



**KIMBERLEY  
PORTS**  
AUTHORITY

# **MOORING PROCEDURE**

**Broome, Derby, Wyndham and Yampi  
Sound**

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**Current version number: 4.0      File reference: HBR003\_219149      Maintained by: Harbour Master**

**Original issue date: October 2008      Last review date: June 2025      Next review date: June 2027**

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| Version No. | Version Date:  | Brief Description of Change:                                                                                                                                                                         |
|-------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.0         | Unknown        | Mooring License guidelines - original issue.                                                                                                                                                         |
| 2.0         | October 2008   | Document names change to Mooring Licenses Terms, Conditions & Owner Responsibilities and Mooring Standards, reduction of content (incorporated into Mooring Standards) and formatting style updated. |
| 2.1         | August 2009    | Minor amendment.                                                                                                                                                                                     |
| 2.2         | September 2009 | Document names change to BPA Mooring Procedures and content amended.                                                                                                                                 |
| 1.0         | August 2014    | Re-issue procedures under Kimberley Ports Authority                                                                                                                                                  |
| 2.0         | October 2016   | Amend Section 1(g) and correct Harbourmaster to Harbour Master.                                                                                                                                      |
| 3.0         | May 2020       | Full review of documents. Standards and Procedures were combined.                                                                                                                                    |
| 4.0         | June 2025      | Full review of document, including update of insurance requirements. Inclusion of other KPA Ports.                                                                                                   |

## 1. INTRODUCTION

Kimberly Ports Authority's (**KPA**) Mooring Procedures provide information for applicants and/or companies wishing to install and use moorings in the Port(s) of Broome, Derby, Yampi Sound and Wyndham. The procedures address mooring design, installation, maintenance and responsibilities of Mooring Owners.

This document in no way absolves any Mooring Owner or user from their own duty of care to others, including but not limited to their employees, licensees, other Port users, visitors and KPA.

It is recommended that this document be read in conjunction with other KPA procedures, such as the KPA cyclone Contingency Plan.

### ***1.1. Kimberley Ports Authority (KPA)***

The KPA is a WA Government trading enterprise that operates the Ports under the jurisdiction of the Port Authorities Act 1999 and Port Authority Regulations 2001, with responsibilities to:

- Facilitate trade within and through the Port and plan for future growth and development of the Ports.
- Operate the Ports safely, efficiently and securely; and
- Protect the environment.

In this role, KPA approves and administers the Port assets including moorings within Port waters.

**Failure to comply with KPA mooring procedures, standards and applicable KPA Mooring Terms and Conditions may, without prejudice to the KPA's other rights, result in the removal of the Mooring and or legal action against the Mooring owner.**

#### **KPA Contact details:**

Telephone: (08) 9194 3100

Fax: (08) 9194 3188

Email: [broomemoorings@kimberleyports.wa.gov.au](mailto:broomemoorings@kimberleyports.wa.gov.au)

Web: [www.kimberleyports.wa.gov.au](http://www.kimberleyports.wa.gov.au)

## 2. ABBREVIATIONS & DEFINITIONS

| ABBREVIATIONS |                           |
|---------------|---------------------------|
| HAT           | Highest Astronomical Tide |
| HM            | Harbour Master            |
| KPA           | Kimberley Ports Authority |
| LOA           | Length Over All           |
| MHWS          | Mean High Water Springs   |
| MHWN          | Mean High Water Neaps     |
| MSL           | Mean Sea Level            |

| DEFINITIONS                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Cyclone Mooring                    | A mooring which must have minimum capability of holding a nominated vessel in line with the requirements of section 12 and as specified by Mooring Designer / Naval Architect                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Mooring                            | A mooring located in gazetted KPA Waters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Mooring Consultant                 | A person or organisation that is either a: <ul style="list-style-type: none"> <li>• a Mooring Designer / Naval Architect; or</li> <li>• a Mooring Inspector / Installer</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Mooring Designer / Naval Architect | A person or organisation with appropriate professional qualifications to: <ul style="list-style-type: none"> <li>• suitably qualified as a Naval Architect;</li> <li>• prepare technical specifications of a mooring system including configuration and materials;</li> <li>• review and make recommendations on inspection reports; and</li> <li>• ensure on-going suitability of mooring systems.</li> </ul> A KPA approved Mooring Designer / Naval Architect can be found on KPA <a href="#">Website</a> .                                                                                                                                  |
| Mooring Inspector / Installer      | A person or organisation capable of installing a mooring as per Mooring Designers / Naval Architect's specifications that are: <ul style="list-style-type: none"> <li>• licensed by KPA to install / inspect moorings within the relevant Port;</li> <li>• duly qualified for their business and licensed in Western Australia;</li> <li>• capable of conducting mooring inspections above / below water; and</li> <li>• capable of producing measurements and records suitable for evaluation by the Mooring designer / Naval Architect.</li> </ul> A KPA approved Mooring Inspector / Installer can be found on KPA <a href="#">Website</a> . |

