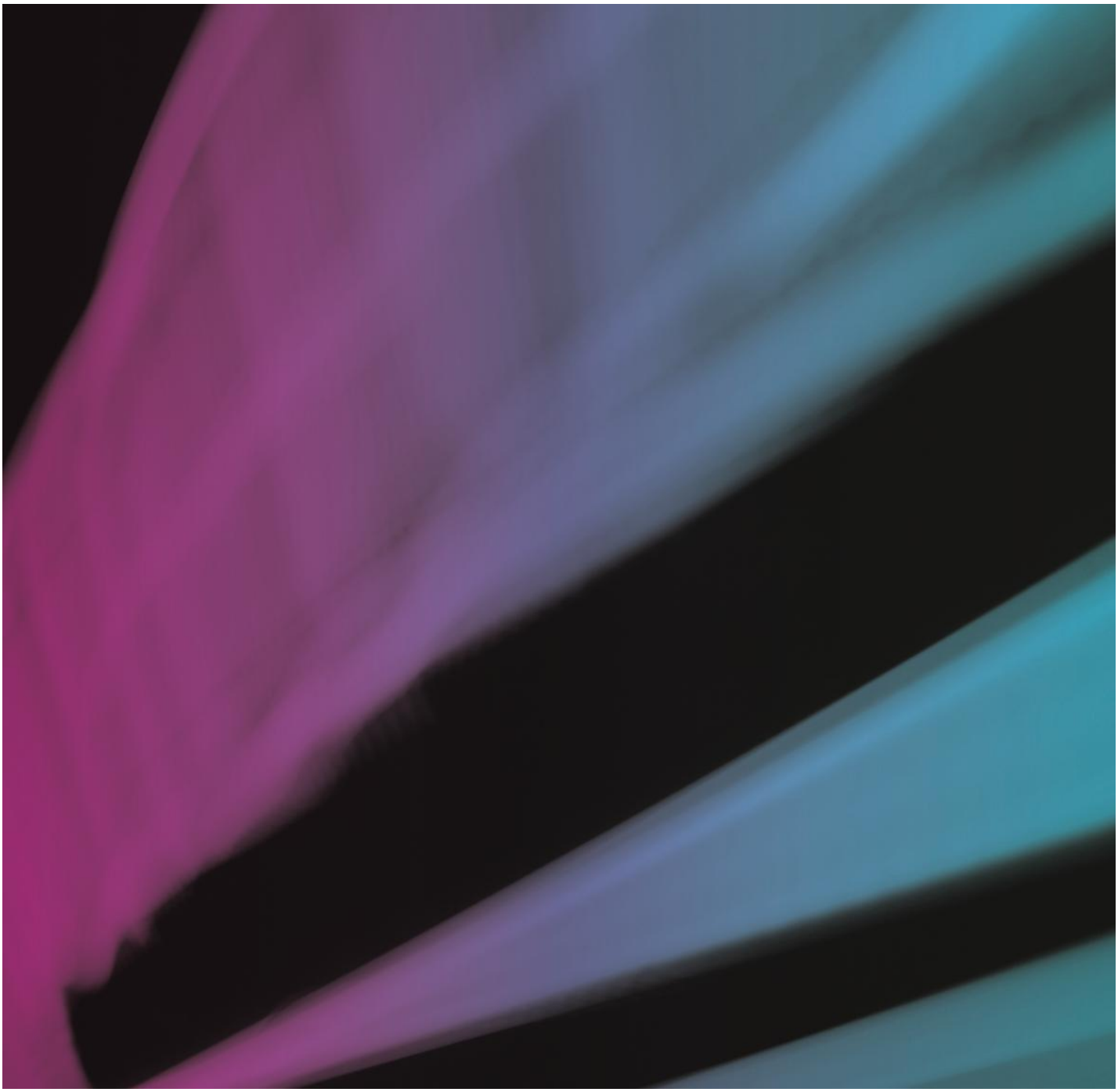
AECOM

White Bay 6 Pty Ltd
12 July 2013

White Bay Berth 6 - Dry Boat Storage Facilities

Section 75W Modification Request



White Bay Berth 6 - Dry Boat Storage Facilities

Section 75W Modification Request

Prepared for

White Bay 6 Pty Ltd

Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com
ABN 20 093 846 925

12 July 2013

AECOM in Australia and New Zealand is certified to the latest version of ISO9001 and ISO14001.

Quality Information

Document White Bay Berth 6 - Dry Boat Storage Facilities

Ref S70106

Date 12 July 2013

Prepared by Vanessa Organo/Caitlin Bennett/Todd Brookes

Reviewed by Kelly Pearsall and Scott Jeffries

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
1	10-May-2012	Draft for White Bay 6 Pty Ltd	Caitlin Bennett Principal Environmental Planner	
2	15-May-2012	Final	Caitlin Bennett Principal Environmental Planner	
3	24-Apr-2013	Revised after Sydney Ports Consultation	Scott Jeffries Associate Director	
4	06-May-2013	Revised after Sydney Ports review	Scott Jeffries Associate Director	
5	12-July-2013	Revised after DP&I review	Scott Jeffries Associate Director	

Table of Contents

1.0 Introduction

This document has been prepared by AECOM Australia, on behalf of the Proponent (White Bay 6 Pty Ltd), as an outline of proposed modifications to previously approved plans at White Bay Berth 6 in Balmain, NSW. The document identifies modified elements, as well as an assessment of the changes to potential environmental impacts from those that were originally identified as part of the approved development.

1.1 Existing Approval

On 12 June 2009, the then Minister for Planning granted approval of a marine fuelling and supply facility at Berth 6, White Bay (MP 06_0037). The approval granted to the Proponent by the Minister allowed for:

- Marine refuelling facilities consisting of a tank farm capable of storing 385,000 litres (L) of diesel fuel and 55,000 L of unleaded fuel, eight card-operated refuelling dispensers and associated pipe work.
- A building approximately 11 m high and 50 m long (approx. 600 m^2 footprint) for bulk storage and a small number of office leases for commercial marine service businesses (Building 1).
- A building approximately 10 m high and 50 m long (approx. 1,000 m^2 footprint) for bulk indoor storage space for boat storage and marine equipment, including rope, buoys, lifeboats or other marine hardware and work shed for refit and repair of boats (Building 2).
- A roll-on/roll-off (RoRo) ramp for intermodal freight operations to service Sydney Harbour islands, with an associated laydown area for temporary storage of goods for water transport.
- A 75-tonne capacity travel-lift with associated construction of dual ramps adjacent to the RoRo ramp.
- Grey water and sullage pump facilities, consisting of a card-operated pump to remove sullage from vessels.
- A supply point for commercial vessels to collect pre-ordered supplies.
- Three temporary vessel moorings.

Operations at the site envisioned the use of hardstand areas to support the repair and maintenance activities at the site in addition to activities identified for Building 1 and Building 2. This included non-permanent storage of boats on hardstand.

The approval followed the consideration of certain aspects of the development (principally relating to justification and need for the development) by a Panel of Experts appointed by the then Minister for Planning, which presented its findings in a report dated July 2008. The review of the Panel into the justification and need focused on the refuelling component of the development within the context of the availability of similar services within Sydney Harbour and the capacity for White Bay to accommodate the facility.

1.1.1 Modification A – Marine Refuelling and Supply Facility

On 14 August 2012, the Planning Assessment Commission as delegate for the Minister for Planning and Infrastructure approved a modification to alter elements of the existing approval. Specifically, the modification approval granted by the Planning Assessment Commission allowed for the following changes from the original project:

- An increase in the number of temporary moorings from three to eight within the same footprint of the lease with NSW Maritime.
- Removal of the restriction on the period of occupation for the moorings from seven days to 180 days.
- Introduction of de-fouling and anti-fouling activities to the site operations.

1.2 Current Operations

In early 2011, Stage 1 of the project commenced operations. Stage 1 included the refuelling, grey water and sullage pump operations.

The marine fuel supply facility serves a wide range of marine vessels, including recreational, commercial fishing, commercial marine, government, charter and marine transport, through a swipe-card system and automated dispensers/cabinets. A sullage pump out system has been installed to remove effluent and sullage from vessels

through a single action diaphragm pump, discharging effluent to the closest sewer main through sealed lines. This type of pumping system is designed especially for use on boats and marinas, with the aim of protecting waterways from pollution.

As part of Stage 1, a small office and an amenities block were refurbished and are now in use.

Stage 2 operations commenced in mid-2012 and involved the use of the travel lift, RoRo ramp and washdown bay.

Following the approval of Modification A, de-fouling and anti-fouling activities have been undertaken on the site. This involves:

- Transfer of the vessel from the water to the approved wash down bay.
- Cleaning and de-fouling of the vessel within the bunded wash down bay.
- Transfer of the vessel to the hardstand. Where mechanical sanding is required, this is undertaken on the hardstand. Anti-foul paint is then applied using rollers, brushes or airless spray systems.

Once completed, the area is swept with all paint chips collected for appropriate disposal.

The moorings modified as part of Modification A are yet to be constructed.

1.3 Site Context

The site is located at Berth No. 6, White Bay, in Balmain. Surrounding land uses include:

- **North** – Residential areas (including Grafton Street), Ewenton Park and Sydney Water Police wharves and offices with residential areas continuing beyond the Sydney Water Police site.
- **East** – Sydney Harbour, with Millers Point located around 800 metres across the harbour.
- **South** – Sydney Harbour, with residential properties located around 300 metres across the harbour.
- **West** – White Bay Berth No. 5 (the current location of the approved Cruise Passenger Terminal operated by Sydney Ports Corporation), and the remaining areas of White Bay wharves under the control of Sydney Ports Corporation.

2.0 Proposed Modification

2.1 Overview

Due to changes in the economic climate and the identification by the NSW Government of the need for greater dry boat storage on Sydney Harbour, the operations intended for Building 1 and Building 2, as outlined in Section 1.1, are unlikely to be realised in the immediate future and within the remaining lease period (which expires in 2020) nor will they currently address the community need and Government policy objectives for the Harbour. As a result, the Proponent has reviewed the original project components to assess their viability and appropriateness and is seeking to modify its approval for the project to reflect the change in need for various project components.

The proposed changes seek to address this need and policy direction and require a modification to the existing approval under section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The modification request seeks to:

- Alter the footprint and intended use of Building 1 to allow dry boat storage with offices, workshops, a showroom and caretakers' accommodation at the eastern end.
- Alter the footprint and intended use of Building 2 for dry boat storage with offices, workshops and a showroom at the eastern end.
- Include two new buildings (Buildings 3A and 3B) between Building 1 and 2 with an intended purpose of dry boat storage. Building 3B would also include offices, workshops and a showroom at the eastern end.
- Alter and augment the location of car park facility from the location in the northern section of the site. The modified car parking would be in two locations, with primary parking in the south-eastern area of the site and overflow or peak parking in the area immediately adjacent to the refuelling area on the southern boundary of the site.
- Increase the number of car parking spaces from 30 to 68, with approximately 10 additional spaces for motorcycle parking.
- Establish new floating pontoons adjacent to the travel lift, for the purpose of providing a temporary tie-up area for launched boats and those waiting to be retrieved.
- Establish a 'meet and greet' area along the eastern edge of the site, for the purposes of providing offices, facilities and a waiting area for clients utilising the boat launching facilities on site.

The proposed modification is shown on Figure 1 with the current site operations shown on Figure 2.

The alterations to the existing buildings and the provision of the new buildings would decrease the total building footprint from approximately 1800 m^2 to 1750 m^2 which is a decrease of approximately 3% below the approved area. The decreased footprint would instead allow for the more efficient use of the available space on the site and would enable the provision of storage for up to 150 vessels in dry boat storage racks (depending on the service demand and the size of vessels being stored).

The proposed buildings would be enclosed on three sides and roofed. Buildings 1 and 2 would be open to the south with Buildings 3A and 3B open to the north. Additionally, all buildings would be design and provided with appropriate fire fighting equipment in order to meet any relevant Australian Standards or Building Code of Australia Standards.

Users of the storage structures would include private recreational vessel owners, who would lease storage spaces from the Proponent.

Boat maintenance and repair, including de-fouling and anti-fouling, would still occur on the hard stand areas of the site under the current approval. Supporting the current activities moveable modular style sleds would be used on the hard stand areas for boats to remain on while works are being carried out, and for storage of boats awaiting availability and relocation into the dry boat storage buildings.

2.2 Built Structures

2.2.1 Modification to Building 1 Footprint and Use - Dry Boat Storage

The existing approval permits the construction and use of a building (Building 1) approximately 11 metres high, 16 metres wide and 50 metres long for bulk storage (such as marine equipment and chilled goods retail storage) and a small number of office leases for commercial marine service businesses (refer to Figure 1), in the central western portion of the site.

The demand for bulk storage within Building 1 has been reviewed and it has been identified that there is greater demand for dry boat storage within the community. As such, it is proposed to establish Building 1 as a dry storage rack facility on the existing hardstand. On the eastern end of Building 1 would be provision for caretakers' accommodation, offices, workshops and/or a boat showroom, similar to the currently approved use, across three levels.

The footprint of the building would be made narrower and extended eastwards towards the property boundary, with the dimensions of the modified building being 10 metres wide and 65 metres long. The Building 2 dry boat storage facility and the existing gantry structure would screen Building 1 when viewed from the adjoining residential area.

A four-storey boat stacking system of 11 metres in height would be established based on the demand for small or larger vessel storage. The dry boat stack storage would be complementary to the existing services at the site, as well offering a service that would remain relevant to the current strategic direction of the White Bay precinct.

The caretakers' accommodation would consist of a studio-style accommodation with a kitchen, living space, and a bathroom. This facility is required to allow a staff member to be on site 24 hours a day, 7 days a week to watch over the site activities.

The preliminary location and design of the facility would be subject to more detailed design with consideration of relevant Australian Standards and *Engineering Standards and Guidelines for Marine Structures* (NSW Maritime Authority). An example of a dry stack storage facility similar to that which would be constructed on site is identified in Figure 3, and comprises a stacking system for vessels, with a roof and enclosed by walls on three sides.

2.2.2 Modification to Building 2 Footprint and Change of Use - Dry Boat Storage

Under the original approval, Building 2, located adjacent to the north-western boundary of the site, was intended for bulk indoor storage of vessels and marine equipment (including rope, buoys, lifeboats and other marine hardware), and a maintenance shed for boat refit and repair. The dimensions of this building were to be approximately 10 metres high, 20 metres wide and 50 metres long. The number of vessels stored within this building would have been dependent on service demand and the size of vessels.

It is proposed that the uses within this building be modified to enable permanent dry boat storage within a stacked rack system, with provision for a small office, workshop and/or showroom across three storeys at its eastern end. To accommodate this, the building footprint would be narrowed to 10 metres and extended to 56 metres in length. An example of a storage system similar to that which would be constructed in Building 2 is shown in Figure 3. The structure would comprise a four-storey stacking system for vessels. This storage shed would comprise of metal cladding on the north, west and east sides to enable screening to residences, with a metal roof. The shed would have a maximum height of 11 metres.

2.2.3 Addition of Buildings 3A and 3B - Dry Boat Storage

The modification seeks the provision of two additional buildings (Buildings 3A and 3B) to be located between Building 1 and Building 2. Building 3A would have dimensions of 7 metres wide, 27 metres long and 11 metres high and would be used solely for dry boat storage. Building 3B would have dimensions of 10 metres wide, 35 metres long and 11 metres high and would be used mainly for dry boat storage with provision for a small office, workshop and/or showroom at its eastern end across three storeys. The location of these buildings is shown on Figure 1.

The Building 2 dry boat storage facility and the existing gantry structure would partially screen Buildings 3A and 3B when viewed from the adjoining residential area.

