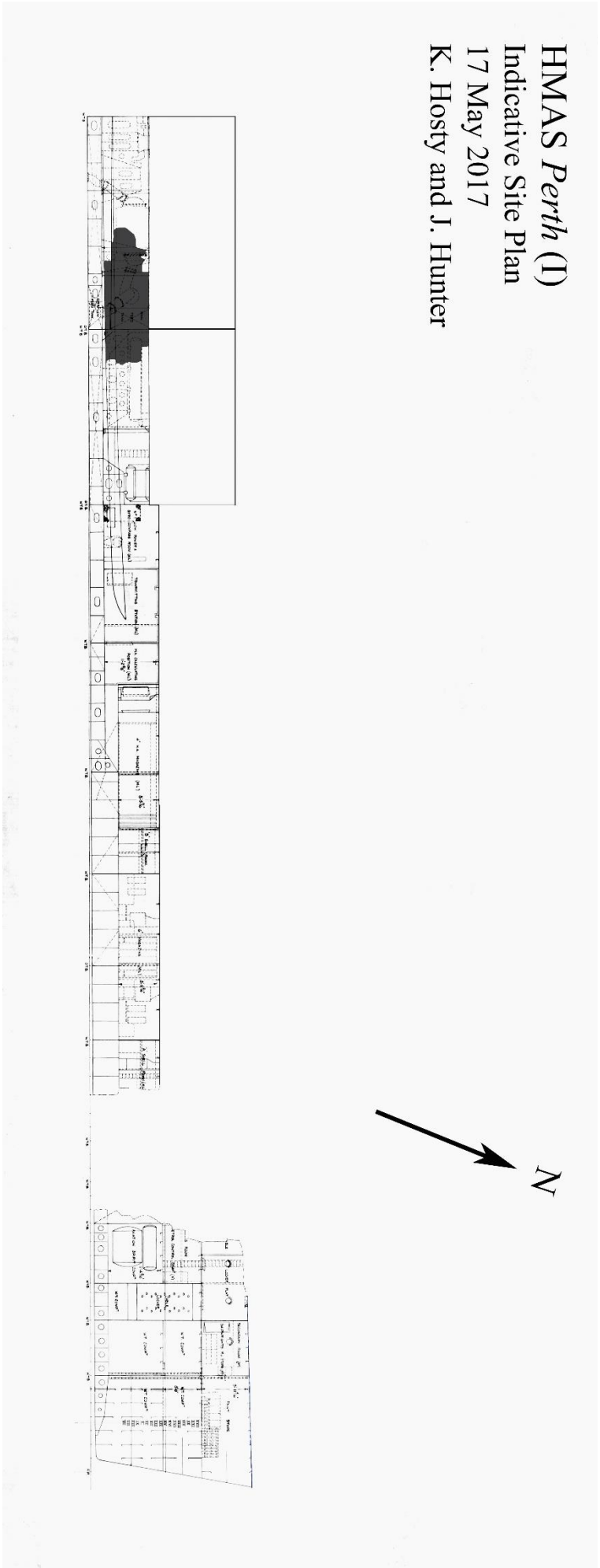


Modern chain block located adjacent to the remains of *Perth*'s forward 4-inch shell magazine, May 2017. (Image: K. Hosty, ANMM / Pusat Penelitian Arkeologi Nasional)

14.4 Discussion

According to MacLeod (2011), the approximate rate of corrosion of iron and steel in seawater is 0.1 millimetre per year, 1 millimetre every ten years, or 10 millimetres every 100 years. This rate can more than double if the vessel was wrecked or lost in shallow water and if the pH, dissolved oxygen and water temperature in the vicinity of the shipwreck are high.

In the case of *Perth*, the vessel's hull plating was approximately 1-inch (25 millimetres) thick, and the armoured belting that protected the steam turbine


HMAS *Perth* (I)
Indicative Site Plan
17 May 2017
K. Hosty and J. Hunter
N

rooms, boilers rooms, magazines and canister storage flats was approximately 3-inches (75 millimetres) thick. *Perth*'s superstructure, along with many of its internal room and cabin partitions, was of lighter construction. The notable exceptions were the vessel's watertight and oil-tight bulkheads.

Following an examination of the 2016 multi-beam and side-scan sonar survey data of the *Perth* wreck site, the team expected to see some damage to the vessel's stern and midships sections, as well as impacts to starboard hull plating. Of more pressing concern was the apparent absence of a sonar return from *Perth*'s engine / boiler room area. While damage was anticipated, the team did not expect to encounter the complete absence of the vessel's stern section, stern gun houses, propeller shafts, engine and boiler room components, as well as the near-complete removal of internal bulkheads and decks.

Given that many of *Perth*'s missing components, including armoured belting, magazines, water tight and oil-tight bulkheads and gun turrets, were manufactured from armoured steel at least 75 millimetres thick, it is improbable that these features disappeared through natural metal corrosion.

14.4.1 Salvage

Historical data and the results of the May 2017 site inspection indicate four general stages of salvage activity have occurred on the *Perth* wreck site since its discovery. These include:

- Historic salvage that commenced with Burchell's discovery of the site in 1967, and ending with the recovery of *Perth*'s 4-inch guns and starboard propellers in the mid-1970s;
- Recreational / technical diver salvage that has occurred from the mid-1980s to the present;
- Opportunistic and small-scale salvage by local fishermen that has occurred from the mid-1980s to the present and;
- Planned, large-scale commercial salvage that has occurred from 2013 to the present.

Whilst all salvage – including archaeological excavation – is destructive in nature, the greatest impact to *Perth* has been caused by planned, large-scale commercial salvage of the site that was first observed in 2013.

Underwater salvage is a complex, risky and expensive commercial enterprise. Costs associated with such work would seem to outweigh any profit made from the sale of corroded steel, iron and copper-alloy metals. Whilst the motives behind large-scale salvage of *Perth*'s remnants remain unclear, the possibility exists that the work is related to current demand for 'low background steel'.

Historic shipwrecks – and particularly those of large, steel-hulled warships sunk prior to July 1945– are one of the world's few reliable sources of 'low background' steel, lead and copper–alloy. These shipwrecks contain thousands of tons of steel, lead and copper that has been isolated from increasing amounts of

atmospheric radiation caused by above-ground atomic detonations that commenced with the *Trinity* atomic bomb test in July 1945.