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mooring Permit                       | The document issued by KPA to a Mooring Owner permitting the use of the specific mooring after it has been provided with evidence of valid insurance, inspection and condition report.                                                                                                                                                                                                                                                                       |
| Mooring License Terms and Conditions | Means the terms and conditions set out in the KPA's standard Mooring Licence Terms and Conditions document as varied from time to time by KPA.                                                                                                                                                                                                                                                                                                               |
| Mooring Owner                        | <p>A person or organisation that seeks or holds a Mooring Permit in the ports of Broome, Derby, Yampi Sound or Wyndham.</p> <p>A Mooring Owner must have the following current documentation within date.</p> <ul style="list-style-type: none"> <li>• a valid mooring permit;</li> <li>• valid insurance documents which include public liability and hull insurance; and</li> <li>• a valid design report for the vessel and mooring equipment.</li> </ul> |
| Port                                 | The Ports of Broome, Derby, Yampi Sound and Wyndham in Western Australia and their seabeds and port waters together with all wharves, piers and land are owned, vested in, occupied by, licenced to or controlled by the KPA.                                                                                                                                                                                                                                |
| Storm Mooring                        | A mooring other than a cyclone mooring and capable of withstanding wind and weather up to (Beaufort force 10) or as specified by the Mooring Designer / Naval Architect.                                                                                                                                                                                                                                                                                     |

### 3. LEGISLATION / ACT

- [Port Authorities Act 1999](#); and
- [Port Authorities Regulations 2001](#)

### 4. DISCLAIMER

A Mooring Owner must obtain their own independent advice from duly qualified Mooring Designer / Naval Architects, to ensure that their proposed mooring will meet not only KPA requirements but also provide a safe mooring for their vessel.

KPA accepts no liability for any loss, harm, damage or delay of kind whatsoever which may be suffered by a Mooring Owner as a consequence of the Mooring Owner relying on the information contained in these mooring procedures.

### 5. PREAMBLE

KPA hosts a range of recreational and commercial vessels each year, many of which utilise moorings as opposed to anchoring within port limits. These moorings may be recreational or commercial storm moorings or cyclone moorings. All moorings within the Ports are administered by KPA. KPA aims are to promote fair and equitable access to moorings and to provide efficient and effective management of waters within port limits.

Each mooring must be capable of safely securing the assigned vessel under a range of weather conditions corresponding to the Assigned Annual Recurrence Interval (ARI) level outlined in metocean data tables below. Mooring designer / Naval architects responsible for the mooring design must use the information provided in these procedures as the basis for their design. The moorings at Gantheaume Point are designated as storm moorings and are suitable for vessels up to 35 metres in length, while those located in Roebuck Bay include both storm and cyclone moorings, accommodating vessels up to 55 metres in length.

Mooring owners must obtain guidance and advice from a qualified Mooring Designer / Naval Architect in order to safeguard the vessel owners' investment.

A list of approved mooring designers, installers and inspectors is available on the KPA website. However, KPA does not guarantee that the listed companies or individuals will provide an adequate level of service or advice. It is the responsibility of Mooring Owners to independently assess the qualifications and capabilities of any mooring consultant they choose to engage. KPA's role is limited to administering the licence and permit process only.

## 6. WEATHER CONDITIONS

### *Tidal Data for Kimberley Ports (Year 2025)*

| DESCRIPTION                                                            | BROOME | DERBY | YAMPI | WYNDHAM |
|------------------------------------------------------------------------|--------|-------|-------|---------|
| HAT                                                                    | 10.63  | 12.20 | 11.10 | 8.74    |
| MHWS                                                                   | 9.36   | 11.21 | 9.92  | 7.90    |
| MHWN                                                                   | 6.40   | 7.89  | 6.64  | 5.96    |
| MSL                                                                    | 5.49   | 6.40  | 5.54  | 4.64    |
| <b>Note: Storm Surge + Wind may add up to 3.5metres to Sea Heights</b> |        |       |       |         |

### **6.1. Broome**

The Port is located at 18° South and 122° 13' East and lies within Australia's cyclone belt. Between three and five cyclones typically approach the Northwest coast during the season (November to April) and winds over 100 knots can be experienced along with associated sea conditions. The Bureau of Meteorology advises that tropical cyclones capable of strong winds, high seas and heavy rain can be experienced during the months from November to April but are most common in January and February.