2.2.4 Addition of Floating Pontoons

Since the travel lift and RoRo ramp commenced operations around 12 months ago, a number of obstacles have been identified which have the potential to impact worker and vessel safety. Specifically:

- The current structure is approximately 3 metres above the deck of small vessels at low tide. Vessels are required to be manually handled into place prior to being lifted, which is safest to undertake at water level. The 3 metre difference in height makes it difficult to get on and off the vessel.
- Bringing vessels into the haul zone on high wind days, particularly when the winds are from the north east or east presents a situation with a high potential to result in damage to vessels.

The provision of floating pontoons to the north east of the travel lift would provide an area where vessels can be safely hauled and launched, resulting in increased worker safety and reduced potential for damage to vessels. Specifically, the floating pontoons would:

- Allow safe access on and off the vessels due to a significantly reduced height difference to the decks of vessels.
- Allow vessels waiting to the hauled to safely queue along the pontoons and safely manoeuvre to and from the haul / launch zone, particularly on high wind days.

The pontoons would be fitted with appropriate fire fighting equipment such as fire hose reels.

2.2.5 Addition of Meet and Greet Area

It is also proposed to construct and operate a ‘meet and greet’ area on the eastern edge of the site to provide a waiting area, facilities and offices to greet boat owners waiting for their boats to be launched or retrieved. This meet and greet area would be placed in close proximity to the entry to the floating pontoons servicing the travel lift and be connected to the primary car park by a pedestrian walkway. The meet and greet area would consist of three demountable style buildings with approximate dimensions of 2.4 metres by 15 metres.

2.3 Ancillary infrastructure

2.3.1 Car Parking

The original approved location for 30 car parking spaces on site was within the northern section of the site. Additional car parking is now required to cater for customers accessing their private vessels stored onsite.

Due to the location of the existing underground fuel storage tanks and load limits of the hardstand areas, the car parking facility would require two car parking locations. The main location, with provision for 30 spaces, would be in the south-eastern area of the site, with a pedestrian walkway provided between the parking and the boat launch area.

The second car park location would be parallel to the southern boundary of the site, adjacent to the refuelling bowsers, along the waterfront (refer Figure 1). This second car parking area would operate as an overflow and staff car parking area and would provide an additional 38 spaces, with an additional 10 motorcycle spaces located immediately west of the car spaces, also parallel to the water.

The primary car park in the south-eastern area of the site would remain in this location due to the need for the safe and practical movement of pedestrians from the car park and its proximity to the boat launch area. The overflow car park in the south has been located based on the need to maintain safe and efficient movement of internal traffic and operational vehicles on site, including fuel delivery trucks and customer vehicles. The modified car park locations would not create accessibility or hazard issues on the site for fire engine access if required, with the nearest fire hydrants able to reach beyond the overflow car park to the water.

Parking facilities for a small number of bicycles would also be accommodated on site.

2.4 Justification and Need for Modification

A recent study completed by the former NSW Maritime titled *NSW Boat Ownership and Storage Report* (NSW Maritime, 2010) (refer to Appendix A) outlines the significant boat storage shortage that will be faced in the future if facilities do not cater for expected projections of growth in boat ownership in NSW. The subsequent *Maritime Policy Agenda* (Transport for NSW, 2012) identifies the need to “encourage development of dry-stack storage facilities on Sydney Harbour”.

To meet the above requirement of the Policy Agenda, the NSW Government has prepared a *Draft Sydney Harbour Boat Storage Strategy* (Transport for NSW, April 2013) (refer to Appendix A). This strategy sets a target for the provision of 1000 to 1200 new dry stack spaces on Sydney Harbour by 2021, but also notes that there are limited potential sites on the Harbour. The proposed modification at White Bay 6 would provide for additional dry stack storage and thereby assist in meeting these targets.

The need for dry stack storage is consistent with the experience at White Bay 6 where there has been increasing demand for undercover storage, especially since the commencement of anti-fouling operations at the site.

The need for dry stack storage in Sydney Harbour is related to the benefits this type of facility offers. Boats stored in dry racks reduce the fouling of both vessels and waterways, and allow for opportunities for vessel cleaning, refuelling and maintenance. A dry stack storage facility on the White Bay 6 Pty Ltd site would complement and augment the number of vessels maintained and stored in this way on the Harbour.

The Government's Draft Boat Storage Strategy also notes that the provision of dry-stack storage is likely to result in additional benefits including the reduced storage of trailered boats on residential streets. Whilst some marine clubs offer hardstand storage for vessels on trailers, many trailers are parked on public roads such as residential streets, or near boat ramps for unloading, causing traffic and parking inconveniences for both boat owners and local residents. A dry stack storage facility on the White Bay 6 Pty Ltd site would also provide an opportunity to decrease the number of vessels stored in trailers.

In 2009, approximately 19,000 vessels were registered in Sydney Harbour, approximately 6,600 of which were between 6-12 metres in length. In addition, Sydney Harbour has more large boats (41.5 per cent over 6 metres in length) than other regions. Although these figures were compiled approximately two to three years ago, the data provided is the most recent and relevant to this industry at the time this modification document was prepared. The modification would enable the dry storage of vessels of up to 12 metres in length at White Bay 6, to service this demand.

The geographic limit of storage space in the Harbour has also led to mooring areas in high demand regions developing long waiting lists. For example, at the end of 2009, North Harbour mooring area, with 111 mooring areas, had 102 applicants on its waiting list. Sydney Harbour currently has the highest demand for on-water storage of any region in the State and few avenues for expansion.

Boat ownership in NSW is only expected to grow in future years. Growth in boat ownership has been predicted by the former NSW Maritime by modelling using previous increases in ownership and population growth predictions. Overall in NSW, boat growth is expected to rise to approximately 351,113 by 2026, which is an increase of 117,000 from ownership levels predicted for 2012. By 2026 Sydney Harbour is expected to boast a cumulative growth of 19 per cent from current levels.

In its report, the former NSW Maritime states that "development of strategies for better integrated planning, management and satisfaction of demand are needed" including the need for "identification of new sites and funding sources for moorings and other options such as dry stack storage for smaller boats such as dinghies".

It is in this context that the proposed modification is presented, to provide an essential supply of dry boat storage to a high demand region, particularly considering expected future growth of the Sydney Harbour boating community. The introduction of dry boat storage to the site would complement the re-fuelling, anti-fouling, and boat maintenance and repair activities approved at the site, and would enable the diversification of activities on the site to ensure the viability of site operations within the current economic climate.

Alternative carpark location

Alternate 'Meet and greet' area

Site Entrance

155m

Edge of concrete

20

61m

Building 2

Tank store (underground)

Existing pump shed to remain

Existing wash down bay and catchment sump

Existing travel lift

39m

Edge of concrete

Building 3A

Building 3B

'Meet and greet' area

Floating pontoons

Existing amenities block to remain

Ramp

78m

Bilge Water Treatment

Awning

Building 1

Existing office to be relocated adjacent to pump shed

Gate

Raised concrete platform

Primary carpark (30 spaces)

46m

Overflow and staff car park (38 spaces)

Gate

Johnsons Bay

Motorcycle parking

Raised concrete platform

Retaining wall

Retaining wall

Retaining wall

141m

Refuelling facility

KEY

Boundary

12 Hydrographic survey contour

Indicative hydrant location

0 20 40m

Map Document: G:\Projects\60\60153589\60153589 White Bay\Figures\Proposed Modification - April 2013\60153589 F1 Proposed Modification 07 05 2013 TO Rev H

AECOM

PROPOSED MODIFICATION

Proposed Modification - White Bay Berth 6 Marine Supply Facility
White Bay, New South Wales

FIGURE 1

AECOM

CURRENT SITE OPERATIONS

Proposed Modification - White Bay Berth 6 Marine Supply Facility
White Bay, New South Wales

FIGURE 2

Figure 3 Example of dry boat storage facility

2.5 Conditions Requiring Modification

In the event that the modification request is approved, a number of conditions would require amendment. These are detailed in **Table 1**. The modified project would operate in compliance with all other existing conditions.

Table 1 MP 06_0037 Conditions of Approval which would require modification

Condition	Description	Modification Required to the Description of the Condition
Part A – Administrative Conditions		
A1 – Development Description	(1) Development approval is granted only to carrying out the development described in detail below: • Construction of a two storey commercial office and storage building • Construction of a bulk storage building • Construction of refuelling infrastructure • Construction of eight temporary moorings, wharf, travel lift ramp and steel pontoon • De-fouling and anti-fouling activities	Modification of the use of the bulk storage building to a dry boat storage facility, with provision for caretaker's accommodation, offices, workshops and a showroom. Modification of the two storey commercial office and storage building to a dry boat storage facility, with provision for offices, workshops and a showroom. Construction of two new buildings for dry boat storage, with one building having provision for offices, workshops and a showroom. Construction of new floating pontoons adjacent to the travel lift facility. Construction of a 'meet and greet' area.
A2 – Development in Accordance with Plans	-	Replacement of the plans with those contained in this modification request.
A3 – Development in Accordance with Documents	-	Reference to this modification request document in the approval.

2.6 Construction and Operation

Components of the modification that would be constructed comprise the following methodologies:

- Dry boat storage facilities, which would involve:
  - Minimal ground works for footings.
  - Installation of pre-constructed boat storage racks.
- Caretakers' accommodation, offices, workshops and showroom facilities, which would involve activities and construction methodologies and equipment almost identical to those outlined in the approved project as per *White Bay Berth 6 Proposed Marine Supply Facility – Environmental Assessment* (KBR, 2006), including:
  - Piling/excavation for ground slab.
  - Masonry walls, suspended slab and structural steelwork.
  - Roofing and welding.
  - Window walls, wall cladding, plastering, partitions and ceilings, doors and frames, tiling.
  - Services fit out.

- Joinery, glazing, painting, concrete sealer, carpet signage.
- Services commissioning.

- Car and motorcycle parking and installation of bike storage facilities.
- Floating pontoons which would be almost identical to floating pontoon works previously constructed at the facility and described within the *White Bay Berth 6 Proposed Marine Supply Facility – Environmental Assessment* (KBR, 2006), including:
  - On water piling works.
  - Placement of pre-fabricated pontoon elements.
- Meet and greet area, which would involve:
  - Minimal ground works for building footings.
  - Placement of demountable style buildings.

All elements of construction would involve the provision of associated utilities (such as lighting and fencing).

2.6.1 Construction Schedule and Hours of Work

Construction of the modified facilities on site could be completed in approximately six months but may be staged to occur in discrete periods over an 18 month period, depending on demand. Timing for construction would be dependent on the timing of any approval of this request. However, it is envisaged that construction would commence as soon as practicable once all necessary approvals are obtained and documentation is in place (such as the Construction Environmental Management Plan).

A construction staging report would be prepared and submitted to SPC prior to the commencement of construction as required, which will detail construction programmes and key milestones.

Construction hours would remain as per the original approval, with work permissible between:

- 7:00am and 6:00pm on Mondays to Fridays.
- 8:00am and 1:00pm on Saturdays.
- No work permissible on Sundays or public holidays.

2.6.2 Operational Timeframe

Operations associated with the dry berth facility would commence on completion of construction activities or the end of a discrete stage. All existing operations would continue throughout the construction phase where feasible.

Hours of operation would remain as per the original approval, with the dry boat storage accessible between:

- 7:00am and 6:00pm on Mondays to Saturdays.
- 8:00am and 6:00pm on Sundays.

In the event that boats return the facility after 6:00pm, they would be required to tie up to the wharf to be lifted out of the water and transferred to dry storage the following day during operational hours.

2.6.3 Operational Activities

The site operations would entail boat owners arranging access to boats via the site operators, and would typically arrive at a pre-arranged time. Vessels would be transferred from boat racks by forklifts, and lowered into the water or placed in the travel lift. Vessels would then be conveyed to the wet berth area to await collection by boat owners. Upon return to the site, boats would be collected by forklift and/or travel lift, washed and returned to storage.

Upon signing a tenancy agreement, boat owners would be provided with the rules and regulations of the site including:

- Access times and security arrangements.
- Car parking locations.
- Safe pedestrian access areas.

- Arrangements for late returns.
- Noise considerations for neighbouring properties.

3.0 Statutory Assessment

3.1 Environmental Planning and Assessment Act 1979 (EP&A Act)

The project was declared to be a major project and approval was granted under Part 3A of the *Environmental Planning and Assessment Act 1979* (the EP&A Act) in 2009.

On 1 October 2011, Part 3A of the EP&A Act was repealed. At the same time, savings and transitional arrangements were put in place for projects that are classified as 'transitional Part 3A projects'. A transitional Part 3A project is defined in clause 2 of Schedule 6A of the EP&A Act, which includes projects what were approved prior to the repeal of Part 3A of the EP&A Act. For these types of projects, Part 3A of the EP&A Act (as in force immediately before the repeal of that Part and as modified under Schedule 6A after that repeal) continues to apply.

This project is defined as a transitional Part 3A project as it was approved prior to the repeal of that Part of the EP&A Act. As such, any modification to the approval is to be considered under section 75W of the EP&A Act.

Under section 75W of the EP&A Act, a proponent may request that the Minister modify the project approval if the project, as modified, would not be consistent with the project as approved.

As the proposed modifications would not be consistent with the existing approval, the Proponent requests that the Minister modify the 2009 project approval as outlined in this assessment.

Section 75W(3) of the EP&A Act also states that the Director-General may notify the proponent of environmental assessment requirements. AECOM wrote to the Department of Planning and Infrastructure (the Department) on 13 September 2011 seeking confirmation that the modifications could be dealt with under Section 75W of the EP&A Act and that it did not consider that environmental assessment requirements were necessary. A representative of the Department verbally advised that no requirements were considered necessary for the modification, based on the information provided.

Landowners' consent for the modification request, as required by clause 8F of the *Environmental Planning and Assessment Regulation 2000*, has been provided by Sydney Ports Corporation for the land based activities and Roads and Maritime Services for the floating pontoons.

3.2 Environmental Planning Instruments

The principal environmental planning instruments that apply to the site are:

- *Sydney Regional Environmental Plan No.26 – City West,* a deemed State Environmental Planning Policy. This applies to the land-based components of the site.
- *Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005* (SREP), a deemed State Environmental Planning Policy. This applies to the water-based components of the site.

The *Leichhardt Local Environmental Plan 2000* does not apply to the land-based components of the project, by virtue of clause 3 of that LEP.

The land-based areas of the site are zoned Ports and Employment under SREP No.26 – City West. Under clause 20C of the SREP, uses within this zone are permissible only if a consent authority is satisfied that the use is generally consistent with one or more of the zone objectives. The project, as modified, would continue to be consistent with the objective to "encourage a mix of land uses which generate employment opportunities, particularly in relation to port and maritime uses".

The water-based areas of the site are zoned W1 – Maritime Waters under SREP (Sydney Harbour Catchment) 2005. The proposed floating pontoons would be located within this zone. The objectives of this zone are:

- *to give preference to and protect waters required for the effective and efficient movement of commercial shipping, public water transport and maritime industrial operations generally,*
- *to allow development only where it is demonstrated that it is compatible with, and will not adversely affect the effective and efficient movement of, commercial shipping, public water transport and maritime industry operations,*
- *to promote equitable use of the waterway, including use by passive recreation craft.*

The provision of the floating pontoons would not adversely affect commercial shipping, public water transport or maritime industry operations, and would promote the equitable use of the water way for passive recreation craft. As such, it is considered that the proposal is consistent with the objectives of this zone.

As the development (as modified) would remain a maritime use, the development (as modified) can be considered to be consistent with the current strategic direction for the site and surrounding White Bay precinct.