Although atmospheric radiation levels have gradually decreased since the *Partial Test Ban Treaty* of 1963, modern metal foundries-- especially those that use blast furnace technology--are affected by remnant radioactive particles. Consequently, modern steel cannot be used to manufacture or house finely-calibrated scientific and medical instruments such as Geiger counters, Whole Body Counters, Lung Counters, Photonics and aeronautical and space sensors (http://hackaday.com/2017/03/27/low-background-steel-so-hot-right-now/ , accessed 16 June 2017; https://en.wikipedia.org/wiki/Low-background_steel , accessed 16 June 2017).

14.4.2 Human Remains

Archaeological and historical data indicate that both ancient and modern shipwrecks that are located in areas of heavy sedimentation, have been quickly buried or otherwise sealed within deoxygenated environment, and not subject to excess current, provide favourable environments for the survival of human skeletal material (Bell and Elkerton, 2007; McLeod, 2008).

In the case of HMAS *Perth* (I), there is high probability that human skeletal remains were—and in some cases still are—present in areas of the ship that sustained heavy shell and torpedo damage, and where crew members were killed, injured or trapped. These areas include the now missing 'A' turret; 4-inch gun deck and Flag Deck; forward 4-inch magazine (where battle damage prevented the crew from escaping); Forward Steam Turbine (Engine) Room; "A" Boiler Room; and the Forward Damage Control (Party) Room and adjacent workshop space (NAA: MP1185/8, 1932/2/200).

Shortly after the beginning of the action the ship was struck by shells in the vicinity of the galley. These hits holed the forward funnel near its base and damaged the water tank. The superstructure was hit a number of times by shellfire that caused considerable damage in the vicinity of the Sick Bay. In addition shellfire dislodged the catapult and aircraft, which dropped down into the starboard waist.

At around 2340, a torpedo struck *Perth*'s starboard side near the bulkhead separating the Forward Engine Room and Forward Boiler Room. This caused the starboard steam turbine to break free from its mounts and release superhot steam throughout the engine room space. According to official documents? (NAA MP1185/8, 1932/2/20), there were no survivors from either the Forward Engine Room, Boiler Room or Damage Control Headquarters.

Fock and Cannon (2013b pp19-21) state that human remains may also have been present in *Perth*'s Sick Bay, Signal Distribution Office, both 6-inch magazines, and their respective cartridge rooms.

Whilst no human remains were observed during the 2017 survey, conditions noted by the survey team strongly suggest human remains exist within and

around the remains of *Perth*'s hull. This is especially true of areas that retain significant sediment deposits. Areas of significant sedimentation observed during the 2017 survey include the inner port hull plating of the Aft Engine Room, the Aft Boiler Room, the Forward Engine Room and adjacent Forward Boiler Room (between Frames 86 and 151), and the inner port hull plating between Frames 53 and 71. The latter area is adjacent to the forward 4-inch magazine and B Turret Shell Room.

14.4.3 Artefact Material

Artefact deposit resting on the starboard side of the forward 4-inch magazine's lateral bulkhead (Image: J. Hunter, ANMM / ARKENAS)

Prior to 2013, and before substantial, invasive and destructive commercial salvage of *Perth* commenced, the site would have contained significant quantities of artefacts associated with the ship and its crew.

Because the vessel is lying on its port side, the majority of this material would have been deposited on the inner port side of surviving longitudinal bulkheads. Areas where dense concentrations of artefacts are expected to have collected include the inner port side of both magazines and shell rooms, both engine and boiler rooms, *Perth*'s various mess areas, the Officers' Aft Baggage Room, Officers' and Warrant Officers' Cabins and Wardrooms, Engineers' Workshop, Sick Bay, Seaman's Cloak Room and Recreation Space.

During removal of the ship's superstructure in 2013 and subsequent destruction of the 'tween deck compartments in 2015 and 2016, the vast majority of artefacts would have either been destroyed by salvage activities or completely removed from context by salvage crews or the strong currents that frequently affect the site.

Although damage to *Perth*'s archaeological deposits has been tremendous, the 2017 survey team nonetheless observed significant, complex and deep deposits of artefact material. Small finds within these deposits included uniform buttons, buckles, a pair of spectacles, leather shoes, rubber boots, cotton clothing fragments, a glass deck light, ceramic tiles, firebricks and small arms ammunition. The areas of highest artefact density observed by the team included the inner port side hull plating of the Forward Engine Room, Forward Boiler Room, (between Frames 86 and 151), as well as the inner port side hull plating between Frames 53 and 71 (adjacent to the forward 4-inch magazine and B Turret Shell Room).