Typically, during November to May, the winds frequently blow in excess of 20 knots from the southwest and occasional winds over 60 knots from the northeast and east might be experienced during seasonal tropical storms. The southwest winds might blow strongly for 3 to 5 days without ceasing.

During May to November the winds typically blow from east to southeast, increasing in strength from the early morning and easing by late afternoon / early evening. Morning winds may exceed 30 knots.

Accordingly, vessel owners and operators in the region are expected to familiarise themselves with the risks associated with adequate securing and mooring of vessels during adverse weather, including the vessel itself, personnel and responsibilities towards other vessels moored in the vicinity.

*Significant Wave Height and Location of Mooring Zones within the Port of Broome.*

| LOCATION                                                                                      | SIGNIFICANT WAVE HEIGHT |
|-----------------------------------------------------------------------------------------------|-------------------------|
| Gantheaume Point                                                                              | 4.8m (10-year ARI)      |
| Roebuck Bay                                                                                   | 2.4m (20-year ARI)      |
| <b>Note: Maximum cyclone waves may be 1.6 – 2.0 times higher than significant wave height</b> |                         |

### **6.2. Derby**

The Port is located at 17° South and 123° 36' East and lies within Australia's cyclone belt. Between three and five cyclones typically approach the Northwest coast during the season (November to April) and winds over 100 knots can be experienced along with associated sea conditions. The Bureau of Meteorology advises that tropical cyclones capable of strong winds, high seas and heavy rain can be experienced during the months from November to April but are most common in January and February.

The tidal range at Derby can reach a maximum of 11.8m which typically occur in late March / April. Tidal currents in the region can exceed 4 – 6 knots.

### **6.3. Wyndham**

The Port is located at 15° South and 128° 06' East and lies within Australia's cyclone belt. Between three and five cyclones typically approach the Northwest coast during the season (November to April) and winds over 90 knots can be experienced along with associated sea conditions. The Bureau of Meteorology advises that tropical cyclones capable of strong winds, high seas and heavy rain can be experienced during the months from November to April but are most common in January and February.

The tidal regime is significant with a spring tidal range over 8 meters. Tidal streams within Cambridge Gulf generally set East with the rising tide and West with the falling tide. Tidal streams within the gulf have been reported up to 2 knots and may be higher.

Expected currents within Ord River range from 4 – 7 knots at spring tides:

- Red Head to Hay Point – Up to 7 knots
- Hay Point to Pender Point – Up to 6 knots
- Pender Point to Anthon's Landing – Up to 4 knots

