Boom Jetty and Yard Fort Hill.
Between late 1941 and early 1942 Darwin underwent a significant metamorphosis, rapidly emptying of civilians and becoming an almost solely military town. Yet, with the end of hostilities the situation just as rapidly reversed and much of the detail of Darwin's wartime history was soon forgotten.

Map of Darwin Harbour.
A number of publications tell the story of the war in Northern Australia, but they deal mainly with actions or events. Details of fixed defences have either been omitted or mentioned only peripherally along with a particular incident. This was the case with Darwin's Harbour defences.
Today, many Darwinians will proudly tell you that an anti-submarine boom net that stretched across the harbour was six kilometres long, and the longest floating net in the world. But, very few of them ever saw the flotation buoys that supported the net, and fewer still knew what was below the surface of the water. Similarly unknown were the submarine indicator loops that lay on the seabed and warned of approaching ships or submarines, and the part played by ASDIC (Sonar), fitted to ships in the defence of Darwin Harbour.

This article attempts to throw some light on the anti-submarine boom net, the indicator loops, ASDIC and the Port War Signal Station (PWSS) at Dudley Point, all of which played a vital part in the defence of Darwin.

**Defences Planned for Darwin Harbour**

In 1937 international political tensions were such that another World War seemed inevitable. Britain needed harbours for her Eastern Fleet and selected Darwin and Cockburn Sound, south of Fremantle, Western Australia, as likely bases for supplies of fuel, water and stores. Later that year HMAS *Moresby (I)* surveyed Darwin Harbour, and the results of this survey revealed that it could provide a fleet anchorage suitable for 28 ships and 17 small craft in the Middle and East Arms.

In a memo circa.1939 the Admiralty announced a requirement for single berth anchorages for one battleship, one aircraft carrier, three cruisers and eight destroyers. Anchorages were also required to accommodate the numerous local defence vessels comprising four Fairmiles (small versatile wooden hulled vessels mass-produced in Australian yards and used for patrol work), four Harbour Defence Motor Launches (HDML), three minesweepers, two Boom Gate Vessels (BGV), four Boom Working Vessels (BWV), six channel patrol boats and one examination vessel.

In 1938 the Admiralty sent an expert on harbour defences, Commander Bannister RN to Australia to advise the Naval Board on necessary defence procedures. The Admiralty undertook to design the anti-submarine defences for Darwin while the Australian Naval Board initiated the construction of two BWVs that would be needed to lay the anchorage for the boom net and subsequently maintain it.

The first vessel built was HMAS *Kookaburra (I)* which was based on the Royal Navy's 'Net' Class design. The second vessel, HMAS *Koala (I)*, was similar to the Royal Navy's 'Bar' Class design and was 40 feet longer (178.3 feet) displacing an extra 300 tons to that of the 'Net' Class. The two
vessels were completed in early 1940 with a third vessel, HMAS Kangaroo (I), arriving in Darwin in January 1941 followed by a fourth HMAS Karangi (I), in January 1942.

By 1942 the boom service had also been allocated five Boom Defence Vessels (BDV) that were necessary for patrolling the boom net. These vessels consisted of former motor boats and motor yachts that were requisitioned for this purpose. The vessels were armed and put into service as HMA Ships Kuru, Kiara, Vigilant, Moruya and Larrakia, performing general boom defence and air sea rescue duties.