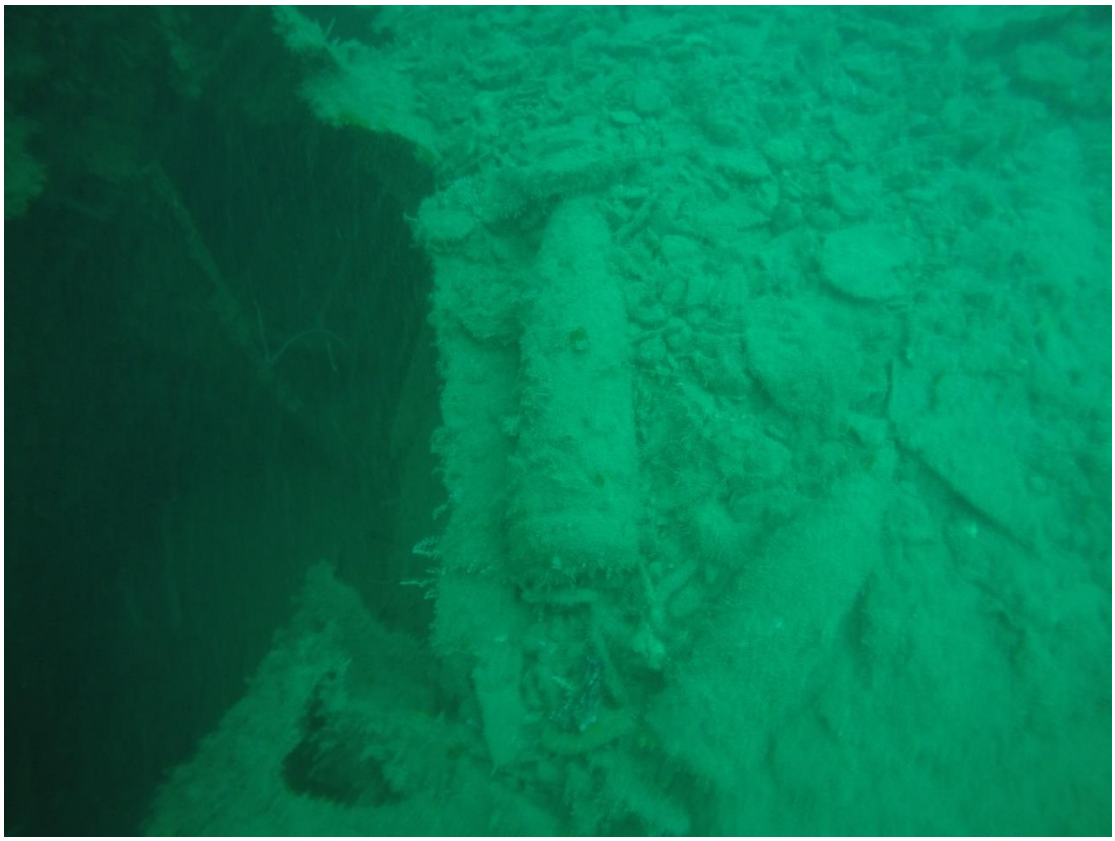
The largest and most diverse concentration of artefacts was noted atop a longitudinal bulkhead immediately forward of Frame 80, next to either the Number One Gunner's Store or the Forward 4-inch Magazine. It contained coverall buckles, uniform buttons, a rubber Wellington boot and a pair of spectacles. . Another artefact concentration was observed in the Forward Engine Room, just forward of *Perth*'s only remaining steam turbine. The deposit was located atop surviving starboard hull plating, where artefacts had settled after having been disturbed and moved by salvage activity.

14.4.4 Fuel Oil and Active Ammunition

The 2017 survey team observed and documented fuel oil and/or aviation spirits escaping from *Perth*'s surviving hull. In addition, numerous unexploded 4-inch and some unexploded 6-inch projectiles were noted throughout the site. The fuel oil/aviation spirits and what unexploded ordnance present significant environmental and health hazards for divers that visit the site, the local fishing community, and those who live along Banten Bay's coast.

In 1941, *Perth* had a total fuel oil capacity of around 1,768 tons. This figure included 1,535 tons of furnace oil and 233 tons of diesel oil for the ship's generators. *Perth* also stored an unknown quantity of aviation spirits. The fuel oil and aviation spirits stores were retained in 27 fuel oil tanks and one aviation fuel tank.

When *Perth* departed Tanjong Priok in late February 1942, it was carrying an estimated 900 tons of fuel (NAA: MP1185/8, 1932/2/20).



Artefact deposit resting on the starboard side of the forward 4-inch magazine's lateral bulkhead (Image: J. Hunter, ANMM / ARKENAS)

Fock and Cannon (2013b pp21-23) state:

…it is estimated that three tanks, A2, A4 and Y3 were ruptured during the battle. … Furthermore, it is possible that any combination of another eight tanks, A1, A3, A8, X1, X2, Y1, Y2 and Y4 may also have been breached. It must be noted that whilst X1 was in the direct vicinity of the torpedo hit that destroyed 'A' Boiler Room and the Forward Engine Room, the depth of this hit and comparatively small hole is not conclusive evidence of a breach. This leaves the unknown contents of 16 tanks unaccounted for.

Recent salvage activities on the *Perth* wreck site has opened up or destroyed many of the vessel's fuel storage areas. However, the midships section of *Perth*'s cellular double bottom is still substantially intact, as is the lower section of the ship's starboard hull. There is a high probability that some fuel oil is still trapped within these areas of the wreck.

There are several options available to host and flag states that wish to mitigate the release of fuel and/or oil and other pollutants from Second World War shipwrecks. These include ongoing monitoring and *in situ* conservation of the shipwreck and oil, sourcing the leak and capping fuel/oil contaminants using oil resistant silicon fillers and adhesives, and entombing the wreck and offloading the fuel/oil by 'hot tapping' the oil source.

All options have costs associated with them. Barrett (2011) states that average recovery/mitigation costs are in the region of $2.25 - $200.00 per gallon.

6-inch shell, cordite cartridge (lower right) and cartridge container (centre right) HMAS *Belfas*t. (Source https://en.wikipedia.org/wiki/BL_6_inch_Mk_XXIII_naval_gun)

According to *The Loss of HMAS Perth* (NAA: MP1185/8, 1932/2/20) *Perth* was armed with 1042 rounds of 6-inch Common Pointed Ballistic Cap (C.P.B.C.) shells at the beginning of the Battle of Sunda Strait. The ammunition was divided more or less evenly between the two 6-inch magazines. Perth also had 30 rounds per gun (60 rounds per turret) of High Explosive (H.E.) 6-inch shells. At 2345 on 28 February, the gun crews of "A" and "B" turrets reported they only had five or six rounds per gun remaining. At about 0000, "A" and "B" turrets had expended all C.P.B.C and H.E. shells, and "B" turret was firing practise projectiles. The gun crews of "X" and "Y" turrets reported they only had 8 rounds per gun left.

As regards the 4-inch secondary armament, *Perth*'s Gunnery Report (NMM: MP1185/8, 1932/2/20) prior to the Battle of Sunda Strait notes all switches on the 4-inch guns were left at H.A. (High Altitude) due to the possibility of aircraft attack during the night.

P1 (Port side No. One 4-inch) and S1 (Starboard side No. One 4-inch) fired star (illuminating) shells as directed by *Perth*'s Fire Direction Officer. All illuminating shells (170 rounds) were expended by about 0002 on the morning of 1 March.