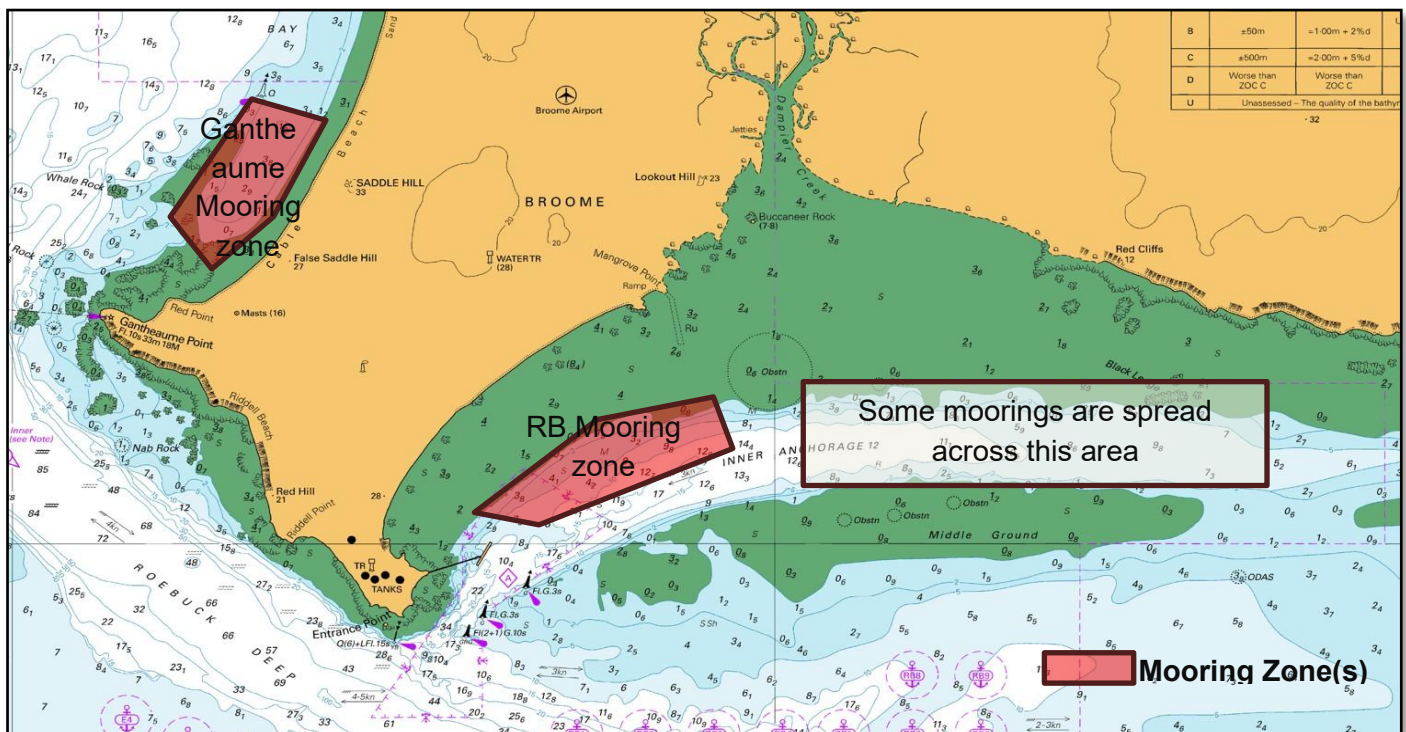
## 6.4 Yampi Sound

The Port is located at 16° South and 123° 36' East and lies within Australia's cyclone belt. Between three and five cyclones typically approach the Northwest coast during the season (November to April) and winds over 100 knots can be experienced along with associated sea conditions. The Bureau of Meteorology advises that tropical cyclones capable of strong winds, high seas and heavy rain can be experienced during the months from November to April but are most common in January and February.

The tidal regime in Port of Yampi is significant with a spring tidal range over 9 meters. Tidal streams within Yampi Sound generally set East with the rising tide and West with the falling tide. Tidal stream currents of 3 knots have been reported although currents may be greater than this.

## 7. MOORING ZONES – STORM AND CYCLONE MOORINGS (INDICATIVE ONLY)

At **Broome**, Storm moorings are both located in Gantheaume Point (Near Cable Beach) and Roebuck Bay and are used seasonally depending on local weather conditions. A majority of cyclone moorings are in Black Ledge, although there are a small number of cyclone moorings situated closer to Broome Wharf in Roebuck Bay.



For the Ports of **Derby, Wyndham and Yampi Sound**, the mooring locations are considered on a case-case basis due to the relatively low number of moorings in the region.

Overnight anchoring in mooring zones or in close proximity to approved moorings is not permitted.

## 8. MOORING STANDARDS OVERVIEW

KPA requires all moorings owners to comply with the following:

- The procedures set out in this document,
- KPA Mooring License Terms and Conditions,
- KPA Port standards and Procedures which are available on KPA website
- The Port Authorities Act 1999 and Port Authorities Regulations 2001
- KPA Cyclone Contingency Procedure
- KPA Port and Terminal Handbook for the specific Port.

By accepting KPA's offer of a Mooring Permit to moor, the Mooring Owner agrees to comply with these mooring procedures, KPA's standard Mooring Terms & Conditions and the responsibilities set below:

- Owner(s) wishing to establish mooring within the Port are to make an application to KPA must use the website link to apply "Application for Mooring Site Permit" form, along with submitting the required documentation;
- The Harbour Master may after consultation, approve or reject the application at the Harbour Master's sole discretion;
- The mooring equipment is to be positioned using Geographical Positioning System (GPS) and its position is to be expressed in Degrees, Minutes and Decimal points of Minutes using Datum WGS84. Accuracy is to be no less than plus or minus 5 meters of that position.
- Once a mooring application is formally approved by the Harbour Master, a KPA licenced mooring installer / Inspector can set the mooring;
- A Mooring Permit remains valid subject to:
  - the payment of the prescribed annual fee;
  - compliance by the Mooring Permit holder with the Kimberley Ports Authority Mooring Procedures and Mooring license terms and conditions;
  - the mooring passes its annual inspection (For Ports other than Broome, a biennial inspection report may be accepted provided the inspections confirms that the condition of the mooring is suitable for a 2-year period); and
  - The owner continues to maintain valid insurances as required and provide KPA evidence of the same.
- Moorings must be inspected annually and as stated in the design report by the Mooring Designer / Naval Architect by a KPA approved Mooring Inspector each year. Following the annual inspection, Mooring Owners must ensure all recommended maintenance work to the Mooring is completed. Mooring Owners must send the inspection reports, together with evidence of any repair work carried out, to the Harbour Master. Failure to do so may result in the Mooring Permit being cancelled.
- Only the registered vessel, or other approved authorised vessel as described on the permit, may occupy the Mooring.
- The Mooring Owner must not hire or lease out his mooring, unless specifically approved by KPA. Mooring hire must only be undertaken by KPA approved mooring hiring service provider.
- Damage caused to other vessels or property by the user or any other vessel which is using the mooring is the responsibility of the owner.