In 1938 Lieutenant Commander W.H Thurlby, RAN and Mr. G.D Logan, a civilian draughtsman, travelled to the UK to be present while the plans for Darwin's boom defence were being drawn up. They also spent time at the Admiralty and visiting various boom depots. On their return to Australia in 1939, Lieutenant Commander Thurlby
became Officer-in-Charge of Boom Services for Australia and he was later appointed as the Director of Boom Services. In this capacity he supervised the preparation for the laying of the Darwin anti-submarine boom net. That same year Chief Petty Officer Wright from the Royal Navy transferred to the RAN and was posted as 'Chargeman' in Darwin. In this capacity he trained civilian riggers in net making and also gave advice on steel wire rope fabrication. In October 1939, Lieutenant Commander A.E. Fowler, RAN, at that time Darwin's Chief of Staff at the Fortress Combined Operation Headquarters, was appointed the Boom Defence Officer, Darwin. Together with four senior sailors, Fowler travelled to Singapore early in 1940 where they studied and trained in boom defence measures. They returned to Darwin on 14 April 1940 where they were joined eight days later by Lieutenant Commander Thurlby and Mr Logan. Lectures on laying boom nets were given to officers and ratings from Kookaburra and Koala as well as the personnel who had assembled in Darwin to work on the boom defence facilities. These comprised chargemen, riggers, artisans, skilled labourers (leading seamen) and labourers (able seamen). In October 1940 approval was given for wives and families to join the riggers subject to the availability of accommodation. Lieutenant Commander Thurlby left Darwin on 20 May 1941 and Lieutenant Commander Fowler assumed responsibility for the laying of the boom net and its ongoing maintenance until the end of the war. The wire rope used for the nets was manufactured by the Australian Wire Rope Works at Newcastle, NSW and differed from normal wire rope, which had a core. The high tensile wire rope used for the boom nets was about one inch in diameter and consisted of all wire strands. That used for the jackstay along the top of the net was 2 inches in diameter. The laying of the net was scheduled to be completed by the end of 1940. However, due to the preparation required for the assembly of the net in the boom yard, the laying of the moorings and unforeseen problems caused by tidal conditions, the laying of the net did not begin until the end of 1940 and was not finished until the end of 1942. The delays significantly increased the costs of the project as the First Naval Member, Admiral Sir Ragnar Colvin, noted in a minute dated 22 May 1940:

I consider that we should now take stock of the situation with regard to our commitments on the boom defences at Darwin. The cost was
originally estimated of the order of £600,000. It has now reached double that - over £1,200,000 - and the limit is not yet in sight. The extensions to the boom advised by Admiralty and the additional vessels may easily entail another £500,000 or more and the eventual total capital cost may quite likely be not less than £2,000,000. The project in my opinion has assumed dimensions of a magnitude out of all proportion not only to the other sea, land and air defences of Darwin, but to our total naval effort and expenditure.

Before work on assembling the nets could begin, a large boom shed had to be built in the boom yard next to Fort Hill.

Boom Yard, 1942 onwards.

Boom Yard, 1940. Photo: Peter and Sheila Forrest.
Within the Boom Yard, 1942. Sketch from 'The Navy in Darwin 1942-1943'. Courtesy of MAGNT.

Within the Boom Yard, 1950. Photo: Peter and Sheila Forrest.

In April 1940 a branch line from the railway yards was run along the shoreline to the boom shed to transport the heavy components - buoys, wire rope and chains - arriving by ship at the Stokes Hill Wharf. By 1 October 1940 work on the boom depot was virtually complete with the exception of the railway branch lines that were required to be laid across the yard. Around this time, part of Fort Hill was also demolished to make room for a road and work space at the end of the new concrete jetty being built by Hornibrook and Co. This was not completed until mid 1941. A concrete net slab on which the nets were to be made was also poured near the jetty and was ready for use by September 1940. A further necessity was the need for a concrete launching trough down to the water that allowed nets to be slid into the harbour and then towed out to the boom net location by one of the boom working vessels. The Department of Interior in Darwin poured the concrete slab and made the large five and eight-ton concrete mooring clumps used for the anchorage of trots.
8 ton concrete clump, details of steelwork.

**Trots**

Trots were an assemblage of three cylindrical buoys anchored by eight 8 or 5 ton concrete mooring clumps to the seabed. Four clumps were positioned on the seaward side of the net and a further four were positioned on the harbour side of the net. The trot buoys were secured to the clumps by 1½" or 2" chain cable. In special cases a large peg top buoy was used instead of a cylindrical buoy. For the anchorage of the trots, 230 tons of 1½" chain cable arrived from America in June 1940. In all, the boom net moorings used 265 clumps.
Final Lay/Out of A/S Boom.

A record of 8 May 1939 lists the cost of 70 five-ton concrete clumps made by the Department of Interior, Darwin, as being £1500.

- Eight foot mesh - 300ft x 91ft
- Three foot mesh - 297ft x 93ft
- Net made in three depths, 25ft, 55ft and 93ft.
- Distance between Trots - 195 yards
- Number of Trots - 30
- Photographic evidence suggests there were 20 to 22 flotation buoys on each net section.