P2 (Port side No.2 4-inch) and S2 (Starboard side No.2 4-inch) fired either L.L.A.D. (Low Level Air Defence) or possible LADDER salvos under the direction of *Perth*'s Fire Direction Officer. Eighty-six rounds of this type were expended by 2340 (28 February) before the crews switched to H.E. rounds and set their fuses to the highest lengths. Approximately 150 shells per gun were expended, totalling 600 rounds. (http://artilleryhistory.org/documents/artillery_abbreviations.pdf, accessed 26 May 2017)

The same report goes on to state that all eight of *Perth*'s torpedoes were discharged during the engagement, and that once the order to abandon ship was announced the depth charges at the stern of the ship were released.

In the case of the ammunition aboard *Perth*, there is a high likelihood that both 4-inch and 6-inch shells used SC (solvent-less cordite / solvent-less carbamate) made up of nitrocellulose, nitro-glycerine and centralite). This substance was incorporated within each 4-inch shell case, or propellant cartridge for each 6-inch round (DiGiulian, 2009).

Both of the vessel's stores of 4-inch and 6-inch shells used a combination of picric acid and guncotton (Lyddite), or toluene and ammonium nitrate (Amatol) in their high explosive shells.

Modern safety standards recommend storing picric acid-based explosives wet or in an aqueous solution, as dry picric acid is very sensitive to shock and friction. Picric acid also reacts to the presence of copper, lead, zinc and other metals, as well as to salts. When exposed to salts, picric acid can form into metal picrate salts that are shock sensitive and extremely hazardous. It is highly recommended that shipwrecks that contain picric acid-based munitions not be disturbed (Albright, 2012).

The Australian National Institute for Occupational Safety and Health (NIOSH) also states that picric acid is highly toxic (NIOSH *Pocket Guide to Chemical Hazards*, 2007).

Protocol 5 of the *Explosive Remnants of War* within the *Convention on Certain Conventional Weapons* (ratified by Australia in 1982 and Japan in 1981) requires that all warring parties must clear areas under their control of 'explosive remnants of war' following cessation of hostilities (*The United Nations Convention on Certain Conventional Weapons*, United Nations office of Disarmament Affairs, 1980; http://disarmament.un.org/treaties/t/ccwc, accessed 22 June 2017).

14.4.5 Commonwealth War Grave Status

The Imperial War Graves Commission (IWGC)--now the Commonwealth War Graves Commission--was established in 1917 to ensure that more than 1.7 million Commonwealth service personnel who died during the First World War and Second World War would never be forgotten. This objective is achieved through establishment and maintenance of cemeteries and memorials at 23,000 locations in 154 countries; research into, and creation of, records and databases that record details of those interred or memorialised; and, in some cases,

recovery of service personnel from where they have died, identification of their remains whenever possible, and re-interment of those remains at an authorised Commonwealth War Grave, Memorial or Cemetery (http://www.cwgc.org/about-us.aspx, accessed 22 June 2017; https://en.wikipedia.org/wiki/Commonwealth_War_Graves_Commission, accessed 22 June 2017). In Australia, the CWGC falls under the purview of the Office of Australian War Graves, Department of Veteran's Affairs, Canberra.

The Commission's principles state

- Each of the dead should be commemorated by a name on a headstone or memorial;
- Headstones and memorials are permanent;
- Headstones are uniform;
- No distinction is made on headstones to account for military or civil rank, race or creed;
- Where no permanent memorial or gravestone can be provided - such as in the case of naval casualties with no known formal grave – each of the dead are memorialised at either the Chatham, Portsmouth or Plymouth Naval Memorials – where 74 First and 1,782 Second World War Australian sailors with no known place of burial (including those who died aboard *Perth* in 1942) are commemorated.

The CWGC currently maintains seven War Graves and Memorials in Indonesia. These include the Ambon Memorial, Ambon War Cemetery, Jakarta (ANCOL) Netherlands Field of Honour, Jakarta (MENTENG PULO) Netherlands Field of Honour, Jakarta War Cemetery, Kembang Kuning Netherlands Field of Honour, and the Pandu Field of Honour, Bandung.

Three of *Perth*'s casualties are buried in the Jakarta War Cemetery:

Ernest Charles Own, Able Seaman,
Robert Stanley Wills, Leading Seaman, and
Frank William George Cadge, Petty Officer Cook,

The Commonwealth War Grave Commission has no legislative control over *Perth*'s wreck site and it has no formal 'War Grave' status. As it lies outside Australian territorial waters, *Perth* is also not eligible for listing under the Australian *Military Memorials of National Significance Act* (2008).

The anomaly regarding sunken sovereign vessels and their war grave status led the British Government to enact *The Protection of Military Remains Act* (1986), which provides protection for the wreckage of military aircraft and designated military vessels as either 'protected places' or 'controlled sites'.

Under the Act, twelve vessels – including a German submarine – are listed as 'controlled sites' where all diving is banned. 55 vessels are listed as 'protected places' where divers can visit the site but not remove, damage or interfere with the vessel and its remains. Seventeen of these vessels are recorded as wrecked in International Waters or, in the case of HMS *Prince of Wales* (1941) and HMS *Repulse* (1941), the waters of another Sovereign State - Malaysia

(https://en.wikipedia.org/wiki/Protection_of_Military_Remains_Act_1986, accessed 22 June 2017),

The Protection of Military Remains Act has no real legislative capability outside the waters of Great Britain, and has provided little protection to *Prince of Wales* and *Repulse*, both of which have been extensively salvaged in recent years.

The United States of America has similar legislation in place. The *Sunken Military Craft Act* (2004) applies to all sunken United States military ships and aircraft wherever they are located around the world. The law also applies to all sunken foreign warships and aircraft in U.S. territorial waters. The Act preserves the sovereign status of all sunken U.S. military vessels by codifying both their protected sovereign status and permanent U.S. ownership.

Australia has no legislation similar to either *The Protection of Military Remains Act* or *Sunken Military Craft Act*.

15.0 HMAS *Perth* (I) – Archaeological and Historical Significance

15.1 Assessment of Heritage Significance

Heritage Significance is a site's heritage value or importance. It is 'contained in the fabric of an item, in its setting and the relationship to other items and in responses that item invokes in those who value it' (NSW Heritage Office, 1996).

15.2 Basis of Assessment of Heritage Significance

To identify the heritage significance of an archaeological site and its relics it is necessary to discuss and assess the significance of the whole study area. This process will allow for the analysis of the site's many values.