- Mooring Owners must ensure that their Mooring buoys should be kept in a state such that they are afloat, free of marine growth and clearly visible. The mooring number allocated by KPA to be clearly legible on the buoy at all times. Mooring owners must advise the Harbour Master if:
  - The Mooring owner proposes to sell the mooring equipment
  - The Mooring owner proposes to remove the mooring equipment
  - There is any change to the Mooring owners contact details
  - The mooring is damaged or shifts location, or
  - The Mooring owner wishes to have an additional vessel registered to the mooring.
- The practice of 'sinking' a Mooring, i.e. removing the Mooring buoy and laying the tackle on the seabed is not permitted.
- Once approved, a Mooring must be installed within three (3) months of approval date, otherwise the Mooring Permit may be cancelled by KPA.
- Mooring owners must comply with KPA mooring procedures and standards to ensure safety for all vessels and infrastructure within Port waters.
- Fees payable for all mooring applications can be found on the Kimberley Ports website [www.kimberleyports.wa.gov.au](http://www.kimberleyports.wa.gov.au). The applicant or Mooring Owner must pay the KPA the Mooring Permit Fee in full and in advance of each anniversary. A non-compliance fee may be applied in the event of non-compliance with these procedures or the KPA Mooring License Terms and Conditions, commencing from the date of notification of the non-compliance to the Mooring Owner.

## 9. INSURANCE COVERAGE

| INSURANCE                                  | COVER                            |
|--------------------------------------------|----------------------------------|
| Contract Works                             | Reinstatement value of the works |
| Public Liability                           | \$10,000,000                     |
| Marine Hull Insurance, and P & I Insurance | Described Below                  |

The Mooring Owner must carry and maintain public liability insurance cover of at least \$10,000,000 covering legal liability for loss of or damage to and loss of use of any property and personal injury, death or illness to any person (other than liability required under workers compensation law); and

The Mooring Owner must ensure that the owner, charter or manager of any approved vessel that uses the Mooring while the Mooring Owner is the holder of an associated Mooring Permit carries and maintains throughout the relevant vessel's visit to the Port, marine hulls insurance in accordance with the International Hull clauses (01/11/03) and protection and indemnity insurance with an International Group P & I Club or in accordance with the Institute Protection and Indemnity Clauses Hulls – Time (20/7/87) or equivalent:

- (i) Including coverage for 4/4ths collision liability, pollution, spillage and wreck removal; and
- (ii) For an amount not less than the market value or agreed value of the hull.
- (iii) Protection and indemnity insurance for an amount of not less than \$10,000,000 for each and every occurrence.

A copy of the above insurances must be submitted to KPA with the initial application, and every year in June prior to consideration of renewal of the Mooring Owner's Mooring Permit.

## **10. ANNUAL REVIEWS**

The Mooring Owner may renew the Mooring Permit annually providing that the Mooring Owner has adhered to KPA Mooring Procedures and the KPA Mooring License terms and conditions.

Renewal reminders will normally be sent in June each year electronically.

Mooring Owners wishing to retain/renew their Mooring Permit, must submit their latest annual inspection report (issued post 1 July of previous year) along with a current certificates of insurance. Failure to provide these documents may lead to Mooring Permit suspension, followed by cancellation if not promptly rectified.

Should Mooring Permits not be renewed, then the Mooring Permit will be cancelled and may be reissued to other applicants by authority of the Harbour Master. Affected Moorings must be removed and, if not removed, may be disposed by KPA at the Mooring Owner's expense.

## **11. APPLICATION PROCESS**

Commercial and recreational owners applying to moor a vessel within Port limits must contact KPA to apply for a permit to moor, the application for a Mooring Permit can be found on KPA's [website](#).

Mooring Owners may submit an application for a new Mooring and propose the GPS position of the preferred location, which may or may not be approved by the Harbour Master. KPA may propose an alternate location to and/or require further details from the applicant prior to acceptance of any Mooring application.

No Mooring can be placed in Port waters unless permitted by the Harbour Master and following compliance with these directions. Any mooring system set without prior authorisation of the Harbour Master may be removed immediately by the KPA at the owner's sole expense.

Before placing a permitted Mooring in any Port water, the mooring tackle design and construction must be in accordance with a mooring designer / Naval Architect's specifications and a copy of this specification must be provided to the Harbour Master.