3.3 Glebe Island/White Bay Master Plan 2000

The Glebe Island/White Bay Master Plan 2000 was prepared as a requirement of SREP No.26 – City West. It provides controls for the future development of the port facilities, which a consent authority must consider when determining a development application in the area. The Master Plan identifies a number of considerations relating to land uses, building design, zones and heights, environmental impacts, landscaping and heritage conservation.

Section 4 provides the consideration of potential environmental impacts of the modified building and external dry boat storage facility.

The Master Plan identifies the need for building heights on Berth No. 6 to not exceed 12 metres to retain existing views down Ewenton Street, on the elevated cliff adjacent to the site, towards Anzac Bridge and other landmarks in the area. As the dimensions for the internal dry boat storage facility reach a maximum of 11 metres in height, the building is compliant with the design requirements of the Master Plan and will not impact the general view of the Pyrmont skyline as seen from the Balmain residential area. The external dry boat storage facilities would have a height of 11 metres.

The Master Plan identifies that buildings must be set back from the water's edge by greater than 20 metres, and relates to the southern interface of the hardstand with White Bay. It is understood that this relates to ensuring that the operational functions of the port are not impeded by permanent structures (when ships are docked) and to improve the visual appearance of the port as the area develops.

The demountable (non-permanent) 'meet and greet' area is positioned on the eastern edge of the site, and would be within this setback (approximately 10 metres). The building is proposed in this location to be close to the boat launch and haul area, and to provide safe and direct pedestrian access from the primary car park. This will assist in maintaining security at the site, and also reduce safety risks for customers and staff. The building structure itself is portable and small in scale and height.

3.4 Sydney Harbour Foreshores and Waterways Area Development Control Plan (DCP) 2005

It was determined in the original approval that the development complied with the Sydney Harbour Foreshores and Waterways Area DCP, which applies to the White Bay Berth 6 area. The DCP aims to:

- Protect ecological communities within the area covered by SREP (Sydney Harbour Catchment).
- Ensure that the scenic quality of the area is protected and enhanced.
- Provide siting and design principles for new buildings and waterside structures within the area.
- Identify potential foreshore access locations in the area.

The DCP identifies general requirements for water-based developments and land/water interfaces developments; the definition of which applies to the proposed development. The general requirements of the DCP for land/water interface developments have been considered in the context of the proposed modification, as detailed in Table 2. More specific requirements, which this modification would affect, are also presented in Table 2.

Table 2 General Requirements of DCP 2005

General Requirement	Consideration
Public access to waterways and public land is maintained and enhanced.	Public access to White Bay is limited to the recently opened Cruise Terminal at White Bay 5. The modification would not alter this situation.
Congestion of the waterway and foreshore is minimised.	Section 5.1 (Traffic and Transport) identifies that the modification would not affect congestion levels of the foreshore. The proposed modification would not affect congestion levels of the waterway due to staggered entry of boats to water via the travel lift and area for boats to rest in wet berth area before exiting the marina. The marina will be managed according to the Vessel Management Plan.
Conflicts on the waterway and foreshore are avoided.	The modification would be contained within the current lease area and would not impact on the main navigational channel or impact on the use of other berths at White Bay.
The development warrants a foreshore location.	The development is to provide marine services, and warrants a foreshore location.
The development does not interfere with navigation, swimming or other recreational activities.	The modification would not affect navigation, swimming or other recreational activities in the area.
The demand for the development has been established.	The demand for the project at White Bay was demonstrated in the original environmental assessment, which related to the refuelling infrastructure as well as maintenance and repair services for vessels on the site. The demand for the development, as modified, would meet the demand for boat storage spaces due to the current lack of dry boat storage in Sydney Harbour, to accommodate current boat ownership levels, as well as future projections of an increasing demand of boat ownership and need for dry boat storage in the harbour. In this context, the development is justified.
The structure does not obstruct or affect the natural flow of tides and currents.	The modification is mainly land-based. The floating pontoons would not affect the tides or currents.
Development does not dominate its landscape setting.	This is discussed in Section 5.3 of this report. The visual impact of the project is not expected to be significant considering the current industrial setting in which it would be located and adherence to the building height limits for the area.
The extent of development is kept to the absolute minimum necessary to provide access to the waterway.	Access to the waterway is outside the scope of the modification as it would not impact on waterway access. Waterway access would remain via the travel lift and wet berth area.
Shared usage of facilities is encouraged to minimise the number of structures and their cumulative impact on the environment of the Harbour and its tributaries.	The facility would be operated commercially, and would provide services for a range of recreational and commercial craft, combined with a variety of workshops and showrooms. The proposed modification would augment this through the provision of dry boat storage facilities.

Development is setback at least 2.5 metres from the division of the waterway as established by the NSW Maritime Authority.	This is not relevant to the site. There are no adjoining properties (that would share this particular section of water) and the facility would remain within the lease footprint.
Built Form	
Where buildings or structures would be of a contrasting scale or design to existing buildings, care will be needed to ensure that this contrast would enhance the setting.	The existing buildings on the site consist of the amenities block and office. The structures proposed as part of the modification would not differ significantly from structures originally approved.
While no shapes are intrinsically unacceptable, rectangular boxy shapes with flat or skillion roofs usually do not harmonise with their surroundings. It is preferable to break up facades and roof lines into smaller elements and to use pitched roofs.	This issue is addressed in Section 5.3 (Visual Amenity). The building shape of the internal dry rack facility would not be significantly altered from that identified in the approved environmental assessment for Building 2. Whilst the internal dry rack facility would be a rectangular boxy shape, it has been previously deemed acceptable through the approval of Building 2, and is practical for the intended use of the building.
Cumulative visual impact of a number of built elements on a single lot should be mitigated through bands of vegetation and by articulating walls and using smaller elements.	This issue is addressed in Section 5.3. Overall cumulative visual impact of the site would not be significantly impacted by the development. The larger built elements on the site would be split by large spaces between structures (such as between the internal dry boat facility, and the external dry boat racks). The existing gantry on site would mitigate the bulk built forms on the site, separating the external dry rack facilities. Landscaping adjacent to the waterway, in the north-east corner of the site would provide some mitigation of built elements on site.
Marinas (Commercial and Private)	
Visual Impact	
The visual contrast (derived from an analysis of form, line, colour and texture) between the marina and the existing or planned future character of its setting is to be minimised.	The boat rack system would not alter the visual contrast between the site and the character of its setting (primarily the adjacent CPT facility). This is addressed in Section 5.3.
The bulk and scale of buildings and other structures on land is to be minimised through appropriate mitigation measures including landscaping, articulated walls, detailing of surfaces and by using smaller elements.	The scale of the internal boat storage facility would not be altered significantly. The storage rack facilities would not significantly alter the visual appearance on the site, and is discussed in Section 5.3.
The visual impact of car parking from the waterway is to be minimised.	Car parking would not impact on overall objectives of the *Sydney Harbour Foreshores Area Development Control Plan*, and is located so as to provide logistical and safe access for vehicles to parking on site. Refer to Section 5.3.
Traffic and Parking	
Land-based impacts including traffic volumes and parking demand meet established performance standards.	This issue is addressed in Section 5.1. The modification would not be expected to significantly change the performance of local intersections. The amount of car parking has been designed to satisfy requirements specified in Australian Standards with some overflow parking due to likely access characteristics and patterns expected at the site and its distance to public transport options.
Adequate car and trailer parking (based on the number and type of berths, associated activities and number of	The modification would include appropriate numbers of car parking in accordance with Australian Standards,

employees) is to be available on-site. Off-site parking is acceptable only where it will not reduce community amenity of generate adverse traffic impacts.	with additional spaces given the distance of the site from public roads and public transport options. This is discussed further in Section 5.1.
The adverse impacts of traffic and parking generated by boat storage facilities in terms of congestion, safety, air quality and noise are to be minimised.	These issues are addressed in Sections 5.1, 5.2 and 5.8.2. The modification would seek to minimise all adverse impacts of traffic and parking.
Noise	
The adverse impacts of noise (considering hours of operation, existing background noise, expected departure/arrival time for vessels, noise level of marina patrons, noise level from repair and testing of vessels and motors) are to be minimised through appropriate design and management measures.	The modification would not significantly alter previously approved levels of noise. Refer to Section 5.2. Mitigation measures to counteract noise that would affect residential receivers would be implemented on site during construction and operation.
Land-based impacts including noise emissions meet established performance standards.	The modification would not alter this and is discussed in Section 5.2.

4.0 Consultation

4.1 Sydney Ports Corporation

Representatives of Baileys Marine Fuels Pty Ltd, White Bay 6 Pty Ltd and AECOM have met with Sydney Ports Corporation (SPC) on a number of occasions between October 2011 and April 2013 to discuss its requirements for landowner's consent (referred to as a Planning Application Meeting (PAM)). Matters discussed at these meetings included the process for the proposed modification, construction activities, environmental and security issues, safety and risks associated with the proposed works, engineering design, applicable legislation and other guideline requirements and the documentation to be provided to SPC (refer to Appendix B for the meeting minutes). Key environmental and engineering matters raised by SPC during and following the PAMs were in relation to:

- Noise impacts from construction and operation of the storage facilities on neighbouring properties and users.
- Waste management and disposal.
- Stormwater, water quality and waste water.
- Traffic impacts.
- Visual impacts.
- Energy and water consumption and management.
- Access and security measures.
- Hours of operation.

SPC also requested that the modification include details regarding both construction and operational impacts on the environment, as well as management and mitigation measures, and that the timing of both the construction and operational phases of the modification are to be discussed with SPC in the context of the operation of the White Bay Berth 5 Cruise Passenger Terminal. Additionally, SPC requested that, with respect to the external boat storage racks, the Proponent provide the credentials of the supplier and load specifications of the racks to ensure that the racks are not inadvertently loaded. This would be satisfied following the selection of the supplier, with training of staff to ensure appropriate loading of stacking system.

In addition, SPC specified that revised plans of the site to show current use as well as the proposed modification should be provided to them, as well as a review of the existing Vessel Management Plan with respect to this modification.

SPC notified AECOM and Baileys Marine Fuels that for landowner's consent to be granted, a Landowner's Consent Application Form, environmental assessment documentation and a Green Ports Guidelines checklist should be submitted to SPC to assist in its consideration of the proposed modification.

During the period of consultation with SPC, the Glebe Island/White Bay Community Liaison Group has been advised by SPC of the proposal to modify the existing approval.

4.2 Roads and Maritime Services

A representative from White Bay 6 Pty Ltd has met with NSW Roads and Maritime Services (RMS) to introduce the water-based components of the proposed modification and to discuss the process and requirements for receiving landowners consent.

RMS has provided landowner's consent for the water-based components of the proposed works.

5.0 Assessment of Issues

5.1 Traffic and Transport

5.1.1 Background

Existing developments along the northern side of Robert Street, between Victoria Road and Buchanan Street, comprise a mixture of recreational, commercial and industrial developments within warehouse type structures with vehicle access provided via the Robert Street frontages. To the eastern end, adjacent to Buchanan Street, there is a mixture of low to medium density residential developments that are accessible via Buchanan Street from the south and other local residential streets from the north.

Sydney Ports Corporation recently completed construction activities for the Cruise Passenger Terminal at White Bay Berth 5, adjacent to the White Bay 6 site. The terminal commenced operations in April 2013.

The site is well serviced to the east by the Victoria Road/Western Distributor, which links the site to the CBD, North Sydney and the eastern suburbs. From the Western Distributor, links to the inner west and beyond are provided by the The Crescent/City West Link Road, which eventually connects to Parramatta Road. Main vehicle access to the site is via the road extension at the eastern end of Robert Street. It is noted that on cruise days access would not be possible via Robert Street. On these days access to the site would be via James Craig Road for dry boat storage users. Staff associated with the site operations and deliveries would maintain access via Robert Street.

Mid-block Volume/Capacity (V/C) ratios signify the level of saturation of roads in relation to their theoretical capacity as per the industry standard *Guide to Traffic Engineering Practice – Part 2 Roadway Capacity* (Austroads, 1988). Similarly, the Level of Service (LoS) indicates the performance of the road, with LoS A being optimal and LoS F representing forced flow, nearing or exceeding saturation. **Table 3** provides an overview of LoS definitions and corresponding V/C ratio criteria.

Table 3 Mid-block Level of Service definitions and criteria

LoS	Definition	V/C ratio criteria
A	Condition of free flow in which drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high.	V/C < 0.60
B	Stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream.	0.60 <= V/C < 0.75
C	Stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream.	0.75 <= V/C < 0.90
D	Close to the limit of stable flow but is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. Small increases in traffic flow will generally cause operational problems.	0.90 <= V/C < 0.95
E	Traffic volumes are at or close to capacity. There is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Minor disturbances within the traffic stream will cause a traffic-jam.	0.95 <= V/C < 1.00
F	Forced flow. The amount of traffic approaching the point under consideration exceeds that which can pass it. Flow break-down occurs and queuing and delays result.	1.00 <= V/C

Existing traffic volumes, Volume/Capacity (V/C) ratios and Level of Service (LoS) of the surrounding road network have been calculated, as displayed in **Table 4**:

- 2005 traffic volumes and V/C ratios are from the original *White Bay Berth 6 Proposed Marine Supply Facility Environmental Assessment* (KBR, September 2006).
- 2010 surveyed traffic volumes are from the *Proposed White Bay Cruise Passenger Terminal Transport Report* (Halcrow, September 2010).

- 2013 traffic volumes have been forecast by applying 2005-2010 average annual growth rates to surveyed 2010 traffic volumes.
- V/C ratios and corresponding LoS have been calculated in accordance with **Table 3**.

The results shown in **Table 4** indicate that between the time of the original assessment (2005) and 2013, mid-block peak hour traffic volumes and network performance has remained broadly unchanged with the following observations:

- The main arterial routes of Victoria Road and ANZAC Bridge continue to operate close to or at their capacity limits, resulting in reduced performance (LoS).
- The Crescent demonstrates stable flow conditions and an acceptable LoS.
- Robert Street and Mullens Street are operating well within their capacity limits.

Table 4 Mid-block traffic volumes and LoS: 2005-2013

Location	Direction	Mid-Block Capacity	2005			2010			Annual Average Growth		2013		
			Volume	V/C	LoS	Volume	V/C	LoS	Actual (2005-2010)	Applied[1] (2010-2013)	Volume	V/C	LoS
AM Peak Hour													
Victoria Road, South of Robert St	Northbound	4,800	2,559	0.53	A	2,471	0.51	A	-0.7%	1.0%	**2,545**	**0.53**	**A**
	Southbound	4,800	3,988	0.83	C	4,565	0.95	E	2.9%	2.9%	**4,961**	**1.03**	**F**
The Crescent, West of Victoria Rd	Eastbound	4,800	3,354	0.70	B	3,809	0.79	C	2.7%	2.7%	**4,119**	**0.86**	**C**
	Westbound	4,800	2,147	0.45	A	2,438	0.51	A	2.7%	2.7%	**2,636**	**0.55**	**A**
ANZAC Bridge	Eastbound	6,400	6,458	1.01	F	7,026	1.10	F	1.8%	1.8%	**7,397**	**1.16**	**F**
	Westbound	6,400	3,419	0.53	A	3,561	0.56	A	0.8%	1.0%	**3,668**	**0.57**	**A**
Robert Street, East of Victoria Rd	Eastbound	1,400	-	-	-	755	0.54	A	-	1.0%	**778**	**0.56**	**A**
	Westbound	1,400	-	-	-	814	0.58	A	-	1.0%	**838**	**0.60**	**A**
Mullens St, North of Robert St	Northbound	1,400	-	-	-	508	0.36	A	-	1.0%	**523**	**0.37**	**A**
	Southbound	1,400	-	-	-	561	0.40	A	-	1.0%	**578**	**0.41**	**A**
Robert Street, East of Mullens St	Eastbound	1,400	239	0.17	A	233	0.17	A	-0.5%	1.0%	**240**	**0.17**	**A**
	Westbound	1,400	220	0.16	A	209	0.15	A	-1.0%	1.0%	**215**	**0.15**	**A**
PM Peak Hour													
Victoria Road, South of Robert St	Northbound	4,800	3,780	0.79	C	4,246	0.88	C	2.5%	2.5%	**4,560**	**0.95**	**E**
	Southbound	4,800	3,129	0.65	B	3,141	0.65	B	0.1%	1.0%	**3,235**	**0.67**	**B**
The Crescent, West of Victoria Rd	Eastbound	4,800	3,090	0.64	A	3,496	0.73	B	2.6%	2.6%	**3,772**	**0.79**	**C**
	Westbound	4,800	3,239	0.67	B	3,311	0.69	B	0.4%	1.0%	**3,410**	**0.71**	**B**
ANZAC Bridge	Eastbound	6,400	4,727	0.74	B	4,890	0.76	C	0.7%	1.0%	**5,037**	**0.79**	**C**
	Westbound	6,400	5,831	0.91	D	5,810	0.91	D	-0.1%	1.0%	**5,984**	**0.94**	**D**

[1] Where 2005-2010 Average Annual Growth <1% or not available, a growth rate of 1% has been applied to forecast a worst-case 2013 scenario.