These criteria are part of the system of assessment which is centered on the *Burra Charter* of Australia ICOMOS. The Burra Charter principles are important to the assessment, conservation and management of sites and relics. (Australia ICOMOS, 1999)

The assessment of heritage significance is enshrined through legislation both in Australia, under legislation such as NSW *Heritage Act* 1977 (amended 2005) and implemented through,

- the NSW *Heritage Manual* (1996),
- *the Archaeological Assessment Guidelines* (Heritage Office, 1996), *Assessing Historical Importance – A Guide to State Heritage Register, Criterion A* (Heritage Office, 2006),
- *Assessing Historical Importance – A Guide to State Heritage Register, Criterion B* (Heritage Office, 2000),
- *Assessing Heritage Significance* (Heritage Office, 2001) and
- *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Heritage Branch, Department of Planning, 2009)

And internationally and implemented under treaties and guidelines such as *The Guidelines to the Annex of the UNESCO 2001 Convention on the Protection of Underwater Cultural Heritage. (*Maarleveld, T.J, Guerin, U and Egger, B.2013)

The various natures of heritage values and the degree of this value will be appraised according to the following criteria.

15.3 Nature of Significance Criteria

Internationally recognised criteria have been developed to help assess whether an item should be recommended for protection on as a Heritage Item or a protected cultural site. Generally an item or site must meet one or more of the following criteria to be of State heritage significance:

Criterion (a) – an item is important in the course, or pattern, of the State's cultural or natural history (or the cultural or natural history of the local area);

Criterion (b) – an item has strong or special association with the life or works of a person, or group of persons, of importance in the State's cultural or natural history (or the cultural or natural history of the local area);

Criterion (c) – an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the State (or the local area);

Criterion (d) – an item has strong or special association with a particular community or cultural group in the State (or the local area) for social, cultural or spiritual reasons;

Criterion (e) – an item has potential to yield information that will contribute to an understanding of the State's cultural or natural history (or the cultural or natural history of the local area);

Criterion (f) – an item possesses uncommon, rare or endangered aspects of the States cultural or natural history (or the cultural or natural history of the local area);

Criterion (g) – an item is important in demonstrating the principal characteristics of a class of the States

- cultural or natural places; or
- cultural or natural environments. (or a class of the local area's
- cultural or natural places; or
- cultural or natural environments.)

15.4 Levels of Significance

As well as the above criteria, heritage significance may also be ranked according to the item's importance in a particular geographical area. Internationally the levels of significance applying to items in a State or Territory are usually assessed at a

- Local
- State
- National; and
- International

And the degree of this significance can be graded by the terms

- Exceptional
- High
- Moderate
- Little and
- Intrusive

15.5 Archaeological Context

To identify a site's significance and the type of research questions that might be answered by investigation of a site's archaeological remains it is necessary to

have a comprehensive overview of other relevant archaeological sites and the results of relevant archaeological excavations.

15.6 Research Potential

Research potential is the most relevant criterion for assessing archaeological sites. However, assessing research potential for archaeological sites can be difficult as the nature or extent of features is sometimes unknown, therefore judgement must be formed on the basis of expected or potential attributes. One benefit of a detailed archaeological assessment is that the element of judgement can be made more rigorous by historical or other research. (NSW Heritage Office, 1996: 26)

15.7 Assessment of Research Potential

Once the archaeological potential of a site has been determined, research themes and likely research questions, as addressed through archaeological investigation and analysis, indicate that the following inclusion guidelines should be applied:

Does the site
1: Contribute knowledge which no other resource can?
2: Contribute knowledge which no other site can?
3: Is the knowledge relevant to general questions about human history or other substantive problems relating to Australian History, or does the site contribute to other major research questions?
From Bickford, A & Sullivan, S. 1984 (23)

If the answer to these questions is yes than the site will have archaeological research potential.

16.0 Assessment of archaeological potential

Archaeological potential describes the likelihood for archaeological sites, features and/or relics to be preserved in situ within the environment:

Archaeological Potential	Description
Low	No archaeological feature present
Medium/Moderate	There is potential for archaeological features/sites/relics
High	There are known archaeological features/sites/relics

The assessment of archaeological potential as outlined in this report is based upon historical research and the physical non-disturbance survey of the site.

The potential for maritime heritage site and relics to survive intact and in situ is affected by the following factors:

- The quantity of fetch (distance over which wind will travel and the size of the wave produced by this wind) which surrounds the item of heritage
- The extent of sea horizon
- Percentage of hours during which a strong wind blows over the site
- Maximum speed of tidal stream over the site
- Minimum and maximum depths of water over the site
- Depth of principle deposit on site
- Average slope of seabed
- Underwater topography (rocky, sandy, mud, coral etc.)
- Nature of the coarsest material within deposit
- Nature of the finest material
- The actual wrecking process (stranding, fire, capsize, storm driven)
- Access to and process of salvage (controlled by depth of water, technology, isolation of site etc.) and
- The size, displacement, material and manufacturing or building technique used in the construction of the item of heritage

Due to the above processes (especially weather and salvage), shallow water sites may potentially have less archaeological material remaining than deeper water sites.

17.0 HMAS *Perth* (I) - Heritage Significance

Criterion (a) – *an item is important in the course, or pattern, of the country's cultural or natural history (or the cultural or natural history of the local area);*

- HMAS *Perth* (I) has great emotional and historical significance for many Australians given its well-known and documented last stand against almost insurmountable odds during the Battle of Sunda Strait in March 1942.
- *Perth* represents the last resting place of at least 353 RAN, RN and RAAF personnel who died in the Battle of Sunda Strait.
- *Perth*'s wreck site, its remaining contents, and its associated debris field are directly related to the Japanese invasion and occupation of the Indonesian archipelago in 1942.
- International Law (*International Convention for the Unification of Certain Rules Concerning The Immunity Status of State-Owned Ships,* 1926) attributes Sovereign Immunity status to wrecked warships, and the Australian Government considers HMAS *Perth* (I) to be a sovereign vessel.