**Mooring Installation / Re-Deployment Procedure Flowchart:**

| Step | Remarks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | Please ensure that you have read the KPA Mooring License Terms and Conditions of owning a mooring that is located in Port waters. The relevant documentation can be found on <a href="#">KPA's Website</a>                                                                                                                                                                                                                                                                                                                                                                                 |
| 2    | Prospective Mooring Owner approaches KPA for a new mooring location– Consultation with KPA to determine suitable location, design requirements (See section 12), insurance requirements and details of the specific vessels proposed to be moored.                                                                                                                                                                                                                                                                                                                                         |
| 3    | Prospective Mooring Owner engages a qualified Mooring Designer / Naval Architect – KPA requires the applicant / prospective Mooring Owner to engage a Naval Architect for the lifetime of the mooring. Looking at the static analysis from the mooring, the Mooring Designer / Naval Architect provides the details and inspection requirements over the life cycle of the Mooring including a preliminary drawing containing a table of permissible wear rates and attach it to the application.                                                                                          |
| 4    | Design is forwarded to KPA by prospective Mooring Owner – Once the prospective Mooring Owner receives the Static or Dynamic Analysis, this must be sent to KPA to be reviewed and kept on file                                                                                                                                                                                                                                                                                                                                                                                             |
| 5    | KPA acknowledges design report (specific to the proposed vessels), checks provided insurances and issues a Mooring Permit – The Mooring Owner will have 3 months to install the Mooring on the approved site.                                                                                                                                                                                                                                                                                                                                                                              |
| 6    | Mooring Owner procures mooring and has licensed installer, installs the approved mooring as per Mooring Designer / Naval Architect specifications                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 7    | The Mooring Inspector will conduct an in-water inspection and complete the mooring components list, inclusive of photos. The completed installation report should be forwarded to the Mooring Owner. If any discrepancy is found in the final installation compared to the design report, such details must be highlighted and rectified.                                                                                                                                                                                                                                                  |
| 8    | Mooring Owner signs off – The Mooring Owner provides the installation report to KPA confirming that the installation has been completed in the approved location and as per the designer specifications.                                                                                                                                                                                                                                                                                                                                                                                   |
| 9    | Once approved, KPA will issue an annual mooring licence and a tax invoice for the licencing fee.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 10   | <p>Inspections:</p> <ul style="list-style-type: none"> <li>• an annual inspection is required as a minimum.</li> <li>• other inspections are biennial, triennial or 5 yearly – as per the Mooring Designer / Naval Architect requirements mentioned in the design report; and</li> <li>• all moorings must have a review by a Naval Architect/Engineering every five years or as directed by the Harbour Master. This review must include an updated assessment of the mooring capacity, construction and wear tolerances. This may require the mooring to be uplifted as well.</li> </ul> |

## 12. MOORING DESIGN REQUIREMENTS

All Moorings must be designed, installed and maintained according to suitably qualified and approved Mooring Consultant's / Naval Architect's design specifications.

KPA minimum requirements include:

- Cyclone moorings should be designed and certified by a qualified Mooring Designer / Naval Architect, with vessels up to 15m requiring at least static analysis, while vessels over 15m require dynamic analysis. Metocean criteria required as per this section must be accounted for as minimum;
- All reports, both static and dynamic, must include at a minimum;
  - Design calculations and specifications;
  - Metocean parameters used;
  - Installation procedures including proof load;
  - Inspection and maintenance requirements for the life of the mooring - for example, annual, biennial, triennial, every five years, or as required;
  - Component replacement requirements;
- Storm mooring buoys must have a diameter of at least 500mm and be bright orange or bright pink; and
- Cyclone mooring buoys must have a diameter of at least 600mm and be bright yellow.
- Mooring Owners must ensure that their allocated mooring number, with a minimum height of 100mm, is visible on the buoy. This should be placed in a location where it remains legible, free from marine growth, bird droppings, and tackle, away from areas prone to chafing.

Due to the significant number of moorings in the **Port of Broome**, in mid-2025, KPA collaborated with Baird to conduct a comprehensive study on metocean conditions at Roebuck Bay and Gantheaume mooring areas in Broome. This study aimed to determine the metocean conditions that should be considered for the design of new moorings. The following section details the conditions that must be taken into account by the Naval Architect when designing a mooring, including the relevant metocean parameters utilized in the design report.

The design criteria for a storm or cyclone mooring depends upon the location and water depth. This section outlines the minimum design criteria for cyclone, wind, and sea state for various port locations. Mooring design and specifications should take into account and be sufficient to overcome the forces likely to be experienced in the harbour as outlined here.