The Net

The manufacture of the 8-foot mesh nets conformed to the UK pattern. On 30 September 1939 the first items for the boom defence - the cylindrical buoys - arrived by ship. These were followed in May 1940 by forty-nine anti-submarine nets varying from 2½ tons to 7 tons. Because there was no crane in the yard, these nets had to be manhandled from the rail trucks into the boom shed. The first nets used came from the
Australian Wire Rope Works, but after September the nets were made in the boom yard. The concrete slab on which the nets were made measured 320 feet by 106 feet and was marked out with 27 holes, 11 feet 3¾ inches apart along the long side (top). Each side had 17 holes, 5 feet 7 and 7/8 inches apart. A 1½ inch galvanised pipe about six inches long was set into the holes. Into these pipes an 18 inch long galvanised pipe 1¼ inch (external measurement) was fitted and loose enough to be removed. The pipes were positioned to indicate where the wire ropes started their diagonal pattern over the slab. Where ropes crossed they were shackled together. Specially designed shackles held the ropes at right angles. The top of the net was shackled to the jackstay, (a length of steel wire rope stretched between two points). The rope 300 feet long had hard eyes spliced into each end. A four-foot length of chain was shackled to a ring under the flotation buoys and the other end of the chain was shackled to the top jackstay. Flotation buoys were spaced approximately every 15ft along the jackstay.

Positioning the Net. The net was then gathered up to the jackstay and tied at intervals with wire rope stoppers. This was to prevent the bottom of the net dragging along the seabed and becoming snagged on reefs or rocks.
One end of the jackstay faced the launching ramp and an 9 ton diesel locomotive jib crane that ran on the rail line adjacent to the net slab was used to drag the net to the head of the launching trough where it was secured to a rope from a boom working vessel. The vessel hauled the net with its flotation buoys into the water and towed it out into position. To secure the section of net between the trots each end of the jackstay was shackled to a ring beneath one of the outer large cylindrical buoys. When the net was secured between the two trots, a rigger would move along the top of the net and cut the ties which held the net to the jackstay. To work on the mooring chain cable under the buoy, it was necessary to lift the buoy out of the water underside up. A lasso was made from a wire rope a few feet longer than the circumference of the buoy with a soft eye spliced into each end. This was shackled to a soft eye on a wire rope from the ship's winch. A rigger, balancing on the buoy, slipped the lasso over each end of the buoy and it was then winched in, lifting it out of the water.

Lifting Buoy. Northern Territory Library, Ron Urquhart Collection.
When the operation was completed the buoy was lowered into the water, the lasso was slackened and the winch wire unshackled. The rigger then swam under the buoy to ease the lasso loose from the chain cable. This allowed the rigger to then retrieve the lasso.
Later, due to the threat of midget submarine and human torpedo attacks, the Admiralty ordered the size of the net mesh to be reduced to 3 feet. Fortunately, no alteration was required to be made to the Darwin net slab, as the Admiralty was able to supply 3.48 miles of 3ft net from stores.

**Laying The Trots**

In November 1940, transit markers were erected at an alcove 500 feet north of Dudley Point and at West Point. Kookaburra, starting with trot one on the edge of a shelf then laid marker buoys (44 gallon drums) between Dudley Point and West Point to indicate the line for mooring the trots. Once the marker buoys were laid and the worst of the wet season had passed, Koala began laying the moorings for the trots, an operation that took two months. Trots 1-12 and 14-18 were laid by 9 April 1941. A space for trot 13 was left open to allow for a shipping channel.

The rise and fall of the tide could often exceed 20 feet and the strength of the tidal stream caused unforeseen problems. During July and August 1941 most of the moorings between trots 5 and 20 moved and had to be lifted and re-laid. In October the Indian Spring Tide caused trots 11-14 to break away from the moorings with the net attached. The stress caused on the clumps, the chain cable, the wire rope and the shackles was so strong that many components had to be replaced and consequently the clumps were re-designed to take the strain.

An RAN survey conducted in August and September 2005 revealed the continued existence of the 8 ton concrete mooring clumps, and other associated fittings, left on the seafloor in 1945. The survey also indicated that these items have been subject to some movement over the last 60 years.