Criterion (b) – *an item has strong or special association with the life or works of a person, or group of persons, of importance in the country's cultural or natural history (or the cultural or natural history of the local area);*

- *Perth*'s wreck site has a strong, emotive, and special association with the Royal Australian Navy, The HMAS *Perth* Association, (www.hmasperth.asn.au) and, by association, the USS *Houston* (CA-30) Association (www.usshouston.org) and USS *Houston* Next Generations.
- *Perth's* wreck site is regularly visited by RAN vessels transiting through Sunda Strait.
- The loss of *Perth* and *Houston* are commemorated at Garden Island Naval Base (Sydney), the City of Perth's Town Hall in Western Australia Australian War Memorial (Canberra), Australian National Maritime Museum (Sydney), and the Australian Embassy in Jakarta, Indonesia.
- *Perth* and *Houston* have a strong, emotive, and special association with a small but active and diverse technical and recreational diving community who have actively worked to have both sites protected since 2013.

Criterion (c) – *an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in the country, state (or the local area);*

- Does not appear to meet this criteria

Criterion (d) - *an item has strong or special association with a particular community or cultural group in the country, state (or the local area) for social, cultural or spiritual reasons;*

- *Perth*'s wreck site has a strong, emotive, and special association with the Royal Australian Navy, The HMAS *Perth* Association,

(www.hmasperth.asn.au) and, by association, the USS *Houston* (CA-30) Association (www.usshouston.org) and USS *Houston* Next Generations.
- Both *Perth* and *Houston* have a strong, emotive, and special association with a small but active and diverse technical and recreational diving community who have actively worked to have the two sites protected since 2013.

Criterion (e) – *an item has potential to yield information that will contribute to an understanding of the country or state's cultural or natural history (or the cultural or natural history of the local area);*

- *Perth*'s wreck site has some potential to contribute to our knowledge of Second World War naval architecture and the role and the vessel played during the Battle of Sunda Strait.

Criterion (f) – *an item possesses uncommon, rare or endangered aspects of the country's or state's cultural or natural history (or the cultural or natural history of the local area);*

- *Perth*'s wreck site represent the last resting place of 353 RAN, RAAF and RN personnel killed during the Battle of Sunda Strait in 1942. *Perth*'s loss resulted in the second highest casualty rate of any RAN vessel in both World Wars.
- *Perth* is under increasing threat from unauthorised, large-scale commercial salvage activity and – without protection – will be completely destroyed by these activities in the very near future.

Criterion (g) – *an item is important in demonstrating the principal characteristics of a class of country or state's cultural or natural places; or cultural or natural environments (or a class of the local area's cultural or natural places; or cultural or natural environments).*

- Does not appear to meet this criteria

17.1. Levels of Significance

As well as the above criteria, heritage significance may also be ranked according to the item's importance in a particular geographical area. The levels of significance applying generally applied to cultural or natural items are local, state, national and international

17.2 Research Potential

Environment- High Research Potential: *Perth* acts as an artificial reef on an otherwise relatively flat and featureless silt and sand seafloor. Consequently, it supports a substantial marine environment, including large numbers of schooling fish. Its status as a well-known fish habitat is evidenced by the presence of a significant amount of lost fishing equipment throughout the wreck site, including hand nets, monofilament line, fishing hooks, and lures.

Pre- European Contact / Occupation - Low Research Potential: Has low research potential

Historical occupation - Medium Research Potential:
Despite being subjected to ongoing and highly destructive large-scale commercial salvage, *Perth* still contains significant amounts of archaeological material. The site has Medium-level potential to provide archaeological information about early 20th century warship design, the outfitting, arming and operation of Royal Australian Navy vessels during the Second World War, and *Perth*'s involvement in the Battle of Sunda Strait.

17.3 Archaeological Potential

Despite being subjected to ongoing and highly destructive large-scale commercial salvage, *Perth* still contains significant amounts of archaeological material. The site has Medium-level potential to provide archaeological information about early 20th century warship design, the outfitting, arming and operation of Royal Australian Navy vessels during the Second World War, and *Perth*'s involvement in the Battle of Sunda Strait.

18.0 Statements of Heritage Significance – Summary

HMAS *Perth* (I) has great emotional and historical significance for many Australians, given its well-known last stand against almost insurmountable odds during the Battle of Sunda Strait in March 1942. Its wreck site represents the last resting place of at least 353 Royal Australian Navy, (British) Royal Navy and Royal Australian Air Force personnel who perished during the Battle of Sunda Strait. *Perth*'s loss still resonates today, and is acknowledged through the activities of commemorative organisations such as the HMAS *Perth* Association and USS *Houston* (CA-30) Association, as well as museum exhibitions such as *Guardians of Sunda Straits*. *Guardians of Sunda Strait* is curated by the Australian National Maritime Museum and will travel to venues in the United States (Houston, Texas), Australia (Perth and Sydney), and Indonesia (Jakarta).

19.0 RECOMMENDATIONS

1: To prevent the highly destructive, ongoing and intentional large-scale salvage of the HMAS *Perth* (I) shipwreck site, its surviving hull and associated artefacts and debris field requires immediate and urgent protection under:

A: Republic of Indonesia Act No 11 of 2010 considering Cultural Heritage (*Undang-Undang Republik Indonesia Nomor 11 Tahun 2010 Tentang Cagar Budaya*) as a *Situs Cagar Budaya* (Cultural Heritage Site) and

B: Republic of Indonesia Act No 1/2014 juncto Undang-undang No. 27/2007 tentang Pengelolaan Wilayah Pesisir dan Pulau-Pulau Kecil and

C: Under informal local village / community rules, regulations and customary law (*Adit)*

2: That Pusat Penelitian Arkeologi Nasional (ARKENAS), working in cooperation with Indonesia's Ministry of Marine Affairs and Fisheries, submit an application to the Indonesian Ministry of Education and Culture (Kementrian Pendidikan dan Budayaan (Kemdikbud) that *Perth*'s wreck site and its surviving hull and associated artefacts and debris field be classified as a *Situs Cagar Budaya* (Cultural Heritage Site

3: That ARKENAS and ANMM submit an application to the government of Banten Province to include the area surrounding *Perth* within the marine spatial planning of Banten Province as Marine Conservation Area.

4: That the Preservation Office (Serang), and the government of Banten Province identify which *Kelian Adat* (Community Leader) is responsible for waters in the vicinity of *Perth's* wreck site and assist the local community in monitoring the site and protect it from additional damage. Further recommend that the Australian Government consider options to assist the Indonesian authorities monitor the site.