Approved mooring designers and engineers involved in the design of a Mooring within the Port are to use the information provided in this appendix as a basis on which the mooring is designed so as not to greatly overcompensate the forces for which the mooring is designed. In designing storm moorings, an ARI of 10 is to be used. In designing cyclone moorings, an ARI of 200 is to be used.

| <b>GANTHEAUME POINT MOORING ZONE</b> |                                     |
|--------------------------------------|-------------------------------------|
| <b>Mooring Type</b>                  | <b>ARI Metocean Design Criteria</b> |
| Storm Moorings                       | 10 Year ARI                         |
| <b>ROEBUCK BAY MOORING ZONE</b>      |                                     |
| <b>Mooring Type</b>                  | <b>ARI Metocean Design Criteria</b> |
| Storm Moorings                       | 10 Year ARI                         |
| Cyclone Moorings                     | 200 Year ARI                        |

Please note that the following figures are based on studies, modelling, and simulations of harbour forces. While they are considered accurate, they are intended to assist designers/engineers in mooring design. KPA is not responsible for any failure, loss, or damage to moorings resulting from compliance with this annex.

### **Metocean Design Conditions Summary for Gantheaume Point:**

The metocean design conditions at Gantheaume Point are summarised in the table below. Modelled significant wave heights (Hs) at this location are considerably higher than those at Roebuck Bay, ranging from approximately 2.1m for a 1-year ARI event to around 7.6m for 1-in-500-year event. Peak wave periods vary between 9 and 14 seconds, reflecting the influence of offshore-generated swells.

The study noted that the wind and swell conditions experienced during Cyclone Rosita are consistent with a 50-year ARI event, providing a useful benchmark for mooring design. The predominant wave direction is from the north through to the west quadrant, reflecting typical swell patterns in the region.

Current speeds at Gantheaume Point also increase significantly with ARI. They range from approximately 1.4m/s during a 1-year event to about 3.2m/s in a 1-in-500-year event. These stronger currents are typically experienced during the ebb tide, with flow directions generally from south to southwest.

### ***Metocean Design Criteria – Gantheaume Point Mooring Zone***

| ARI | Hs (m) | Tp (s) | Mean Wave Direction (°TN) | Peak Still Water Level (m LAT) | Current Speed (m/s) | Current Direction (°TN) | Estimated Wind Speed in knots |
|-----|--------|--------|---------------------------|--------------------------------|---------------------|-------------------------|-------------------------------|
| 1   | 2.1    | 9.2    | N to W                    | 10.3                           | 1.4                 | S to SW                 | 29                            |
| 5   | 3.1    | 9.5    | N to W                    | 10.4                           | 1.4                 | S to SW                 | 43                            |
| 10  | 4.8    | 12.1   | N to W                    | 10.4                           | 1.4                 | S to SW                 | 49                            |
| 20  | 5.9    | 12.1   | N to W                    | 10.4                           | 1.4                 | S to SW                 | 51                            |
| 50  | 6.8    | 12.1   | N to W                    | 10.8                           | 1.6                 | S to SW                 | 58                            |
| 100 | 7.2    | 12.1   | N to W                    | 10.9                           | 1.7                 | S to SW                 | 68                            |
| 200 | 7.5    | 13.8   | N to W                    | 10.9                           | 3.0                 | S to SW                 | 83                            |
| 500 | 7.6    | 13.8   | N to W                    | 11.1                           | 3.2                 | S to SW                 | 103                           |

### **Metocean Design Conditions Summary for Roebuck Bay Mooring Zone:**

Metocean design conditions in Roebuck Bay are summarised in the below table. At Roebuck Bay modelled significant wave heights (Hs) are much less than those at Gantheaume Point, ranging from approximately 1.6m for a 1 – year ARI event to around 3.6m for a 1- in 500 – year event. Peak wave periods range remain below 7 seconds even for the most intense storms, indicating the dominant impact of wind seas and minimal influence from offshore swell within the bay.

Baird's mooring studies indicated Tropical Cyclone Hilda appeared to correspond to a 50-year ARI event. Only three historical cyclones (1980's onward) have generated wave heights exceeding the 10-year ARI threshold, evidencing the consistency of the derived design wave criteria based on modelling. Wave directions at Roebuck Bay are predominantly from the East through to the South quadrant.

Current speeds range from about 1.1m/s for a 1-year ARI event to around 1.8m/s for a 1-in-500-year event occurring primary at ebb tide from south to west.