**Laying the Boom Net**

The net was at first laid from trot 22 on the western side to trot G. Later it was extended to trot H at the beginning of the shelf off Dudley Point. Unfortunately this left a strip of unprotected water at both ends of the net which at high tide would be deep enough to allow enemy midget submarines and motor torpedo boats to pass around the end of the boom net. Consideration was given to building a breakwater at each end of the boom net but this idea was dismissed when the more practical solution of erecting seven pylons on the eastern side of the harbour to span the 1866
feet of shallows and reefs to the Dudley Point cliffs was suggested. Similar pylons were erected in the shallows at West Point. Photographic evidence suggests that the pylons were 25 feet high with concrete foundations on the reef. A two inch wire rope connecting the tops of the pylons prevented fore and aft movement and side stays prevented lateral movement. 
A net was hung from the wire rope lines hanging from the jackstay connecting the tops of the pylons with the eastern end of the jackstay being secured to a concrete block on the cliff at Dudley Point. It was estimated that it would be June 1944 before these additions were completed. Anecdotal evidence suggests that the pylons were destroyed using demolition charges in 1967 or 1968.
The Gate and the Gate Vessels

To enable ships to enter and leave harbour, two permanently moored gate vessels operated a gate in the net within the shipping channel. In November and December 1940, with the assistance of a 10 ton crane and a 60 ton lighter from Hornibrooks, five-ton concrete mooring clumps with chain cable were laid on the seabed to provide moorings for the gate vessels.

HMAS Kara Kara (I) and HMAS Koompartoo, two former Sydney ferries, were refitted and commissioned for this purpose. This included equipping them with powerful winches on their after decks to enable them to operate the gate. Kara Kara arrived in Darwin in November 1941 and while Koompartoo was being converted Kookaburra and HMAS Gunbar (I),
an auxiliary minesweeper, alternated as gate vessels. Koompartoo eventually arrived in Darwin in February 1943.

Boom gate operation diagram.
During the operation of opening the gate, the after decks of the Kara Kara and Gunbar were cleared of all personnel except for the Engine Room Artificer (ERA) operating the winch. When the tide was flowing strongly there was enormous strain on the recovery wire rope and occasionally it would part between the stern and the gate. Released of its tension the loose end of wire rope would swing wildly in the air and over the deck for several seconds. The ERA would have to duck for shelter behind the large drum of the winch to avoid the wire that would have cut in half anyone on the after deck.

At first stores and water for the gate ships arrived regularly by a towed lighter or by one of the other boom working vessels. Later a regular service was provided by a supply vessel. Kara Kara and Kookaburra were placed in the gate in January 1942 and the gate became fully operational on 14 February 1942. A small gate, large enough for patrol boats and luggers to pass through, operated between the starboard side of the eastern gate vessel and a large peg top buoy.
HMAS Gunbar as seen from the deck of HMAS Kara Kara. During the 19 February 1942 Japanese air raids, both gate vessels were heavily machine gunned. Kara Kara sustained casualties, with her captain and four of her crew being badly wounded. The injured were transferred to the Hospital Ship Manunda, which sailed for Fremantle the following day with 300 other wounded personnel on board. The gate was consequently closed until 13 March 1942. When the gate reopened, Gunbar was assigned as the western gate vessel, until Koompartoo arrived, and Kara Kara was assigned as the eastern gate vessel.
Maintenance of the Boom Net

Boom Defence rating badge.
The boom working vessels were constantly required to check and replace damaged nets, shackles and buoys that had broken adrift or were taking in water. This work was carried out by Riggers. Their duties were separate from the normal 'part of ship' duties carried out by other members of the ship's company which included painting, chipping rust, gunnery, watch keeping etc.
'Riggers' was the generic term used to describe the men working on the boom net and often as many as six would be assigned to each boom working vessel.
The navy's rating equivalent was: Chargeman
Chief Petty Officer
Riggers
Petty Officers and Leading Seamen
Skilled Labourers
Able Seamen
Labourers
Ordinary Seamen

The riggers were supervised by a Petty Officer and/or a Leading Seaman, and for their hazardous work they received an extra one shilling a day as danger money. As with most ship's companies in the tropics, a hard lying allowance of one shilling a day was also paid to them. (The equivalent of 1/- in 1945 is about $7.50 in 2006). Hard lying allowance was paid to ship's companies living in the exceptionally uncomfortable conditions that existed in the tropics that made sleeping in cramped mess decks beneath an iron deckhead (ceiling) quite unbearable.