Robert Street, East of Victoria Rd	Eastbound	1,400	-	-	-	1,008	0.72	B	-	1.0%	**1,038**	**0.74**	**B**
	Westbound	1,400	-	-	-	701	0.50	A	-	1.0%	**722**	**0.52**	**A**
Mullens St, North of Robert St	Northbound	1,400	-	-	-	644	0.46	A	-	1.0%	**663**	**0.47**	**A**
	Southbound	1,400	-	-	-	529	0.38	A	-	1.0%	**545**	**0.39**	**A**
Robert Street, East of Mullens St	Eastbound	1,400	269	0.19	A	313	0.22	A	3.3%	3.3%	**344**	**0.25**	**A**
	Westbound	1,400	245	0.18	A	213	0.15	A	-2.6%	1.0%	**219**	**0.16**	**A**

Intersection performance is primarily determined by the average delay to approaching traffic. **Table 5** provides an overview of LoS definitions and corresponding average delay criteria, as defined in the *Guide to Traffic Generating Developments* (NSW RMS (formerly RTA), 2002).

Table 5 Intersection Level of Service definitions and criteria

LoS	Average Delay/ Vehicle (seconds)	Traffic Signals | Roundabout	Give Way | Stop Signs
A	Less than 14	Good operation.	Good operation.
B	15 to 28	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
C	29 to 42	Satisfactory.	Satisfactory, but accident study required.
D	43 to 56	Operating near capacity.	Near capacity and accident study required.
E	57 to 70	At capacity; at signals incidents will cause excessive delays.	At capacity; requires other control mode.
F	>70	Roundabouts require other control mode.	At capacity; requires other control mode.

As Robert Street will provide access to the proposed development, the Victoria Road | Robert Street and Robert Street | Mullens Street intersections would be most affected by traffic associated with the proposed development. The existing performance of these intersections has been assessed using SIDRA intersection modelling. Traffic volumes, modelled delays and Level of Service (LoS) of these intersections are displayed in **Table 6**:

- 2010 traffic volumes have been taken from the *Proposed White Bay Cruise Passenger Terminal Transport Report* (Halcrow, September 2010).
- A site inspection was undertaken to assess existing traffic conditions, and which informed the following assumptions:
    - Movements between Mullens Street and Robert Street (East approach) were observed to be approximately five percent of intersection approach flows – other turning volumes at the Mullens Street | Robert Street intersection have been forecast through deduction incorporating this assumption.
    - Heavy vehicle proportions were estimated to be approximately five percent, which has been adopted for the purposes of SIDRA modelling.
    - Signal phasing for the Victoria Road | Robert Street intersection was observed and recorded (ie two phases in the AM peak and four phases in the PM peak (three unique, and phases two and four repeated)).
    - Traffic queues caused by right-turning traffic on the northbound approach of Victoria Road at the Victoria Road | Robert Street intersection extended back into the adjacent through traffic lane during the PM peak, effectively reducing the northbound through capacity of this intersection.
    - Traffic queuing back on Robert Street from the Victoria Road | Robert Street intersection was observed to impact the practical performance of this intersection, particularly during the AM peak.
- Traffic volumes for 2013 have been forecast by applying relevant 2005-2010 average annual growth rates (from **Table 2**) to surveyed 2010 traffic volumes.
- Average delay has been calculated using SIDRA intersection modelling; LoS has been defined in accordance with **Table 5**.

The results shown in **Table 6** indicate that the Victoria Road | Robert Street intersection is currently operating at capacity during peak periods, where through movements on Victoria Road contribute around 80 percent of total traffic.

The Robert Street | Mullens Street intersection is shown to have significant spare capacity and to incur minimal delays for all major traffic flows.

Table 6 Intersection traffic volumes and LoS (2010-2013)

Intersection	Approach	Movement	2010	Annual Average Growth (2010-2013)[2]	2013		
			Volume		Volume	Average Delay (seconds)	LoS
AM Peak Hour							
Victoria Rd | Robert St	Victoria Rd (North Approach)	Through	3,821	2.9%	4,153	96.9	F
		Left	52		57	9.7	A
	Robert St	Right	0	1.0%	0	-	-
		Left	814		838	165.8	F
	Victoria Rd (South Approach)	Right	703	1.0%	724	70.7	F
		Through	1,810		1,864	0.3	A
	(All)	**Total**	**7,200**	**-**	**7,636**	**74.4**	**F**
Robert St | Mullens St	Mullens St	Right	533	1.0%	549	0.0	A
		Left	28		29	4.6	A
	Robert St (East Approach)	Right	10	1.0%	11	62.0	E
		Through	199		205	9.0	A
	Robert St (West Approach)	Right	205	1.0%	211	37.1	C
		Through	550		567	0.0	A
	(All)	**Total**	**1,525**	**-**	**1,572**	**6.7**	**A**
PM Peak Hour							
Victoria Rd | Robert St	Victoria Rd (North Approach)	Through	2,359	1.0%	2,430	151.5	F
		Left	56		58	33.0	C
	Robert St	Right	43	1.0%	44	89.7	F
		Left	658		678	28.3	B
	Victoria Rd (South Approach)	Right	952	2.5%	1,023	112.2	F
		Through	3,307		3,555	2.8	A
	(All)	**Total**	**7,375**	**-**	**7,788**	**66.5**	**E**
Robert St | Mullens St	Mullens St	Right	503	1.0%	518	0.0	A
		Left	26		27	5.0	A
	Robert St (East Approach)	Right	11	1.0%	11	117.6	F
		Through	202		208	8.5	A
	Robert St (West Approach)	Right	287	1.0%	295	29.2	C
		Through	721		743	0.0	A
	(All)	**Total**	**1,750**	**-**	**1,802**	**6.3**	**A**

[2] Refer to Table 4.

5.1.2 Construction

Construction Traffic Generation

The original Environmental Assessment assumed a staged construction of the total development, and considered each separate component of the development. The component with the highest volume of traffic generation related to the construction of the fuel loading facility, with 80 heavy goods vehicles (HGVs) and 80 private vehicles on a two-way daily basis. This component has been constructed.

Traffic generated by the construction of the two approved buildings was estimated at 20 HGVs and 30 private vehicles on a two-way daily basis. The construction of the modified elements of the project would be expected to remain within this range of daily movements, if not lower due to the simpler construction methods associated with the external stacking system and its pre-fabricated components.

Impact on Surrounding Traffic Routes

The original Environmental Assessment assessed the impact on surrounding traffic routes in a worst-case scenario, being the addition of vehicles associated with the construction of the fuel loading facility to existing local traffic volumes. Though this stage of construction represented the forecast highest traffic volumes, the construction traffic was predicted to have a negligible impact on surrounding routes.

It is anticipated that the construction impact of the modification would be lower that the worst-case scenario previously assessed. The impacts of the modification during construction on the surrounding road network would be most significant on Robert Street and Victoria Road (in the immediate vicinity of Robert Street).

Table 7 presents the results of the 2013 'Base Case' (from **Table 4**), and for comparison a worst-case construction scenario which assumes:

- One third of construction traffic travels to the site during the AM peak.
- One third of construction traffic travels from the site during the PM peak.
- All construction traffic is assumed to travel to and from the south via Victoria Road.

Table 7 Mid-block traffic volumes and LoS: 2013 Base case and worst-case construction scenario

Location	Direction	Mid-Block Capacity	Base Case			Base Case + Construction Traffic		
			Volume	V/C	LoS	Volume	V/C	LoS
AM Peak Hour								
Victoria Road, South of Robert St	Northbound	4,800	2,545	0.53	A	2,562	0.53	A
	Southbound	4,800	4,961	1.03	F	4,961	1.03	F
Robert Street, East of Victoria Rd	Eastbound	1,400	778	0.56	A	795	0.57	A
	Westbound	1,400	838	0.60	A	838	0.60	A
Robert Street, East of Mullens St	Eastbound	1,400	240	0.17	A	257	0.18	A
	Westbound	1,400	215	0.15	A	215	0.15	A
PM Peak Hour								
Victoria Road, South of Robert St	Northbound	4,800	4,560	0.95	E	4,560	0.95	E
	Southbound	4,800	3,235	0.67	B	3,252	0.68	B
Robert Street, East of Victoria Rd	Eastbound	1,400	1,038	0.74	B	1,038	0.74	B
	Westbound	1,400	722	0.52	A	739	0.53	A
Robert Street, East of Mullens St	Eastbound	1,400	344	0.25	A	344	0.25	A
	Westbound	1,400	219	0.16	A	236	0.17	A

The results shown in **Table 7** indicate that construction traffic associated with the proposal would create a minimal change in V/C ratios and no change to LoS. Robert Street - which would be impacted most heavily - would continue to operate at LoS A or B, which represents good traffic operation.

Intersection Operation

Under the original approval, the addition of construction traffic (based on the worst-case scenario) was not expected to significantly affect the existing performance of the most heavily impacted intersections.

As noted in **Section 5.1.1**, Robert Street would provide access to the development, and consequently the Victoria Road | Robert Street and Robert Street | Mullens Street intersections would be most affected. The performance of these intersections including the impacts of construction traffic has been assessed using SIDRA intersection modelling. **Table 8** presents the results of the 2013 Base Case (from **Table 6**), and for comparison a worst-case construction scenario which uses the traffic generation and distribution assumptions listed above.

The results shown in **Table 8** indicate that the relatively small increase in traffic for a worst-case construction scenario (when compared to Base Case intersection throughput) would result in an almost imperceptible impact on intersection performance. However, it is acknowledged that these intersections currently experience significant loadings during peak periods. To minimise the potential for the proposed development to further contribute to these impacts, the Proponent would implement a Traffic Management Plan, which would include scheduling (where possible) heavy vehicles movements outside peak periods.

Construction Traffic Management Plan

A construction traffic management plan has been prepared for construction works that have been completed at the site. This plan would be reviewed and updated, if required, prior to the start of construction as part of the Construction Environmental Management Plan (CEMP) for the site.

Table 8 Intersection traffic volumes and LoS: 2013 Base case and worst-case construction scenario

Intersection	Approach	Move-ment	Base Case			Base Case + Construction Traffic		
			Volume	Average Delay (seconds)	LoS	Volume	Average Delay (seconds)	LoS
AM Peak Hour								
Victoria Rd | Robert St	Victoria Rd (North Approach)	Through	4,153	96.9	F	4,153	96.9	F
		Left	57	9.7	A	57	9.7	A
	Robert St	Right	0	-	-	0	-	-
		Left	838	165.8	F	838	165.8	F
	Victoria Rd (South Approach)	Right	724	70.7	F	741	70.8	F
		Through	1,864	0.3	A	1,864	0.3	A
	(All)	**Total**	**7,636**	**74.4**	**F**	**7,653**	**74.4**	**F**
Robert St | Mullens St	Mullens St	Right	549	0.0	A	549	0.0	A
		Left	29	4.6	A	29	4.7	A
	Robert St (East Approach)	Right	11	62.0	E	11	65.6	E
		Through	205	9.0	A	205	9.0	A
	Robert St (West Approach)	Right	211	37.1	C	228	35.1	C
		Through	567	0.0	A	567	0.0	A
	(All)	**Total**	**1,572**	**6.7**	**A**	**1,589**	**6.7**	**A**
PM Peak Hour								
Victoria Rd | Robert St	Victoria Rd (North Approach)	Through	2,430	151.5	F	2,430	151.5	F
		Left	58	33.0	C	58	33.0	C
	Robert St	Right	44	89.7	F	44	89.7	F
		Left	678	28.3	B	694	28.5	B
	Victoria Rd (South Approach)	Right	1,023	112.2	F	1023	112.2	F
		Through	3,555	2.8	A	3,555	2.8	A
	(All)	**Total**	**7,788**	**66.5**	**E**	**7,804**	**66.5**	**E**
Robert St | Mullens St	Mullens St	Right	518	0.0	A	518	0.0	A
		Left	27	5.0	A	27	5.0	A
	Robert St (East Approach)	Right	11	117.6	F	11	115.2	F
		Through	208	8.5	A	225	9.1	A
	Robert St (West Approach)	Right	295	29.2	C	295	30.1	C
		Through	743	0.0	A	743	0.0	A
	(All)	**Total**	**1,802**	**6.3**	**A**	**1,819**	**6.4**	**A**

5.1.3 Operation

Traffic Generation during Operation

The project, as approved, was expected to generate 60 light vehicle movements per day (based on 30 employees) and 70 HGV movements per day, as shown in **Table 9**. For the purposes of the Environmental Assessment and Preferred Project Report, 30 light vehicles associated with employees and three fuel deliveries were assumed to occur during the AM and PM peaks. The assessment acknowledged that turning movements from Robert Street during AM and PM peaks would experience LOS E and F, and that the project could worsen this performance. To mitigate this impact, the Proponent undertook to minimise, where feasible, heavy vehicle movements during peak periods.

Table 9 Predicted worst-case traffic generation (daily movements) as approved

Source	Private vehicles	Heavy vehicles
Employee trips	60	
Fuel deliveries		6
Roll on/Roll off		64
Total	**60**	**70**

The proposed modification would alter predicted traffic movements to and from the site, given the introduction of dry berths at the site and movements associated with customers arriving and departing the site. It is expected that the heaviest demand for the project, as modified, would occur during weekends or outside peak periods during the weekday, being late morning and early afternoon given the recreational nature of service. Based on the operational capacity of the forklifts to transfer boats from the dry-boat storage racks to the launch area, it is assumed that around 10 vessel movements per hour could be accommodated, totalling 110 vessel movements per day. Assuming each boat departs and returns on the same day, this would be the equivalent of accessing approximately 55 dry berths per day during the operational hours of the site.

To account for the new vehicle movements introduced as part of the modification, the *Guide to Traffic Generating Developments* (NSW RMS (formerly RTA), 2002) has been used to estimate traffic volumes associated with operation of the facility. An assumption of 1.4 vehicle movements per day for each dry berth has been adopted, with a vehicle movement defined as a trip to or from the site. Extrapolating this assumption, the proposed 150 dry berths would generate a maximum of 210 vehicle movements daily.

To account for a worst-case scenario, it has been assumed that 20 per cent of the 210 movements, being 42 additional light vehicle movements, would occur during the AM and PM peak periods. This is considered a worst-case scenario, given the maximum number of vessels that can be launched or retrieved in an hour is approximately 10 vessels. Further, the peak periods of traffic generation for the site would be outside the peak periods of the surrounding network (being the AM and PM peaks during weekdays).