#### *Metocean Design Criteria – Roebuck Bay Mooring Zone*

| ARI | Hs (m) | Tp (s) | Mean Wave Direction (°TN) | Peak Still Water Level (m LAT) | Current Speed (m/s) | Current Direction (°TN) | Estimated Wind Speed in knots |
|-----|--------|--------|---------------------------|--------------------------------|---------------------|-------------------------|-------------------------------|
| 1   | 1.6    | 4.5    | E to S                    | 10.3                           | 1.1                 | S to W                  | 29                            |
| 5   | 1.8    | 5.1    | E to S                    | 10.4                           | 1.1                 | S to W                  | 43                            |
| 10  | 2.1    | 5.4    | E to S                    | 10.5                           | 1.1                 | S to W                  | 49                            |
| 20  | 2.4    | 5.7    | E to S                    | 10.6                           | 1.1                 | S to W                  | 51                            |
| 50  | 2.7    | 6.2    | E to S                    | 10.6                           | 1.1                 | S to W                  | 58                            |
| 100 | 3.0    | 6.9    | E to S                    | 10.7                           | 1.1                 | S to W                  | 68                            |
| 200 | 3.3    | 6.9    | E to S                    | 10.7                           | 1.5                 | S to W                  | 83                            |
| 500 | 3.6    | 6.9    | E to S                    | 10.7                           | 1.8                 | S to W                  | 103                           |

### **13. MOORING INSTALLATION**

The Mooring must be installed by a KPA licensed Mooring service provider. The Mooring must be installed to the Mooring Designer's / Naval Architect's design specifications.

Upon installation, the mooring must be inspected by a licensed Mooring service provider for structural integrity, disposition on the seabed and compliance with these procedures and the design report – the inspection report must be a written document containing photographs from diver inspection of the below water tackle and specified configuration.

An approved list of KPA approved mooring service providers can be found on the [website](#).

Final Confirmation that the mooring is set in the designated location, including GPS readout along with a photograph of the top mark and markings must be forwarded by the Mooring Owner to the Harbour Master in conjunction with a copy of the full "Mooring Installation Report" as built.

## **14. MOORING INSPECTIONS**

The mooring owner must make advance arrangements for the inspection to be carried out prior to annual review date.

KPA's approved service providers normally provide inspection service every year in April and September at the Port of Broome. The availability of service providers in other ports depends on the inspections or service requirements for which the owner must make arrangements well in advance.

The Mooring Owner must obtain an annual Inspection of all Mooring components at least every year by a KPA licensed service provider and provide the latest copy to KPA in the first half of June every year.

The frequency and scheduling of any other types of inspections shall be determined by the Mooring Owner's Mooring Designer / Naval Architect. A copy of such inspection reports must be submitted to KPA by the due date as identified in the design report.

The Mooring Owner must forward any inspection reports to KPA together with:

- Evidence of engineering recertification and maintenance work;
- A table detailing design measurements of components, current measurements and wear tolerance as per design and current inspection;
- Photographs;
- Evidence of a divers inspection; and
- A signed mooring owner declaration

In the event of a non-conformity. The Mooring must not be used until the issue is rectified. If the Mooring issue cannot be rectified within 30 days, then the Mooring Owner must contact KPA.

Upon suspension and / or revocation of a Mooring Permit, the Harbour Master may remove and store the Mooring equipment, and the costs associated with the removal and storage of the Mooring will become a debt payable by the Mooring Owner on KPA's demand.

An Inspection of the Mooring will also be required when a Mooring:

- Is intended to be used by a vessel other than that currently permitted;
- Is intended to be configured differently;
- Has been dragged;
- After a significant weather event e.g. A cyclone; or
- Any other event as determined by the harbour master

**Notes for approved mooring inspectors:**

- Following any Mooring inspection, the inspector must submit a report to the Mooring Owner and provide a copy of the report along with the 'KPA Mooring Inspection Report' to KPA within 14 working days following the inspection.
- Organisations wishing to be listed as Mooring service providers should apply in writing to the Harbour Master and provide details of their qualifications, past experience and details of the equipment proposed to be used for services. Insurance requirements will need to be met and kept current as long as they wish to remain licensed.
- All diving operations to be conducted in line with Australian Standards AZ/NZ 2299.1(2015)

**15. SALE, TRANSFER OR SURRENDER OF YOUR MOORING**

In the event of a Mooring Owner wishing to transfer their mooring, KPA must be notified and the relevant form with appropriate documentation must be completed and submitted to the KPA for review.

The Mooring Owner or prospective purchaser of a Mooring must obtain approval from KPA for the transfer or sale of Mooring. Recreational or commercial moorings or locations cannot be sold, transferred, rented, swapped, assigned, relocated or bartered except as allowed by the relevant Mooring Permit and the License Terms and Conditions.

The transfer or sale of a Mooring does not guarantee that the purchaser will retain the current location of the Mooring. The purchaser must contact KPA to discuss their requirements for the Mooring, and an alternative location may be identified.

The new owner or transferee must comply with section 12 of this document and submit all Mooring Designer / Naval Architect report before an approval can be granted for the new owner transferee to use the Mooring.

In the event a Mooring Owner has no further use for the Mooring they must notify KPA and complete the relevant form and submit the same with appropriate documentation to KPA.

At the discretion of the Harbour Master, the Mooring Owner may be requested to remove the Mooring at their expense.