Able Seaman Dave Gooden, an ex-rigger, provides an interesting insight, through his recollections, into the day to day activities of the riggers '...we were volunteers and could not be ordered over the side, but suggestions were made that 'so and so' should do 'this or that' and usually the request was complied with. But we were never [asked] unless the Petty Officer thought we could safely handle the job.'
Riggers working on the net. The Australasian 1943.

'The jackstay on the top of the net was hauled up by a grapnel (a three or four pronged hook) to the horns on the boom vessel and the riggers would work their way along the jackstay into the water and swim from buoy to buoy. We only wore shorts and heavy boots to protect our feet from the barnacles and our hands became callused. [Some wore leather gloves with the fingers cut off to protect their hands]. The wire ropes and chains were covered with barnacles, white slimy sea lice, seaweed and sponges. For safety, a lookout was posted on the ship to keep an eye out for sharks.'

Able Seaman Bert Jones, another trigger, recalls that, 'when repairing and tightening the shackles on the flotation buoys, a spanner [on a lanyard] was attached to our waist...' he also recalls 'the infection we received from frayed wires' as well as 'a watch (lookout)] being posted on deck to warn the riggers on the net of drifting jellyfish [Box Jellyfish]. They weren't difficult to see. The water was crystal clear and you could easily see a swarm floating about 2ft from the surface.'

A Naval medical report of 19 July 1945, confirms at least four cases of swimmers being stung by Box Jellyfish. All were successfully treated at the hospital however none were riggers working on the boom net. Another
ex-rigger, Arthur Lorriman, recalls attending a funeral in early 1944 for Able Seaman W.N. Schneider who was fatally stung at the Lameroo Baths. Riggers were also continuously employed in the boom yard splicing wire rope, constructing nets, chipping rust off buoys and repainting them. The most frequently used buoys were the large cylindrical type used for the trots and the barrel shaped flotation buoys supporting the nets. Peg top buoys were also used to suit special circumstances. Illustrations are not to scale.

Details of cylindrical buoys.

Buoy maintenance. NAA 150/1.

Completion of the Anti-Submarine Boom Defence

With the boom net and extensions completed in 1944 Karangi was released to do work in other ports but Kookaburra, Koala and Kangaroo were constantly at work maintaining the net and the moorings until it was time for them to be dismantled following the cessation of hostilities in September 1945.

Indicator Loop
Submarine Indicator Loop construction. Numerous methods had been developed prior to World War II to alert harbour defenders to the presence of enemy submarines and it was magnetic sensing that was selected for anti-submarine detection at Darwin. This method relied on the production of an induced current in a stationary loop of wire placed on the sea bed that triggered a signal when a ship or a submarine passed overhead. The Royal Navy developed the technology in 1915 at HMS Osprey, which they later shared with the United States Navy (USN). The first recorded use of the Indicator Loops was at Scapa Flow on the 28 October 1918 when the German U-Boat UB-116 was detected and destroyed in a controlled minefield. The cable that actually detected the crossings consisted of a single core of 17 strands of .029 inches tinned copper wire covered with three layers of India rubber then a layer of waterproof tape wound with jute yarn. This was then covered with hessian tape and spirally wound with soft lead alloy wire. The lead was covered with more waterproof tape, a tarred jute
serving, two more layers of hessian tape, 22 steel armour wires (each 2mm diameter) covering the lead. Further braiding of dressed hemp yarn wrapped over hot pitch and resin was added, and finally a preservative coating. The final diameter was 1.3 inches (33mm) and it weighed 6.09 tons per nautical mile. The loop was typically 5000 yds long and 400 yds wide with a central cable running the length of the loop and joined at both ends by a waterproof junction box. From the junction box at one end a tail travelled the seabed to the shore and an Indicator loop hut. The loop tail was a 4 core, 7 strand .029 inch cable used for the four central cores and had a 22 strand steel cable armour, with a final diameter of 25mm. (Extracts from Walding, Richard. Indicator Loops, Moreton Bay College, Wynnum, Queensland).