Traffic movements associated with approved operational components of the project have also changed, since obtaining approval. Demand for the RoRo ramp is anticipated to be infrequent, and as such, the predicted daily movement of 64 HGVs would rarely occur. Further, staff levels have been halved based on the operational needs of the development from 30 to 15 full time staff. This would result in a reduction of 30 light vehicle movements per day, or 15 movements during peak periods. This reduction in traffic generated by the approved project during AM and PM peaks relative to the predications made in the original Environmental Assessment would provide some capacity to offset increases in traffic generation associated with customers accessing their boats. A summary of worst-case traffic generation within peak periods is provided in **Table 10**.

Table 10 Worst-case traffic generation (peak periods) of the project as approved and as modified

Source	As approved	As modified
Staff trips	30	15
Fuel deliveries	3	3
RO-RO ramp	0	0
Dry berths	0	42

Source	As approved	As modified
Total	**33**	**60**

Net Changes in Traffic Generation during Operation

The recently operational Cruise Passenger Terminal (CPT) facility adjacent to Berth 6 would have increased net traffic in the area. However, peak traffic for the CPT would only occur during the docking of a ship, and would therefore be limited in duration and frequency. Approximately 2,164 vehicle movements would occur between the hours of 6:30am and 4:30pm during a ship docking. However, the majority of these movements would comprise passenger vehicles, coaches and taxis, which would access the site via James Craig Road and an internal road.[3]

Only service vehicles would access the site via Robert Street (shared with White Bay 6). The Environmental Assessment for the CPT Project Application (JBA, 2010) indicated that service vehicles, during ship docking, would equate to 29 vehicles per hour in the morning peak and seven vehicles per hour in the evening peak. Given the separation of road access to the CPT site for passenger and service vehicles, the cumulative impact of the proposed modification and the CPT (when ships are docked) is minimised.

It is also noted that based on the *Cruise Schedule April 2013 – November 2020* (Sydney Ports Corporation, 2013) for the White Bay CPT, the majority of cruise ships arrive at dock early in the morning, with departures being late afternoon to evening. The peak road traffic periods would be anticipated to coincide with these arrival and departure times. The peak use period for private vessels is generally outside of these times, being late morning to early afternoon.

Access to the White Bay 6 site on non-cruise days would be via the Robert Street gate. On cruise days, the White Bay 6 site would be accessed via James Craig Road / Sommerville Road, with no access via the Robert Street gate except for White Bay 6 staff and delivery vehicles. The details regarding access and egress would be agreed with SPC prior to the start of operation, while an Operational Traffic Management Plan would form part of the OEMP to be prepared for the facility prior to operation.

Impact on Surrounding Traffic Routes

The traffic impacts of the modification during operation on the surrounding road network would be most significant on Robert Street, Mullens Street, and Victoria Road (in the immediate vicinity of Robert Street).

Table 11 presents the results of the 2013 Base Case (from **Table 4**), and for comparison a worst-case operational scenario. This scenario includes cumulative operational traffic generation of both the CPT (service vehicles) and White Bay 6, and assumes:

- Two thirds of White Bay 6 staff vehicles travel to the site during the AM peak, and from the site during the PM peak.
- White Bay 6 fuel delivery vehicles generate equal volumes of inbound and outbound movements during peak periods.
- Trip generation relating to the White Bay 6 dry berths consists of 75 percent inbound and 25 percent outbound movements during peak periods.
- All traffic generated by the CPT and White Bay 6 is expected to distribute across the wider road network with 25 percent travelling to | from the north, and 75 percent to | from the south.[4]
- CPT service vehicles comprise 50 percent light and 50 percent heavy vehicles.

The results shown in **Table 11** indicate that in a worst-case scenario operational traffic generated by the development, as modified, - in addition to traffic generated by the CPT - would marginally increase V/C ratios, and hence only create a minor impact on road network performance. Robert Street - which would be impacted most heavily - would continue to operate between LoS A and LoS C which represents satisfactory stable traffic flow.

[3, 4] Proposed White Bay Cruise Passenger Terminal Transport Report (Halcrow, September 2010)

Table 11 Mid-block traffic volumes and LoS: 2013 Base case and worst-case operational scenario

Location	Direction	Mid-Block Capacity	Base Case			Base Case + Operational CPT & White Bay 6 Traffic		
			Volume	V/C	LoS	Volume	V/C	LoS
AM Peak Hour								
Victoria Road, South of Robert St	Northbound	4,800	2,545	0.53	A	2,587	0.54	A
	Southbound	4,800	4,961	1.03	F	4,982	1.04	F
Robert Street, East of Victoria Rd	Eastbound	1,400	778	0.56	A	822	0.59	A
	Westbound	1,400	838	0.60	A	859	0.61	B
Mullens St, North of Robert St	Northbound	1,400	523	0.37	A	530	0.38	A
	Southbound	1,400	578	0.41	A	590	0.42	A
Robert Street, East of Mullens St	Eastbound	1,400	240	0.17	A	296	0.21	A
	Westbound	1,400	215	0.15	A	243	0.17	A
PM Peak Hour								
Victoria Road, South of Robert St	Northbound	4,800	4,560	0.95	E	4,586	0.96	E
	Southbound	4,800	3,235	0.67	B	3,256	0.68	B
Robert Street, East of Victoria Rd	Eastbound	1,400	1,038	0.74	B	1,064	0.76	C
	Westbound	1,400	722	0.52	A	744	0.53	A
Mullens St, North of Robert St	Northbound	1,400	663	0.47	A	669	0.48	A
	Southbound	1,400	545	0.39	A	553	0.39	A
Robert Street, East of Mullens St	Eastbound	1,400	344	0.25	A	378	0.27	A
	Westbound	1,400	219	0.16	A	247	0.18	A

Intersection Operation

Intersections in the area that would be impacted by operational traffic from the proposed development include:

- Victoria Road | Robert Street.
- Mullens Street | Robert Street.
- The Crescent | City West Link Road.
- The Crescent | James Craig Road.
- The Crescent | Victoria Road.

As noted in **Section 5.1.1**, Robert Street will provide access to the development for all traffic, and consequently the Victoria Road | Robert Street and Robert Street | Mullens Street intersections would be most affected. The performance of these intersections – including the impacts of operational traffic generated by both the CPT (service vehicles) and White Bay 6 – has been assessed using SIDRA intersection modelling. **Table 12** presents the results of the 2013 Base Case (from **Table 6**), and for comparison a worst-case operational scenario which uses the traffic generation and distribution assumptions listed above.

The results shown in **Table 12** indicate that the increase in traffic for a worst-case construction scenario (when compared to the Base Case) would result in a general increase in delay at both intersections. However, the general level of performance at both locations would remain relatively consistent with Base Case conditions: the Victoria Road | Robert Street intersection would continue to incur significant delays due to heavy volumes of

through traffic on Victoria Road; conversely, the Robert Street | Mullens Street intersection would continue to operate with minimal delay to the majority of traffic.

Table 12 Intersection traffic volumes and LoS: 2013 Base case and worst-case operational scenario

Intersection	Approach	Move-ment	Base Case			Base Case + Operational CPT & White Bay 6 Traffic		
			Volume	Average Delay (seconds)	LoS	Volume	Average Delay (seconds)	LoS
AM Peak Hour								
Victoria Rd | Robert St	Victoria Rd (North Approach)	Through	4,153	96.9	F	4,153	112.4	F
		Left	57	9.7	A	59	10.0	A
	Robert St	Right	0	-	-	-	-	-
		Left	838	165.8	F	859	165.7	F
	Victoria Rd (South Approach)	Right	724	70.7	F	766	70.4	E
		Through	1,864	0.3	A	1,864	0.3	A
	(All)	**Total**	**7,636**	**74.4**	**F**	**7,701**	**82.6**	**F**
Robert St | Mullens St	Mullens St	Right	549	0.0	A	549	0.0	A
		Left	29	4.6	A	41	4.8	A
	Robert St (East Approach)	Right	11	62.0	E	18	143.6	F
		Through	205	9.0	A	226	9.9	A
	Robert St (West Approach)	Right	211	37.1	C	255	34.0	C
		Through	567	0.0	A	567	0.0	A
	(All)	**Total**	**1,572**	**6.7**	**A**	**1,656**	**8.0**	**A**
PM Peak Hour								
Victoria Rd | Robert St	Victoria Rd (North Approach)	Through	2,430	151.5	F	2,430	178.0	F
		Left	58	33.0	C	58	33.8	C
	Robert St	Right	44	89.7	F	45	90.4	F
		Left	678	28.3	B	699	27.8	B
	Victoria Rd (South Approach)	Right	1,023	112.2	F	1049	125.6	F
		Through	3,555	2.8	A	3,555	2.8	A
	(All)	**Total**	**7,788**	**66.5**	**E**	**7,836**	**76.6**	**F**
Robert St | Mullens St	Mullens St	Right	518	0.0	A	518	0.0	A
		Left	27	5.0	A	35	4.9	A
	Robert St (East Approach)	Right	11	117.6	F	17	144.2	F
		Through	208	8.5	A	231	9.1	A
	Robert St (West Approach)	Right	295	29.2	C	321	30.3	C
		Through	743	0.0	A	743	0.0	A
	(All)	**Total**	**1,802**	**6.3**	**A**	**1,865**	**6.9**	**A**

When considering the worst-case assessment, it is important to consider the Base Case conditions of the Victoria Road | Robert Street intersection – which is a LoS F during the AM peak period, and a LoS E during the PM peak period. This intersection has an existing hourly throughput of approximately 7,600-7,800 vehicles. Using the worst-case assumption of 60 vehicles per hour associated with the modified development, the percentage increase to the volume of traffic passing through the intersection during peak times equates to approximately 0.8 percent. Hence the overwhelming majority of delay at this intersection will continue to be generated by other sources of traffic.

It is also noted that the assumptions used are conservative and indicative of a worst-case. Typical vehicle movements during peak hours are expected to be lower, and the consequential impacts less significant. In addition the performance of the intersection has been assessed assuming peak trip generation for the modified development coincides with weekday peak traffic periods. In reality, peak periods for White Bay 6 would not typically occur during these times. Furthermore, the performance assessment includes estimated traffic generated by the CPT in addition to that generated by the proposal.

In the above context, the anticipated impact of the proposal on both key intersections is believed to be acceptable.

Parking and Internal Circulation

The project, as approved, includes 35 car spaces, including 30 spaces for employees and five for visitors.

The project, as modified, would have a lower demand for employee parking (reduced from 30 to 15 spaces). Provision for visitor spaces would still be required to cater for the boat maintenance, repair and refuelling components of the project. As such, the parking demand from these components would reduce from 33 to 18 spaces. The modified project would also be required to provide car parking for private boat owners using the dry boat storage facilities. As such, car parking is proposed to be increased under this modification to provide 68 car parking spaces, representing an increase of 33 spaces over approved car space numbers.

AS 3962-2001 – Guidelines for design of marinas requires 0.2 to 0.4 car spaces for each dry berth, which would equate to between 30 and 60 car spaces based on 150 dry berths. However, the Australian Standard also recommends that parking requirements consider peak periods, locations for overflow parking and kerb side parking, the practicality and possibility of offsite parking, and activities ancillary to the dry berths. Given there are limited opportunities for overflow parking on neighbouring streets (due distance of public roads to and from the site) and the limited opportunities for public transport options to the site, the car parking provided would be towards the upper limits of 60.

Experience at similar operational facilities in Australia and New Zealand should also be taken into account in determining the number of spaces provided. This experience indicates that car parking requirements on a typical day is between eight to 12 per cent of the total occupancy, with peak days (such as Australia Day, Boxing Day and Easter Holidays) achieving usage rates of 15 to 25 per cent of total occupancy. Based on the upper limits of these rates, 18 spaces would be required during a typical day with provision for an additional overflow of up to 38 spaces on peak days, totalling 56 required spaces.

Based on these guidelines and operational statistics, it is proposed that a total of 68 spaces be provided on the White Bay 6 site to ensure sufficient space is provided during times of peak demand at the dry berths. This allows for 15 spaces for employees, five spaces for visitors / deliveries and 48 spaces for users of the dry boat storage. These spaces would be split across two areas with the primary car park providing 30 spaces and the overflow car park providing 38 spaces.

The additional 33 spaces are not expected to detrimentally affect the internal circulation of the site. Opportunities for line marking the hardstand area to guide vehicular traffic within the site to car parking areas would be explored, alongside management measures and fencing, to minimise potential conflicts between operational areas and car parking areas.

The preliminary car park design would allow for adequate manoeuvring of vehicles and incorporating adequate turning circles and parking bay dimensions required by *AS 2890.1 Off Street Car Parking*. This would be confirmed during detailed design as per the existing conditions of approval.

Security

Access to the site would be restricted to those who have signed up to a tenancy agreement and controlled at the entry point through a gatehouse and automatic boom gate. Upon signing a tenancy agreement, boat owners would be provided with an access swipe card, along with the rules and regulations governing the operation of the site. Owners would be required to comply with these requirements.

On cruise days, access to the site would be required to be gained via James Craig Road as access would not be possible from Robert Street. On non-Cruise days, Robert Street would be utilised for access to the site. A security process would be agreed between White Bay 6 and Sydney Ports for access through the Sydney Ports gatehouse.

5.2 Noise and vibration

5.2.1 Background

Construction

As approved, construction works and activities in the vicinity of the site that would generate noise associated with the preparation for the commencement of work must only be carried out between the hours of:

- 7:00am and 6:00pm Mondays to Fridays.
- 8:00am and 1:00pm Saturdays.
- No work to be carried out on Sundays or public holidays.

Furthermore, noise and vibration emissions from equipment and associated site works must not result in damage or loss of amenity to nearby residents or businesses. All work must comply with *Australian Standard 2436-1981 'Guide to Noise Control on Construction, Maintenance and Demolition Sites'*.

The noise modelling in the original Environmental Assessment concluded that as a worst-case scenario, assuming all construction activities occur simultaneously and no control measures are in place, construction noise criteria are likely to be exceeded at residences within 700 metres in full view of the site during construction. The criteria was established using *Environmental Noise Control Manual* (DEC, 1994) and based on background noise levels plus 5dB(A). The closest receivers may receive up to 23 dB(A) above the criteria during the loudest periods of construction (being piling as well as excavation work for the fuel tanks). However, noise levels were expected to be substantially lower and within the criteria for a large proportion of the time.

Since the publication of the Environmental Assessment for the project application, the ENCM has been replaced by the *Interim Construction Noise Guideline* (ICNG) *(DECCW, 2009)*, which sets noise level objectives for construction (refer to **Table 13**). These objectives must be complied with where reasonably practicable. Where an exceedance of the guidelines is predicted the ICNG advises that the Proponent should apply all feasible and reasonable work practises to minimise the noise impact. Criteria for residential sensitive receivers are provided below.

When comparing the ICNG noise level objectives to the predicted worst-case scenario levels, residential sensitive receivers would be below the highly noise affected management level. Construction noise for the project, as modified, would remain above the noise affected management level, and as such, would continue to require the implementation of all feasible and reasonable work practices, and the preparation of the noise management plan.

Additionally, measures would be implemented to reduce construction noise such as:

- Restricting construction to periods specified previously.
- Maintaining construction equipment with particular regard to noise control components.
- Increasing efficiency, reduce number of machines operating simultaneously and choose construction equipment carefully.
- Keeping reverse alarms at lowest possible noise level consistent with safe working practice.
- Switching machines off when not required rather than leave idling.
- Fabricating components off-site to minimise work required on site.