5: That Pusat Penelitian Arkeologi Nasional and the Australian National Maritime Museum continue to work with the Indonesian Ministry of Marine Affairs and Fisheries and the Australian Embassy (Jakarta) to regularly assess and monitor *Perth*'s wreck site.

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Appendix One: List of material known to have been salvaged from HMAS *Perth* 1967-2016

1 x voice tube mouthpiece from bridge, engraved brass plate "No 44 Upper Bridge Starboard". Presented to Captain David Leach; HMAS *Perth* II (RAN)
1 x Voice tube. Kept by David Burchell.
1 x Voice tube. Location unknown
2 x Bronze gyro compass repeaters from wheelhouse. Location unknown
1 half of a 4inch shell case. Presented to US Ambassador, Mr Ed Clark
1 half a 4inch shell case. Presented to Mr Veryard Lord Mayor of Perth, W.A.
2 x 4inch shell cases (S 2 starboard aft turret). Location unknown
1 x porthole (scuttle) rim. Presented to W.A Branch of the Navy League
2 x scuttles / portholes. Location unknown – (one possible presented to the HMAS *Perth* Memorial Hall at HMAS *Leeuwin*) (Edwards, 1975)
1 x Compass Binnacle. Presented to Australian War Memorial, Canberra, November 11 1967
1 x Compass binnacle light. Presented to Mrs Waller (wife of Captain Hec Waller)
1 x piece of lead tubing. Location unknown
1 x Starboard range-finer. Location unknown
1 x Starboard Bridge signalling lamp / searchlight (?). Location unknown
1 x Compass indicator. Presented to Elizabeth and Salisbury Navy Club (Captain Waller Memorial Hall) – 1968
http://www.elizabethandsalisburynavyclub.org.au/history.htm
Several small shell cases. One presented to John Scammell and the other to Gordon Reid (President of HMAS *Perth* Association – now held at the Captain Waller Memorial Hall, SA.)

Burchell, David, *The Bells of Sunda Strait*, David, Rigby, 1971; and
Edwards, Hugh, *Sharks and Shipwrecks*, Edwards, Hugh; Lansdowne Press, 1975

1974 Indonesian Salvage Company

1 x HMAS *Perth* (1) bronze bell from quartermaster cabin underside of vessel. Presented to Australian War Memorial (AWM) 25 Nov 1974
Whilst Burchell states he purchased it from a salvage company.
http://www.awm.gov.au/collection/REL/07771/\ Newspaper accounts of the story state that it was presented by the salvage company to the Australian Embassy in Jakarta then onto the AWM. (*Canberra Times*, 25 November 1974)

4 x 3lb saluting guns removed
4 x 4inch guns displaced or removed
4inch guns ready use lockers removed
1 x starboard anchor removed
1 x port side anchor possible removed
2 starboard propellers removed
2 port propellers possible removed

Appendix Two: Diving Operations and Regulations

All scuba diving operations during The HMAS *Perth* Project 2017 were conducted under occupational diving regulations (AS 2299 and AS2815) with all participants having adequate diving qualifications (ADAS or equivalent) and up to date (less than 12 months old) diving medical certificates or a Queensland Diving Medical Declaration (CSQ/05/2168)

All divers were required to provide documentation to verify their diving qualifications, proof of recent diving experience and fitness to dive prior to the expedition commencing. Additionally all divers were required to undergo one or more check out dives prior to commencing survey work.

There are risks associated with entering and working in and on any body of water and additional risks exist in remote coral reef environments. All expeditioners were made aware of these issues and were encouraged to actively participate in the Diving Risk Assessment Process that was conducted by each diving group prior to any diving or snorkeling activities taking place.

All divers and snorkelers that participated in the The HMAS *Perth* Project 2017 completed the *ANMM Diving Register Personal Questionnaire*, read the *Ashmore Reef Project Risk Management Assessment* and *Emergency Assistance and Evacuation Plan* and attended the various expedition, site induction and dive protocol briefings prior to participating in diving or snorkelling activities during the Project. In addition each diver also had to undertake an individual diver risk assessment prior to the commencement of the Project and their work tasks were assigned subject to that risk assessment.

In addition the Australian National Maritime Museum has a *Scientific Diving Operations and Procedures Manual* and *Scientific Code of Practise* in place and copies of these documents along with the Museum's Maritime Archaeology Policy Document were supplied upon request.

It was a mandatory requirement of the expedition that no diving or snorkeling occurred less than 12 hours after the consumption of alcohol.

It was also a mandatory requirement of the expedition that all dives be monitored and observed by a designated and qualified dive master and that all divers were kept under constant observation from both the main research vessel and their accompanying dive tender.

Dive Teams

All Diving operations were the responsibility of the Project Leader, the designated Diving Officers and the Dive Leaders but all divers were also encouraged to participate in the diving risk assessment process and the dive planning process.

Normal dive team comprised three or more qualified divers and a boat person with one of the divers nominated as the Dive Leader. Divers had to dive in groups of two or three and had to remain within sight of each other throughout the dive. Responsibilities of Divers and Dive Leaders are shown below.

In low-risk conditions where

- Depth of bottom does not exceed 10 metres
- Swell and/or wave height does not exceed 0.5 metres
- Current is nil to slight (diver can swim against it with minimum exertion)
- Underwater visibility is greater than 10 metres
- Dive starts and ends in full daylight
- Where the boat is within sight of the main survey vessel.

Diving without a boat person could take place provided that:

- The Dive Leader determines that low-risk conditions exist at the dive site;
- All divers agreed to dive without a boat person;
- Both boat and divers remain within the designated survey area throughout the dive;
- All divers agreed to abort the dive at a signal from the Dive Leader if low risk conditions cease to exist;
- The Dive Leader ensured that a 25 m float line is deployed from the boat and that the anchor is checked for security at the beginning of each dive;
- The boat displayed an International 'A' Flag;
- The boat has VHF radio / mobile phone communication with the main survey vessel;
- The boat was equipped with first aid and O_2 Resuscitation equipment;
- The Diving Officer could cancel this general dispensation at any time.