Position of Indicator Loops.
In September 1940 two Indicator Loops were laid two miles to the seaward side of the Darwin anti-submarine boom net, requiring some 276,000 feet of cable supplied by Cable and Wireless Ltd, Victoria Embankment, London. Unfortunately, the force of water caused by the changing tides and the rough seabed in Darwin resulted in many breakages in the cable. Following a survey conducted of the seabed, by HMA Ships Vigilant, Kiara and Wato, it was decided to lay a replacement of five loops three miles further to seaward. This was completed in 1943 when the indicator loop
hut was moved to Nightcliff, west of the present jetty, providing a more direct location for the tails from the junction boxes to the shore. The hut was fully operational on 30 June 1943.

Between January and March 1942, several unsighted crossings were recorded by the indicator loop. Later, between 8 and 16 August that year, unsighted crossings were made and the signatures recorded on the screen in the hut were very similar to those made by the midget submarines that entered Sydney Harbour in May 1942.

Security for the indicator loop equipment at the station was considered paramount. Should the Japanese have landed in Darwin it would have been impossible to retrieve any of the cable from the seabed, but without the receiving equipment it would have been useless to anyone. On 21 August 1941 a letter from the Naval Board (1855/3/185) instructed all indicator loop stations to prepare plans for burying the recording equipment, which was to be distributed in three boxes. Advice marked 'Most Secret' was to be sent to the Naval Board showing the burial location that included a diagram with bearings and distances from a known position.

**Asdic (Sonar)**

This detection devise is commonly referred to by its acronym 'ASDIC' [Anti-Submarine Detection Investigation Committee]. Similar to a hydrophone, an asdic made use of underwater acoustics, but was based on high frequency echo ranging, and hence was an active rather than a passive sensor system. It could be fitted as part of a harbour defence, but the Navy expected ASDIC's prime application to be in surface vessels. The device consisted of an oscillator built up of quartz discs and fitted in a circular steel frame. In use, the operating vessels lowered the oscillator through a trunk open to the sea until it protruded below the hull. Protected from damage by a dome, the oscillator acted both as transmitter and receiver. Since the speed of sound was known, the target's distance could be measured by the time it took for the echo to return to the source. The asdic operator could also train the oscillator in a horizontal plane and thus the combined system at last made feasible the accurate location of a submerged submarine in terms of both range and bearing from the equipment.

The Royal Navy fitted the first standard asdic set, Type 112, in some of the Portland 'P' boats in 1920...early experiments in good conditions
produced detection ranges of 3000-4000 yards. Assuming the realisation of the full potential, ASDIC clearly offered a scientific device so eagerly sought by the Admiralty...[and] provided the ideal means for a surface vessel to resume an attacking role.


From 1940 onwards Admiralty and the Naval Board discussed the possible uses of fixed ASDIC in Darwin Harbour. The suggestion was for ASDIC to be fitted to dolphins (pylons or stands fixed to the seabed) but this was considered unsuitable because of the nature of the seabed and tides. Consideration was also given to fitting Type 135 Detector Units, a fixed ASDIC that was secured to a ship's side, to the boom working vessels and the gate ships. Eventually only the gate ships were equipped with this in 1943.

**Port War Signal Station**

During times of war, the Navy has traditionally established War Signal Stations on coastlines to communicate with ships coming within visual range. Those at the entrances to harbours were called Port War Signal Stations (PWSS).

As radio silence was often imposed on ships during wartime, the first communication a ship would have with Naval Headquarters was when its bridge 'tipped' the horizon and Morse code challenges were flashed to and from the PWSS.

Darwin's PWSS was located half way between Dudley Point and East Point with it's staff arriving on 27 August 1939. Wireless telegraphy was installed by 6 October 1939 and the indicator loop station (hut) was established at Dudley Point by 10 October 1939. Of the 60 feet high signal tower, nothing remains. It was in a position 1080 feet, bearing 009½° from the Triangulation Station at Dudley Point. The reference point doesn't exist today, but a study of the area suggests a navigational beacon was erected on the end of Dudley Point. This was probably on a single pole. A surveyor's plaque on the cliff's edge marks the spot.
Aerial View of Boom Net.