Table 13 Noise level objectives for residential sensitive receivers (ICNG)

Time of Day	Management Level L_{Aeq} (15min)*	How to Apply
Recommended standard hours: Monday to Friday 7am to 6 pm Saturday 8 am to 1pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	• The noise affected management level represents the point above which there may be some community reaction to noise. • Where the predicted or measured $L_{Aeq\ (15\ min)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details
	Highly noise affected 75 dB(A)	• The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: o times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences o if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Operation

The project has approval to operate seven days a week, with certain activities limited to the daytime period only (refer to **Table 14**). Operational noise conditions were also imposed, and are provided in **Table 15**. As stated in Section 1, the project is not yet fully operational as approved, and not all the activities below are currently being undertaken at the site. The operational noise management controls and procedures have been included in the Operational Environmental Management Plan prepared for the site.

In August 2011 and April 2013, AECOM conducted noise compliance assessments for the site in accordance with the conditions of approval. The assessments demonstrated compliance with the operational noise conditions in **Table 15**.

Table 14 Hours of Operation (Condition A7)

Activity	Day	Time
Mixed marine tenancies and commercial storage and work sheds	Monday – Saturday Sunday and Public Holidays	7 am to 6pm 8 am to 6pm
All activities on hardstand / lay down areas e.g. power tools, travel lifts, roll on roll off ramp, cranes, forklifts		
Truck movements to and from the site		
General deliveries		
Disposal and collection of garbage, including cans and bottles from vessels		
Recreational vessel arrives, departures and mooring	Monday - Sunday	5 am to 10 pm
Recreational vessel refuelling and grey water and sewerage pump out		
Commercial vessel arrivals, departures and mooring	Monday - Sunday	Anytime
Commercial offices		
Office building mechanical services e.g. A/C plant, compressors for chiller room, etc.		

Table 15 Operational Noise Limits (Condition F1)

Residential Location	Day	Evening	Night		
	$L_{Aeq\ (15\ minute)}$ (dB(A))		$L_{Aeq\ (15\ minute)}$ (dB(A))	$L_{Aeq\ (9hrs)}$ (dB(A))	$L_{Aeq\ (1\ minute)}$ (dB(A))
1 Grafton Street, Balmain	54	48	48	45	59*
24 Datchett Street, Balmain	49	44	44	41	54*
33 Adolphus Street, Balmain	36	35	35	35	60
2 Point Street, Pyrmont	40	35	35	35	61

***** the sleep disturbance limits do not apply to trucks whilst engaged in movements on the access road to enter and leave the site.

General Activities

The noise impact assessment that supported the Environmental Assessment for the project assessed the operational noise impacts of the project. This included noise generated by truck, car and forklift movements and manoeuvring, movements of boats and barges, material handling impacts, electric power tools, high pressure water spray guns, refrigeration and air conditioning units, fuel, sewage and sullage pumps and travel lifts. The impact assessment was based on a worst-case scenario where there is some contribution from all likely noise sources within a 15-minute period. Further details of the types of approved activities, and the hours of operation are provided an attachment to Appendix E, which presents the noise assessment for the proposed modification.

During the worst case scenario, the noise impact assessment predicted an exceedance at the closest receiver during the daytime and evening period (up to 4dB(A)) without the implementation of noise mitigation measures. The noisiest activities were associated with truck movements, boat movements and the occasional water blasting. The assessment concluded that the average 15-minute noise levels in the absence of these sources would be at least 10 dB(A) lower than that predicted and below the applicable noise criteria. Whilst some 15 minute periods may include noise from a particular source for longer than the assumed duration, it is considered unlikely that all sources would occur simultaneously in the same period.

The Panel of Experts, convened for the original application, also considered noise from the site operations and concluded that the exceedances were marginal and could be managed. Limits to the hours of operation, as provided in **Table 15**, were also recommended by the Panel.

5.2.2 Construction

The Environmental Assessment assumed the concurrent construction of all components of the project, as approved, over a 40 week period and included piling activities. The modification would not result in changes to these predicted noise levels.

However, it is acknowledged that construction of the project has occurred in stages, and that the construction of the proposed modification could coincide with some operational activities. The extent of activities is not known at this point in time though a stagging report would be prepared prior to construction. Consequently, it is recommended that the Construction Noise and Vibration Environmental Management Plan is reviewed prior to commencement of construction to further identify any additional reasonable and feasible measures in addition to those outlined previously that would assist in reducing cumulative noise levels, based on the types of activities being undertaken.

5.2.3 Operation

The hours of operation would remain as set out in the approval for the project, with dry boat storage to be accessible between 7:00am and 6:00pm, Monday to Saturdays, and 8:00am to 6:00pm on Sundays. In the event that a boat returns to the site after 6:00pm, the boat would be moored and lifted out of the water and transferred to dry storage the following day during the normal hours of operation.

The proposed modification, in terms of additional significant noise sources, includes the operation of one additional forklift on site, for the purposes of what is referred to in the original assessment as ‘boat pre-commissioning and launching activities’. This involves the transport of boats to and from the boat storage facilities to the travel lift for launching and docking.

The additional forklift has been assessed with regards to noise to determine the impact on expected operational noise levels for the site (refer to Appendix E). The additional forklift would be operating with a sound power level of 94dB(A), for approximately 7.5 minutes in every 15 minute period . This takes into account the identification of the vessel, retrieval of the vessel and handover procedures with customers. The operation of this forklift would take place during the daytime period only, as per the original approval

The sound power level of the additional forklift has been based on near field noise measurements undertaken by AECOM of the current forklift on 23 March 2013 during a noise audit. As this sound power level is likely to be representative of the proposed forklift and is considered to be more accurate that assumed noise levels used in previous assessments for the site, it has been used for the purposes of this assessment. .

The modification also includes changes to the dimensions and number of buildings on the site, increasing from two buildings to four buildings on the existing site. The buildings would provide additional acoustic shielding for the closest residential receivers on Grafton Street from site activities. However, shielding has not been considered in the assessment, making it conservative.

Noise emissions from the typical daytime activities with the additional sound power level has been predicted at the nearest residential sensitive receiver at 1 Grafton Street, Balmain and are presented in **Table 16**. The calculation is conservative and does not include air absorption, ground absorption or any form of undulating terrain or shielding.

The contribution from the additional forklift is 13 dB below the total noise contribution from the site. This means that the total noise level would increase by a negligible amount.

The results show that compliance at the worst affected sensitive receiver is achieved during daytime operations with the inclusion of the additional forklift. Compliance at the worst affected receiver ensures compliance at all other sensitive receivers.

Table 16 Total predicted noise levels

Receiver location	Noise level, $L_{Aeq(15\ minutes)}$, dB(A)				Exceedance
	Daytime criterion	Previous predicted noise level	Predicted noise emissions from the additional forklift	Total predicted noise level	
1 Grafton Street, Balmain	54	54	41	54	-

In addition to this assessment, the additional forklift was added to the noise levels measured in the most recent noise audit, as reported in April 2013. This also found that the total site operations (as they current exist) would remain within the operational noise criteria. The full results of the noise assessment can be found in Appendix E.

As the assessment predicts no exceedance of the noise criteria, further specific mitigation strategies for the modification have not been identified. Nonetheless, mitigation measures as per the original approval would be implemented, and include optional 'quiet packages' which would be fitted to forklifts to muffle engine noise. Staff would be trained in quiet driving and unloading techniques, and the importance of noise management on site. The internal dry boat storage building would also provide some noise shielding of the forklift movements, when manoeuvring vessels at the dry boat storage areas.

5.3 Visual Amenity

5.3.1 Background

The visual context of the site has not changed since the submission of the original approval. The site is located in an industrial zone, with large built elements comprising most of the visual landscape in adjacent berths. The site is located near other major bays of inner Sydney Harbour including Cameron Cove to the north, Johnstons Bay to the south and Darling Harbour to the east.

In the original Environmental Assessment, key viewpoints into the site were identified using topographic maps, aerial photography and a series of site inspections. The location of the viewpoints included:

- Pyrmont Point Park, located directly south of the site on the opposite shore of Pyrmont, a distance of around 250m at its closest point.
- Anzac Bridge, approximately one kilometre south of the site, at the southern end of Johnstons Bay.
- Datchett Street in Balmain East, located approximately 150 m north-east of the site boundary.
- Millers Point, from the high-rise office buildings along Kent Street in the northern CBD.
- Grafton Street in Balmain adjacent to the nearest residences at the north-western corner of the site
- Ewenton Park in Balmain located directly north of the site.

The modification has been analysed based on these same locations.

5.3.2 Construction

Visual impacts during construction would be temporary and minor from all sensitive receivers. The visual impact from receivers, as assessed in the original environmental assessment, would be low to moderate. Construction works on the site are not likely to impede waterfront views from existing residential receivers. During construction, the following mitigation measures would minimise the visual impact of works undertaken:

- Minimising stockpiling of construction materials and parking of construction plant on site.
- Efficient construction program to minimise period of works.
- Covering any stockpiled materials.
- Keeping construction areas tidy.

5.3.3 Operation

Photomontage of the site from a number of key viewpoints, showing the existing site and the proposed site are provided in Appendix C. The proposed facilities and car park can be seen on the site.

It is acknowledged that the modified elements of the proposal would alter the visual detail of the site. However, the overall visual impact of the development from surrounding receivers would not be significantly altered for the following reasons:

- The modification includes built structures that are similar in form and scale to those originally approved. The internal boat storage facility would be housed in the structure originally approved as Building 2, the dimensions of which would be altered minimally. The addition of the two boat rack systems to be located between Buildings 1 and 2 would minimally alter the overall landscape character of the setting in which they would be located (taking into account the adjacent CPT facility and surrounding industrial context). It is therefore likely that the visual impact of these structures would be similar to what was to be expected under the original approval.
- The proposed Buildings 3A and 3B would be of smaller scale and located between Buildings 1 and 2, shielding them from the view lines of receivers.
- Views to the south across the site to the water from the closest residential viewpoint (being 1 Grafton Street, Balmain) are obstructed by gantries and other existing structures on the site at present (refer Figure 4). The dry boat storage facility would partially impede this southerly view from Grafton Street, however these views would also have been partially impeded by the approved Building 1 and Building 2. It should also be noted that the primary focus of views from Grafton Street residences is looking in an easterly direction to the water and CBD. These views would not be altered by the proposed modifications.
- Due to the distance between the site and several of the viewing locations (including Pyrmont Point Park, Miller Street, Datchett Street and Anzac Bridge), the modifications are not likely to negatively affect the visual impact of the site, as the site does not dominate views from these locations, and details of the site are not likely to be visible (refer to Figures 5, 6 and 7).
- The proposed demountable meet and greet area is of low profile, portable and non-permanent in nature.
- No significant additional lighting is proposed as part of the modification, other than navigational lights and low-lit lighting bollards on the floating pontoons for safety reasons. Additional lighting would be designed in accordance with Australian Standards (AS 4282-1997 Control of the Obstructive Effects of Outdoor Lighting).

Figure 4 View southeast into the site from Grafton Street, Balmain

Car parking

The *Sydney Harbour Foreshore Areas Development Control Plan* (DCP) encompasses guidelines for commercial marinas, including suggestions regarding preferred visual impact. The DCP states that 'the visual impact of car parking from the waterway is to be minimised'. The location of the primary car park proposed in this modification is in the south-eastern area of the site, which would be exposed and visible from the waterway. The location of the proposed overflow car park would also be exposed and visible from the waterway, and therefore not compliant with this DCP requirement.

The original approval included parking bays located in a similar position which were also visible from the waterway. This is a result of the characteristics of the site that the ability to minimise the visual impact of the car park at the site is restricted due to the lack of alternative locations on the site, and the need for the safest possible movement of vehicles around the facility.

During the design stage, options for car park locations were considered, with the only other viable space being the north east corner of the site. This alternative location was not considered viable as it would:

- Conflict with the movements at the wash down bay and travel lift.
- Conflict with the required turning circles for fuel delivery trucks.
- Have a greater visual impact for residences on Grafton Street, for whom the car park would be visible.

In its proposed location, the most likely receivers to view the overflow car park from the waterway or across the waterway from district viewing points. Any views from the harbour would be temporary, and views from land opposite the site (Pyrmont Point Park) would view the overflow car park in the broader context of its landscape setting, which consists of a highly modified industrial port environment, with minimal landscaping on the adjacent berths. In addition, the overflow car park would not be obstructing attractive natural features in the area, and would not dominate the view.

5.4 Water Quality

5.4.1 Background

The site drainage currently includes a roadside collection system along the northern boundary of the site which feeds into three concrete pipes which cross the site form north to south and are located under the hardstand areas. Surface water which falls onto hardstand areas drain into the stormwater intake pits that are equally spaces along the three drainage lines. The stormwater is then discharged along the southern boundary of the site into White Bay, which forms part of the Sydney Harbour and Parramatta River catchment.

The approved project separated the hardstand areas into zones that reflect specific operational activities. Stormwater would continue to be collected by the existing concrete pits, with a gross pollutant trap provided at each discharge point. Additional controls include bunding for the fuel storage area and spill kits to contain any spills before they enter the stormwater system, or the harbour.

A wash down bay has been constructed in association with the travel lift, which captures surface runoff from this area. Captured water settles in the 32,000 L settlement tank for eventual disposal to the sewer. The trade waste agreement currently covers the sewerage, grey water and sullage. A new agreement is currently being processed to cover the boat works area.

5.4.2 Construction

The construction of the building for the internal boat storage facility, car park, meet and greet area and floating pontoons, is not expected to introduce additional impacts to those assessed in the environmental assessment for the project application.

As identified in the environmental assessment, there is potential for increased sediment yield in runoff during excavation and earthworks for the construction of the building footings, particularly as the Gymea soil landscape in the area is subject to high erosion potential; as well as during piling works for the floating pontoons. Based on the experience from previous on-water piling activities undertaken at White Bay 6, sediment generated by this activity would be minimal and would be contained at depth. These works would not create additional impacts to the water quality of the site or harbour. With appropriate mitigation measures, such as the Soil and Water Management Plan to be implemented, the potential for water quality contamination would be low.

5.4.3 Operation

The operation of the internal and external storage facilities and associated activities, such as clients using the on-site car park, pose potential water quality impacts at the site, if not managed appropriately. However, these impacts would not be in addition to those assessed in the original environmental assessment for the development.

The water used for washdown of vessels after use, and prior to returning them to their storage location, would be in part sourced through the collection of rainwater from the boat storage buildings, and would not pose water quality issues due to the provision of the wash down bay, which has sufficient capacity to accommodate the washdown requirements of the additional boats to be stored on site as a result of this modification. The water from

the washdown bay would drain to a 32,000 L tank for treatment prior to disposal or re-use. The water would drain as per the original Environmental Assessment, through the clean hardstand area drainage method, transferring the water through one of the three 600 mm stormwater pipes, with gross pollutant traps to contain larger pollutants. The car parks would be managed in the same way, as per the original application.

5.5 Waste Management

5.5.1 Background

Construction wastes associated with the original development included:

- Excavated material.
- Construction waste including metal, concrete, timber, sand, soil and asphalt.
- Green waste including cleared vegetation and topsoil, including weeds.
- General domestic waste (paper, plastic and glass bottles) and sewage associated with site offices and compounds.
- Liquid waste – waste oils and liquids from maintenance of construction plant and equipment.

Operational wastes from the project, as approved, comprise of:

- Effluent/sullage waste (Sydney Water trade waste licence), which would be pumped to the existing sewer main located adjacent to the existing toilet block from vessels (up to 2,000L per day).
- Maintenance and servicing waste oil (up to 1,000L per month).
- Oil filters and rags from maintenance and servicing, to be collected once a month.
- General wastes (including food waste, glass, plastics and paper) from 30 full time employees.
- Small quantities of green wastes from grounds maintenance, which would typically remain on site.

The marine fuel supply facility provides waste disposal facilities for vessels and other marine users. A licensed waste disposal contractor has been engaged to collect for eventual treatment and/or disposal.