For all other diving and snorkelling activities not covered by 'low-risk conditions' e.g.; when diving below 10 metres, when diving in seas greater than 0.5m, when diving in current, poor visibility or when diving out of sight of main survey vessel a boat person with the following qualifications and experience remained on station during diving operations

- Queensland recreational shipmaster's certificate or other Australian state equivalent;
- Significant experience handling similar craft in conditions similar to those at the proposed dive site;
- Adequate knowledge of the actual boat to be used and of the proposed dive site area;
- Current first aid certificate;
- Current oxygen therapy and resuscitation certificate; and
- Familiarisation with the oxygen equipment provided

Dive Leader's responsibilities

- Ensuring that the dive team operates within diving regulations. A more detailed ANMM Diving Operations Code of Practice is available on request.
- Ensuring that all divers and any boat attendant are sufficiently trained and experienced to carry out required tasks safely.
- Ensuring that all divers have taken part in the diving risk assessment process for the planned dive.
- Discussing the dive plan with team members before each dive.
- Ensuring that a dive flag is flown during each dive.
- Ensuring that all safety and first aid equipment is on-board the boat.
- Ensuring that details of every diver in the team are entered in the dive log upon return from each dive.
- Notifying the Diving Officer if planning any of the following: dives deeper than 10 metres, dives at exposed sites in rough conditions, and any variation to the dive team regulations outlined below, any other potentially hazardous dives.
- Notifying the Diving Officer of any diving-related injury to any member of the dive team.
- The Dive Leader also had additional responsibilities when diving without a boat person (see Diving Regulations)

Diver's responsibilities

- Diving safely within the limits of their capabilities. The Dive Leader and/or Diving Officer / Master must be notified of any uncertainties concerning capability.
- Abiding by the ANMM Diving Code of Practice and any special conditions imposed by the Diving Officer.
- Being aware of the agreed risk assessment for the dive and complying with agreed risk controls.
- Wearing the required diving equipment.
- Not diving with faulty equipment.
- Notifying the Dive Leader of any injury sustained while diving.
- Maintaining contact with their buddy.
- Being proficient at using dive tables and any dive computers in use.
- Filling in the dive log upon return from each dive.
- Being adequately hydrated.
- Ensuring that they have not consumed alcohol within ten hours of the dive taking place.

Dive tables and computers

- Use of the DCIEM dive tables is mandatory as they are the only ones allowed for repetitive diving by the relevant Australian Standard (AS 2299). Copies of these tables were provided.
- Dive computers were also used to supply bottom times, maximum depths and other dive information, but all divers were still required to work out dives manually using the tables and stay within the adjusted DCIEM no-decompression limits.

- Because the HMAS *Perth* site was more than six but less than hours away from the nearest recompression chamber maximum no-decompression bottom times were reduced to comply with AS 2299.
- If divers completed three or more dives a day for three consecutive days, the DCIEM tables required a 24 hour surface interval after the third day.

Multilevel dives were calculated using the DCIEM tables. As this could extend bottom time for deeper dives all calculations must be checked and approved by the Diving Officer prior to the dive taking place

Prohibited dives

- Decompression dives
- Dives deeper than 40 m
- Dives less than 24 hours before flying
- Dives less than 12 hours after consuming alcohol

Other considerations

- A safety stop at 5 m for 5 minutes was mandatory for all dives deeper than 9 metres.
- For all dives greater than 25 metres an independent redundant air supply (regulator and bailout bottle) was to be carried by divers
- When planning any strenuous activity consider your nitrogen load.
- Stay hydrated and be ‘sunsmart’.
- 12 hours minimum period between drinking alcohol and diving.

Diving equipment

The following equipment must be carried by each diver unless specifically exempted by the Diving Officer:

- Mask, snorkel, fins
- Buoyancy compensator or back-plate and wing with both oral and power inflation
- Watch or other submersible time-keeper
- Dive computer
- Depth gauge
- Tank pressure gauge
- Secondary air source, e.g. octopus regulator
- Diver safety kit comprising safety strobe, inflatable safety 'sausage' and whistle.
- Dive knife or safety shears
- 3mm – 5mm wetsuit for SCUBA diving or Stinger suit for snorkel diving

Additional equipment

Weight belt or integrated weight system (minus weights)
Torch
Drink bottle

Potential Diving hazards

The Project Risk Assessment identified a number of potentially hazardous marine creatures in the proposed survey area many of these marine creatures could cause serious harm to unaware or inattentive divers.

There are four major types of injury patterns from marine creatures of which three are potential hazards for diving and snorkelling operations.

- Contact irritants including stinging coral, crown of thorns starfish, hydroids.
- Marine stingers (including box jellyfish and the *irukandji*s) and sea urchins.
- Injected toxins including cone shell, stingray and a variety of venomous fish (including stonefish, butterfly cod, and firefish) sea snakes and predatory fish such as moray eel, barracuda, shark (including reef, blacktip, white tip and tiger) and salt water crocodile.

The Box jellyfish (*Chironex fleckeri*) sting can be lethal. The risk of encountering a box jellyfish on the HMAS *Perth* site was considered low but will increase during and after flood conditions on the mainland during the monsoon season.

Irukandji syndrome is a very painful and potentially deadly reaction to stings from a range of jellyfish species. The risk of encountering *Irukandji* on the HMAS *Perth* site was considered low but will increase during and after flood conditions on the mainland during the monsoon season.

A full length rash or Lycra stinger suit or wetsuit provides the best protection to the parts of the body that it covers.

First aid treatment for all marine stings is currently dowsing with vinegar followed up by the removal of tentacles (if safe to do so), patient observation and additional medical attention if required.

Sharks have been reported on the site of HMAS *Perth*. These include White-Tip Reef Sharks (*Triaenodon obesus*), Black-Tip Reef Sharks (*Carcharhinus melanopterus*) and Grey Reef Sharks (*Carcharhinus amblyrhynchos*) however larger more aggressive sharks such as the Tiger Shark (*Galeocerdo cuvier*) and Oceanic Whitetip Shark (*Carcharhinus longimanus*) have also been observed.

Divers were briefed and made aware that if they encountered a shark and felt at all uncomfortable by its presence that they abandon the dive until the shark(s) leave the area. Sharkshields (https://sharkshield.com) were also available if required.