Until 1943 the indicator loop hut was also located at the PWSS. Dan Allison, a signalman between 1941-1943 recalled, ... 'because of the indicator loop we had close cooperation with the [Army's] searchlight battery at Dudley Point and the Army's battery at East Point, which were always alerted if a crossing was recorded over the loop'. There were between 35 and 40 naval personnel at the PWSS because of the indicator loop. The Commanding Officer was Lieutenant A.B. Smith, RANVR who was also the Extended Defences Officer. Another officer acted as second in command and below him were, four rating watch-keepers, an ERA to maintain the generator, five wireless telegraphy operators, one Yeoman (Petty Officer) of signals, one leading signalman, 10 signalmen, one for administration, one cook and assistant, one wardroom steward and two workmen. HMAS Melville, (the Darwin shore headquarters) also sent men recuperating from illness out to the PWSS for a few days at a time.

Dan Allison also recalls that 'There were also two ABs, WWI veterans, who were taken on as guards after the Japanese came into the war. They were there to protect us from paratroopers, but they cracked under the strain
and one night clubbed a W/T rating on the head when he was out of the W/T office spending a penny!' With the wartime blackout, torches were not permitted and men were forced to grope their way around in the dark.

Photographic evidence suggests the staff had increased to six officers and at least thirty-five men by 1944.

Blythe Lindsay, signalman at PWSS Darwin in 1944 recalled ... 'there was an enclosed room at the [signal tower's] base, built of concrete, which housed a small generator mounted at waist height on a concrete block. This had to be hand-started to power the 10 inch signal projector that was used to challenge approaching vessels.' Communication with the boom gate ships, about a mile and a half to the west, was by visual signals also using the 10 inch signalling projector from the Port War Signal Station, and signals from the gate ships to the PWSS was either by Aldis lamp (a hand-held signal lamp) or semaphore.

The PWSS ceased functioning 12 September 1945.

**Following the Cessation of Hostilities**

With the cessation of hostilities in August 1945 Australia's ports were cleared of their anti-submarine defences except for Darwin and Fremantle where the nets and the buoys were dismantled and stored in their respective boom depots. The concrete clumps in Darwin Harbour remained on the seabed in case they were required for future use.

In Darwin the indicator loop was lifted and with the fixed ASDICs were all returned to stores. Karangi had been transferred to Fremantle, and after dismantling the Darwin boom net and buoys Koala and Kangaroo sailed for Sydney. Kookaburra, Kara Kara and Koompartoo remained in Darwin and were placed in reserve.

**Consideration given to Anti - Torpedo Defence**

Laying anti-torpedo nets to protect the fleet anchorage was discussed in 1939 but as the Pacific war moved away from Australian waters this idea was abandoned. However, anti-torpedo nets were laid at the Manton Dam, the town's water supply about 47 miles south east of Darwin, under the supervision of the Boom Defence Officer.

**Shipping Movements of Boom Working Vessels**

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**The Author**

Paton (Pat) Forster joined the RANR in October 1940. From October 1941 to September 1943 he served in Darwin, first as a signalman and later as a draughtsman in the Boom Defence Office. After receiving his commission he joined HMAS Whyalla as the anti-submarine officer and completed his war service in the Pacific. He was demobilised a Lieutenant RANVR in March 1946.

**Footer Info**

This email has been checked for viruses by Avast antivirus software.
www.avast.com
8 TON CONCRETE CLUMP
DETAILS OF STEELWORK

ELEVATION

FINAL LAYOUT of A/S BOOM

TROTS "H" to 22.

Gate Ships' Moorings

TOTAL NUMBER ORDERED 265

TOTAL NUMBER REQUIRED TO COMPLETE DEFENCE 232

LOST 33

SPARE 19

Drawn 14-10-42
BOOM GATE

Gunbar until February 1943
Koompartoo from February 1943

To open gate
Gunbar winches in wire cable A, which passes through a block on buoy C. Kara Kara pays out the recovery cable B secured to end of gate. When gate is fully open Kara Kara lets cable B rest on seabed.

To close gate
Kara Kara winches in recovery cable B, Gunbar pays out cable A until gate is closed. End of gate is secured to the stern of Kara Kara.
The cable
A submarine loop is made of a lead-sheathed single core (Admiralty Pattern No. 1989).

The tail