A trade waste agreement has been entered into with Sydney Water for the disposal of effluent, grey water and sullage. The site also has a dedicated waste area, which is bunded.

5.5.2 Construction

The proposed modification is not expected to significantly alter the types or volumes of waste that were considered in the original environmental assessment for the project. The original Environmental Assessment included the construction of Building 1, which would not proceed until such time as it is deemed to be required. The construction of the boat storage racks, including additional Buildings 3A and 3B, would not produce as much excavated material waste, as the racks would be delivered to site pre-fabricated, with minimal groundwork for footings required.

Construction waste would be managed in accordance with a Construction Environmental Management Plan, which would include measures to minimise, reuse and recycle.

5.5.3 Operation

The operation of the internal and external boat storage facilities would create minor additional waste-related impacts, to those assessed under the original application. Staff numbers would be reduced to 15 employees, which would decrease general domestic waste on site. However, there is the potential for more general domestic waste to be generated by increased customers using the site.

This waste would be managed as per the mitigation measures outlined in the original environmental assessment, under the existing Waste Management Plan for the operation of the facility. This would include dedicated waste collection bins, for removal by a licensed waste disposal contractor (Transpacific Industries). The volume of waste created by customers is not expected to necessitate more frequent waste collection. However, in the event that the estimated 2,000 L per day is exceeded, the Trade Waste Agreement would be modified.

5.6 Energy and Water Consumption

The energy consumption of the site is not likely to be significantly changed as a result of the modification.

The water requirements for the site would slightly increase due to the increased use of the washdown bay, due to additional vehicles moored and docked via the marina. This volume increase is not likely to be significant as a portion of the water is to be sourced from the collection of rainwater from the constructed buildings.

Please refer to the Green Ports checklist (refer Appendix D) for additional information regarding site sustainability.

5.7 Safety and Risk

5.7.1 Fire Safety

A Fire Safety Study (FSS) was completed prior to the construction of Stage 1 of the project as a requirement of the Minister's project approval. The FSS identified three key incidents that would have potential to impact offsite or result in excessive heat radiation impact at fire fighting equipment (that is, making equipment inaccessible during the fire events). These were carried forward for further analysis. These incidents were associated with refuelling activities at the site, specifically:

- A fuel spill during transfer of fuel from delivery tankers to storage tanks, ignition of the spill and a full containment bund fire at the fuel transfer point.
- A fuel spill into the pump bund as a result of pump seal failure, ignition of the spill and a full transfer pump bund fire.
- A fuel dispensing spill resulting in release to the harbour, ignition and pool fire on the harbour.

A recommendation of the FSS included the installation of additional fire hydrants to ensure a hydrant is no further than 70 metres from a potential fire (being 60 metres for hoses and 10 metres for a water jet). This was required to comply with Australian Standard AS 2419 - Fire Hydrant Installation. The locations of the fire hydrants installed at the site are shown in Figure 1. The proposed modification does not alter the location of these hydrants or add additional refuelling locations or pumps as current hydrant provisions on site adequately cater for proposed changes under this modification.

With the changes proposed under the modification, the safety of the site would not be implicated. The risk of an incident occurring would increase due to additional vehicles (and subsequently, additional fuel in vehicles) being stored on site, and an increase in the frequency of refuelling. However, this increase in risk would be facilitated under the site Operational Environmental Management Plan (OEMP) which would encompass OHS requirements for the safe conduct of site activities and staff behaviour during operation. Additionally, based on a preliminary review of the fire hydrant reach, the combined 70 metre reach of the existing hydrants would encompass the entirety of the site. In order to ensure the reach would extend beyond the car park onto the water, an additional fire hydrant would be provided on the southern side of Building 1. The FSS would be reviewed and need for the additional infrastructure (including water pressure requirements) would be confirmed prior to the commencement of construction.

The location of the overflow car park would not pose safety issues for the site. The space between the car parking and other infrastructure is adequate to allow space for a fire engine to pass through in case of emergency.

The proposed buildings would be designed and provided with fire fighting equipment in order to meet the relevant Australian Standards and the Building Code of Australia Standards. The floating pontoons would also be equipped with appropriate fire fighting equipment such as fire hose reels.

5.7.2 Dry Boat Storage Facilities

The operation of the boat storage facilities would not pose risks to the safety of staff on site, in addition to those common site safety issues already acknowledged in the original application.

An Operational Environmental Management Plan has been prepared for the operation of the site, which would be updated with details of all safety requirements of staff and site managers to minimise risk during operation of the boat storage facilities and vessel transport vehicles on site. Engineering loadings for the stacks would also be complied with, while commitments and guidelines for customers and the role of the 24hr hour seven days per week occupation of the caretakers' residence would be specified.

5.7.3 Green Ports checklist

The Green Ports checklist is provided in Appendix D.

6.0 Conclusions

The modification would provide an essential supply of dry boat storage to a high demand region, particularly considering expected future growth of the Sydney Harbour boating community. The introduction of dry boat storage to the site would complement the re-fuelling, anti-fouling, and boat maintenance and repair activities approved at the site, and would enable the diversification of activities on the site to ensure the viability of site operations within the current economic climate. The modification request seeks to:

- Alter the footprint and intended use of Building 1 to allow dry boat storage with offices, workshops, a showroom and caretakers' accommodation at the eastern end.
- Alter the footprint and intended use of Building 2 for dry boat storage with offices, workshops and a showroom at the eastern end.
- Include two new buildings (Buildings 3A and 3B) between Building 1 and 2 with an intended purpose of dry boat storage. Building 3B would also include offices, workshops and a showroom at the eastern end.
- Alter and augment the location of car park facility from the location in the northern section of the site. The modified car parking would be in two locations, with primary parking along the northern edge of the site and overflow or peak parking in the area immediately adjacent to the refuelling area on the eastern boundary of the site.
- Increase the number of car parking spaces from 30 to 68, with approximately 10 additional spaces for motorcycle parking.
- Establish new floating pontoons adjacent to the travel lift, for the purpose of providing a temporary tie-up area for launched boats and those waiting to be retrieved.
- Establish a 'meet and greet' area in the north-eastern corner of the site, for the purposes of providing offices, facilities and a waiting area for clients utilising the boat launching facilities on site.

The impacts likely to arise as a result of the development include additional traffic generated by customers utilising dry boat storage facilities and changes to visual detail of the site due to modified elements. These and all other impacts are anticipated to be minor in nature, and are not anticipated to change significantly to those outlined in the original environmental assessment and later documents.

7.0 References

Department of Planning, 2005, *Sydney Harbour Foreshores and Waterways – Development Control Plan*, Sydney.

JBA Planning, 2010, *Environmental Assessment Report – White Bay Cruise Passenger Terminal*, Sydney.

KBR, 2006, *White Bay Berth 6 Proposed Marine Supply Facility – Environmental Assessment*, Sydney.

KBR, 2007, *White Bay Berth 6 Proposed Marine Supply Facility – Preferred Project Report*, Sydney.

KBR, 2007, *White Bay Berth 6 Proposed Marine Supply Facility – Additional Noise Information for Panel of Experts*, Sydney.

NSW Maritime, 2010, *NSW Boat Ownership and Storage: Growth Forecasts to 2026*, Sydney.

RTA, 2002, *Guide to Traffic Generating Developments*, Sydney.

Sydney Ports, 2000, *Glebe Island and White Bay Master Plan*, Sydney.

Sydney Ports Corporation, 2013, *Cruise Schedule April 2013 – November 2020*, Sydney.

Transport for NSW, 2012, *Maritime Policy Agenda*, Sydney.

Transport for NSW, 2013, *Draft Sydney Harbour Boat Storage Strategy*, Sydney.

Appendix A

NSW Boat Ownership and Storage: Growth Forecasts to 2026, Sydney (NSW Maritime, 2010) and the draft Sydney Habour Boat Storage Strategy (TfNSW, 2013)

NSW GOVERNMENT | Maritime

NSW BOAT OWNERSHIP AND STORAGE: GROWTH FORECASTS TO 2026

JULY 2010

Contents

1. Executive Summary

In 2009, partially in response to requests for data from industry, NSW Maritime undertook a study to project boat ownership and storage in this State to 2026. Apart from providing data to boating peak bodies, the intention was also to develop reliable projections to inform planning discussions at all levels of government.

Recreational boating – on which this report focuses – is an important leisure activity for the people of NSW. In July 2009 New South Wales had over 215,000 recreational vessels registered across 7 regions with another 7483 registered to interstate and overseas owners. Busy waterways host a huge variety of vessels from yachts to pleasure cruisers, recreational fishing boats, sailing skiffs, kayaks and dinghies. The first part of the report looks at the patterns of growth in recreational vessels over the period 1999 to 2009, regional differences in that growth, trends in the size of vessels registered and the different needs for storage. It also examines storage capacity and demand both on-water (for vessels over 6m) and off-water (for smaller 'trailerable' vessels).

The report acknowledges that there are a number of factors that may impact on the growth of boat numbers in NSW, with the potential extent of their impact largely unknown. These include economic growth (especially in regions), movements in population (particularly to the coast), age distribution and tourism. In addition the report mentions the effects of sea level rise associated with climate change from the point of view of the increase in extreme sea level events such as storm surges.

The report uses two methods to forecast growth. The first is linear projection and estimates the number of recreational boats each year up to 2026 based on the average compounded annual growth rate (2.9%) experienced across the State in the period 1999–2009. This projection method estimates that in 2026 the number of registered boats in NSW will have grown to 351,113. The second method is based on the proportion of the population who are boat owners and population forecasts to 2026 from the Australian Bureau of Statistics (ABS). Using that method, it is estimated there will be 334,470 recreational boats registered in NSW in 2026.

Either way, we face a significant boat storage challenge, and there is room for optimism in the boat storage sector of industry.

Further analysis estimates the numbers of large and small boats, region by region, to 2026. This will allow for a better understanding of regional demand for on-water or off-water storage and allow planning for upgrading of recreational boating facilities such as boat ramps. Finally, the report discusses the implications of this assessment of increases in boat numbers and storage demand on NSW Maritime strategic planning including potential reexamination of policies relating to moorings and marinas and the funding of recreational boating infrastructure across NSW.

1. National Marine Safety Committee (2003), National standard for the Australian builders plate for recreational boats. Final regulatory impact statement, NMSC, Sydney.
2. Follow-up study of hospital treated recreational boating injury – the long term effects of industry. Marine Safety Victoria May 2008.

2. Introduction

NSW Maritime has undertaken this report to provide information to stakeholders about trends and patterns in boat ownership and storage. The report has been long sought by industry for its own information and to assist future land use planning and decision making. Given up-to-date information, land use studies can take account of growing community demand for boats and boat storage in their considerations. This will assist in providing recognition for the important part recreational and commercial boating plays in the life of the State. The purpose of this report is in part to remedy the lack of readily available data, to show what information is available, and where and what it suggests. The report aims to quantify accurately the number and types of vessels currently owned and stored in the State and to provide an insight into indicative future needs in boat ownership and storage demand based on past trends. This will facilitate more informed decision making by government at all levels and assist the private sector – both developers and the boating industry.

The report provides a clear picture of the types and quantity of vessels owned and stored in NSW and uses this data to suggest trends in boat storage demand. The report supersedes the *2004 Boat Storage Policy for Sydney Harbour* and identifies future trends in ownership and the demands on storage capacity in NSW up to 2026.[1] The report does not attempt to dictate when, where or what storage infrastructure is required, what planning controls are needed or the strategy necessary to accommodate growth. It is a source of data to provide an informed basis for this planning.

For convenience, the report assesses boat storage and ownership across all of New South Wales using NSW Maritime's regional administrative areas (which largely reflect groupings of local council areas) shown on the following map[2]:

- North Coast
- Hunter Inland
- Hawkesbury/Broken Bay (including Pittwater)
- Sydney (divided into Sydney Harbour and Botany Bay/Port Hacking
- South Coast
- Murray Inland (identified as Murray Inland).

The data can, of course, be readily organised by other geographic areas to suit industry or Government needs.

Figure 1: Map showing NSW Maritime Regions

1 June 2004, *Boat Storage Policy for Sydney Harbour*, prepared by NSW Department of Infrastructure, Planning and Natural Resources and the Waterways Authority (now NSW Maritime).

2 In addition to regional analysis, the Boat Ownership and Storage Report also looks at ownership on a postcode basis for all of NSW.

Data

NSW Maritime's licensing and registration system holds a wide variety of current and historical data for the agency's central business functions including vessel registrations and private and commercial mooring licences. The report examined data on registrations between 1 July 1999 and 1 July 2009 allowing a sufficiently large sample to identify trends. In addition, because the storage needs of vessels change as vessels get larger, growth in vessel size has been examined to inform an understanding of developing storage needs. Likewise, the type of propulsion also affects a boat's storage profile; so the changing balance in ownership between powered and sail propelled vessels is also considered.

NSW Maritime does not require registered owners to indicate where a vessel is actually stored. Boat owners indicate their *intended* storage method when the vessel is first registered but there is no legal requirement to update this information as things change. In this respect therefore, the data should be treated with caution, as an indication only of an owner's storage intentions. The database also contains details of some (but not all) vessels used in NSW but registered in another jurisdiction.

Storage types differ in terms of their efficiency of waterway use, cost, environmental impacts and size and the examination of storage distribution shows differing levels of capacity and demand between the NSW Maritime regions. Forecasting regional storage needs is also related to population and socio/economic factors by region; these factors are used to forecast expected trends in vessel numbers by region.

Geographical references are on a NSW, regional and postcode basis.[3] Vessels registered with NSW Maritime include the postal address and postcode of the boat's owner. Because postcode boundaries change, postcodes for historical data relate to the boundaries of the code at the point of registration, not the current code for that area. In comparisons of recent and historical boat ownership, postcodes have been reconciled to place the location of the vessels in the postcode in place at the time of the most recent data sample.[4]

3 The Australian Bureau of Statistics (ABS) Census records Postal Areas not Postal Codes. A Postal Area is used where a Collection District (the smallest sample of Census data collection) is bisected by a Postal Code boundary.

4 Where this reconciliation has not been possible (such as an address in another jurisdiction or a Post Office Box address) the data has been excluded from the examination and clearly noted or included under the regional category of 'NSW Other'.

3. Boat ownership in NSW

Legislation administered by NSW Maritime requires that the following vessels must be registered when they are on navigable waters in NSW:

- commercial vessels
- power-driven vessels that are powered by an engine with a power rating of 4.0 kilowatts or more (greater than 5hp)
- power-driven or sailing vessels 5.5 metres or longer
- vessels subject to a mooring licence
- personal watercraft.[5]

At 1 July 2009 there were around 229,000 registered vessels, including over 223,000 recreational craft (97%) and 5,510 that are commercially registered (used for hire and reward).[6] There are also a large number of unregistered vessels, such as dinghies and similar small boats. This report is only concerned with registered vessels.

The types of boats operated in NSW waterways vary in size and complexity from small 'tinnies' to commercial charter vessels, sailing race boats and private super yachts. NSW Maritime collects data on vessel size, method of propulsion, material composition and intended usage. Most important to this report is vessel length, means of propulsion (powered craft or sailing vessel) and proximity to the water.

The number of boats registered in NSW has grown on average around 2.8% annually in the last decade, expanding more rapidly than the State's population and across every major vessel category. The table below gives a picture of boat ownership in NSW at 1 July 2009 with data broken down by region and into aggregated size categories. The table also shows the split between boats smaller and larger than 6m (considered the divide between on-water and off-water storage)[7]:

Figure 2: Recreational and commercial vessels registered in NSW 1 July 2009[8]

Region	Under 4m	4 to 6m	6 to 8m	8 to 10m	10 to 12m	12 to 14m	14m & Over	Total
Botany Bay/ Port Hacking	6 440	13 661	2 518	735	545	264	219	24 382
Hawkesbury/ Broken Bay	10 352	25 198	5 002	1 844	1 313	618	406	44 733
Interstate/ Overseas	2 116	4 040	630	234	192	231	345	7 788
Murray Inland	7 148	6 846	643	47	32	48	109	14 873
Hunter Inland	16 353	30 709	4 054	1 267	777	342	203	53 705
North Coast	12 650	15 959	1 605	394	349	196	176	31 329
NSW Other	89	172	33	11	11	4	6	326
South Coast	9 502	19 604	2 303	414	301	130	125	32 379
Sydney Harbour	3 534	7 459	3 142	2 019	1 467	704	803	19 128
NSW Total	68 184	123 648	19 930	6 965	4 987	2 537	2 392	228 643
% of NSW Total	30%	54%	9%	3%	2%	1%	1%	

5 Exemptions from this requirement include:
- off-the beach vessels unless subject to a mooring licence or similar authority (including marina wet berths and wetland lease);
- passive craft;
- seaplanes;
- vessels in charge of a trader being used for a specified commercial purpose of the vessel or of a trade article and displaying a trade plate; and
- visiting vessels in prescribed circumstances

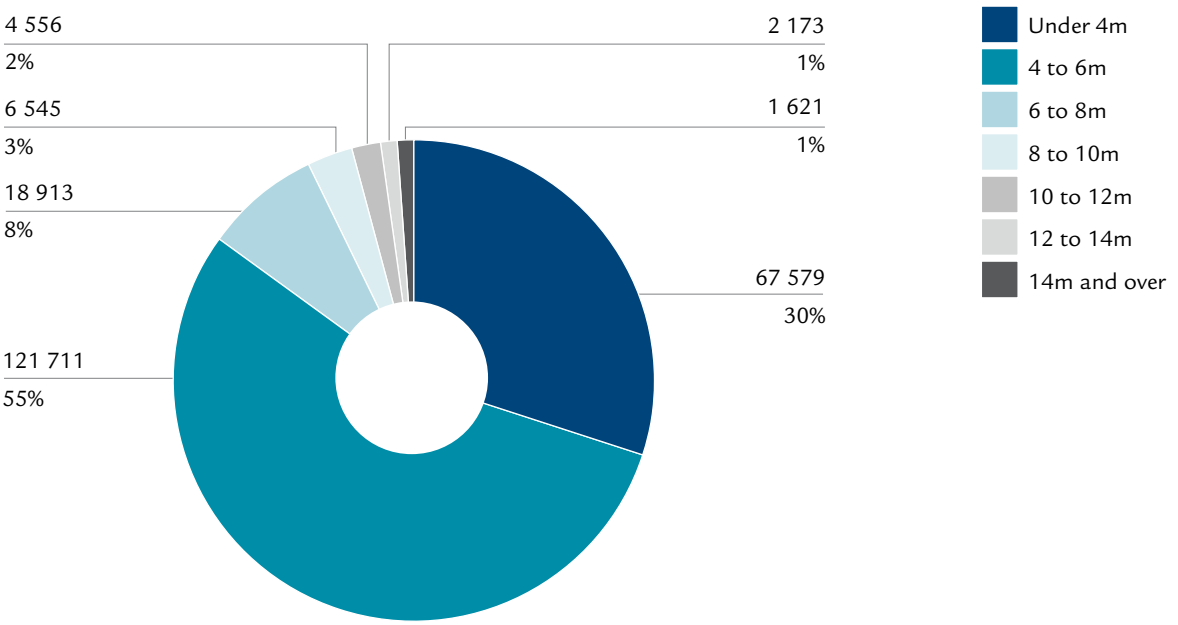
6 Figures for 1 July 2009 are the latest available. In 2010, NSW Maritime's registration and licensing database will be decommissioned and replaced by the Government Licensing System run by the Department of Services, Technology and Administration so more current data will not be available until 2011.

7 The regions depicted in the table below are based on the NSW Maritime regional administrative areas and represent the area in to which the address of the boats registered owner falls.

8 Tables showing regional breakdowns of recreational and commercial vessels are at Appendix A.

Another way of representing this data is in the following pie chart:

Figure 3: Registered vessels in each size category at 1 July 2009



As indicated in Figure 2, the regions Hawkesbury/Broken Bay and Hunter Inland have the largest number of boats. It is important to consider, however, that Sydney Harbour and Botany Bay/Port Hacking (when joined to become the Sydney region) represent a more compact area with a more densely concentrated boat owning community. Moreover, the Sydney Harbour region has a far greater proportion of large vessels than other regions. In addition, as outlined at Figure 4, while Sydney Harbour has only 8% (18,011) of the State's recreational vessels, it has 20% of its commercial boats.

Figure 4: Distribution of recreational and commercial vessels by region

Region	% of Total Recreational	% of Total Commercial
Botany Bay/Port Hacking	11%	7%
Hawkesbury/Broken Bay	20%	14%
Interstate/Overseas	3%	6%
Murray Inland	7%	3%
Hunter Inland	24%	15%
North Coast	13%	23%
NSW Other	0%	1%
South Coast	14%	12%
Sydney Harbour	8%	20%
NSW Total	223 098	5 510
% of NSW Total	97.6%	2.4%

Because of the small number of commercial vessels and their erratic growth rate in recent years, this report concentrates in its treatment on recreational boats only.

4. Types of boat storage

On-water

Private moorings

A mooring is a fixed point in the water to which a vessel can be tied when not in use. Swing moorings usually consist of a submerged concrete block, chain and buoy, but could be any fixed point in the water. A moored vessel is usually free to move around the fixed point and a mooring does not provide land or walkway access to the craft. NSW Maritime issues Private Mooring Licences (PML) which permits licensees to moor their vessels on navigable waters. Although a PML is renewable annually, it is not a lease of the seabed and there is no guarantee of tenure. There are around 15,800 private moorings in NSW. Waiting lists exist for private moorings in some locations while spare capacity is available in others

Figure 5: Bridle and beehive mooring

Commercial moorings

NSW Maritime also issues Commercial Mooring Licenses (CML) which are similar to PMLs but are issued to business entities trading to provide services to the boating public. CMLS are issued to bona fide marine businesses (for example, a boat repair facility). One licence may comprise a number of mooring sites. There are around 4,900 commercial mooring sites in NSW. Vessels on moorings are normally restricted to those greater than 5.2m in length (i.e. non-trailerable) and smaller vessels which must be stored in the water (e.g. timber vessels).

Club moorings

There are hundreds of moorings associated with boating and sailing clubs in NSW.

Commercial marinas

A marina is a boat storage facility consisting of jetties, pontoons, slipways, boatlifts and boat pens allowing walkway access to berthed vessels. Marinas are sometimes commercial operations although many are private marinas and those associated with boat clubs. A marina will often provide related services such as fuelling and pump out facilities.

Commercial marinas are defined in the Sydney Harbour Regional Environmental Plan (2005) as a permanent boat storage facility (whether located wholly on land, wholly on water or partly on land and partly on water) including:

(a) any facility for the construction, repair, maintenance, storage, sale or hire of boats

(b) any facility for providing fuelling, sewage pump-out or other services for boats

(c) any facility for launching or landing boats, such as slipways or hoists

(d) any associated car parking, commercial, tourist or recreational or club facility that is ancillary to a boat storage facility

(e) any associated single mooring.

Figure 6: Marina

Private marinas

A private marina is an apparatus or structure located on or in the waterway, used for restraining two or more vessels, which is not available for public use. Like their commercial counterparts, private marinas consist of jetties, pontoons and boat pens allowing walkway access to berthed vessels, but they do not normally have maritime support services attached to them. They are often associated with strata-titled private residences and are for their exclusive use.

Domestic waterfront tenancies

Private boating facilities sometimes front residential waterfront properties. They provide infrastructure such as jetties, ramps, pontoons, slipways, steps, landing platforms and boatsheds for the use of the property to which they are attached. Private facilities can include mooring pens which are an arrangement of freestanding piles or other devices within which a vessel is berthed.

Other facilities

For the purpose of this report other facilities include:

- Sailing clubs
- Temporary marinas
- Charter vessel facilities
- Government facilities such as NSW Police Marine Area Command stations.

Off-water

Commercial dry stack storage

With dry stack storage, boats are removed from the water (usually using forklift trucks) and stored in multilevel covered stacks. There are advantages to having boats stored out of water:

- Less fouling of waterways
- Reduced risk of damage
- Opportunities for vessel cleaning, refueling and maintenance.

Not all vessels – because of their size and shape – are suitable for commercial dry stack storage. There is one commercial dry stack facility in NSW at Akuna Bay on the Hawkesbury River/Broken Bay waterway. It has 175 storage berths. There is also planning approval for 600 dry storage berths at Rozelle on Sydney Harbour.

Figure 7: dry stack storage facility

Trailer storage

In July 2009, there were over 195,000 boat trailers registered with the Roads and Traffic Authority of NSW (RTA) making this the most popular method of vessel storage. At the waterside a vessel is transferred to and from the water using a boat ramp or similar facility (there are around 625 boat ramps in NSW). Because around 84% (191,832) of registered vessels were 6 metres or less in length, craft of this size are generally stored on trailers and transported to the waterway for launching.

Trailer storage is generally the least expensive storage option. Trailers, being dry storage, also avoid various fouling and corrosion problems connected with prolonged on-water storage. Some marine clubs offer 'hard stand' storage for members' boats: vessels are removed from the water and on to trailers which are permanently stored in parking lots near the water. Trailer storage has some disadvantages, however, including the need to transfer the vessel to the water and to load and unload it. Traffic and parking near boat ramps can inconvenience both boat owners and local residents. Another constraint is the limits the RTA imposes on trailer width: vehicles wider than 2.5 meters must apply for a special oversize permit to travel on NSW roads.[9] In addition, oversize permits are usually accompanied by travel restrictions.

Use of trailer storage is influenced by factors such as vessel size and style: sailing boats, for instance, which have keels and masts, are cumbersome to manage on trailers. The development of retractable keels and removable masts has facilitated trailer storage but adds to the work required each time the vessel is used.

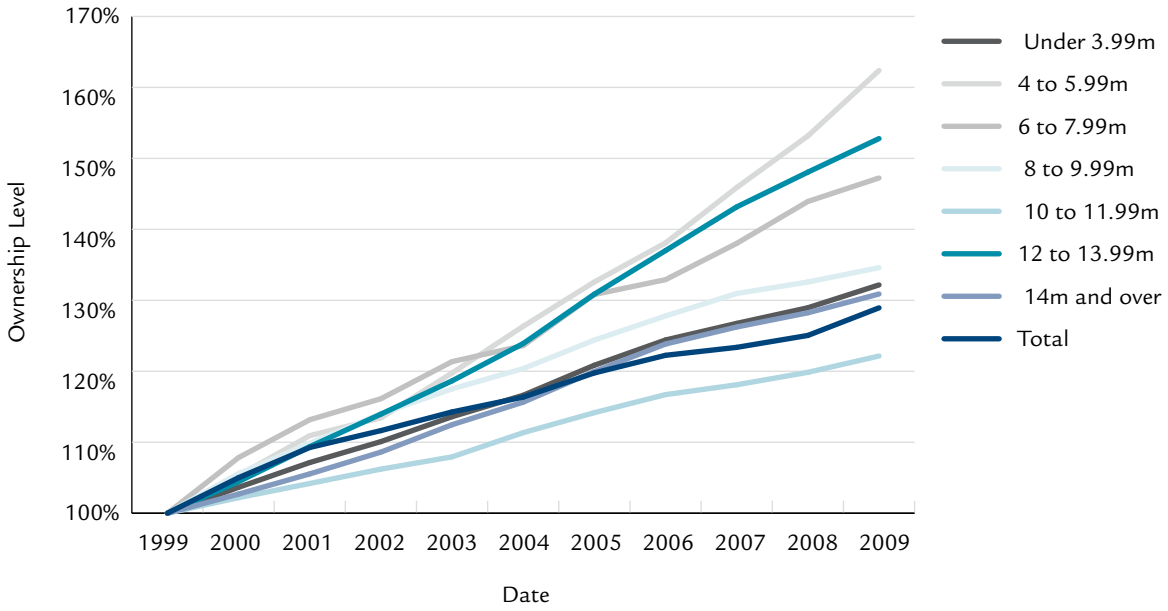
Likewise, there is a limit to the size of vessels which can be stored and transported on trailers. Beyond 5–7 metres, the costs of trailer storage increase rapidly along with technical complexity and cost of the vehicle and trailer required for transport. For the purpose of this report, 6 metres has been adopted as the maximum 'trailerable' limit for a vessel and assumes that vessels up to 6 metres in length are overwhelmingly stored on trailers and those of 6 metres and above require on-water storage, or off-water storage close to the waterway. Importantly, NSW Maritime data shows vessels less than 6 metres in length accounted for 84% (191,832) of registered boats at 1 July 2009.

9 See Vehicle Dimension Limits, 19 May 2010 at http://whome.rta.nsw.gov.au/registration/downloads/vsi/vsi_5_-_vehicle_dimension_limits_19_may_2010.pdf

5. Changes in boat ownership

Between 1 July 1999 and 1 July 2009, 55,645 more boats were registered in NSW. There have also been changes in the proportion of boats at different sizes.

Figure 8: Growth in boat sizes 1999–2009



Most significant growth appears to have occurred in small to medium size vessels.[10] In addition, the number of vessels in the 14m and over category has also seen a large relative increase over the past decade (although total numbers are small) with a 63% increase from 1,473 to 2,392.

10 See table at Appendix B.

6. The 6 metre mark

The principal factor in forecasting boat storage demand is the relationship between 'trailerable' and 'non-trailerable' vessel numbers. This is because, as we have seen, boats longer than 6m require on-water storage and an increase in numbers requires more water-based storage infrastructure. On the other hand, an increase in smaller boats requires access to other forms of boating infrastructure such as boat ramps and trailer parks.

Since 1999 there has been a trend towards registration of boats in the over 6m group: the proportion of the fleet over 6m has grown from 14.8% in 1999 (25,647 boats) to 16.1% in 2009 (or 36,811). This represents an additional 11,164 vessels in 10 years. However, this increase should be set against an increase in total boat numbers of 55,109 and a growth in boats less than 6m of 43,992. The growth in boats less than 6m has been at a ratio of 4:1 when compared with the 6m and over category. The table below shows the comparative growth in smaller and larger vessels, of all usage types, between 1999 and 2009 split regionally and shown with the related annual growth figure.

Figure 9: Distribution and growth in vessel size 1999–2009

	1/07/1999		1/07/2009		Average Annual Growth	
Region	6m and over	6m and under	6m and over	6m and under	6m and over	6m and under
Botany Bay/Port Hacking	3 202	17 865	4 281	20 101	2.9%	1.2%
Hawkesbury/Broken Bay	6 661	30 308	9 183	35 550	3.3%	1.6%
Murray Inland	318	9 957	879	13 994	10.7%	3.5%
Hunter Inland	4 070	34 468	6 643	47 062	5.0%	3.2%
North Coast	1 824	19 086	2 720	28 609	4.1%	4.1%
South Coast	1 859	20 386	3 273	29 106	5.8%	3.6%
Sydney Harbour	6 653	9 938	8 135	10 993	2.0%	1.0%
	25 647	147 351	36 811	191 832		

Every region except the North Coast has experienced higher than average growth in vessels over 6m. The statistics, however, mask growth in real terms. For example, Hunter Inland has experienced a growth of 2,573 vessels over 6m, an annual growth of 5.0% compared with average annual growth of 3.2% in vessels less than 6m long. However, this 3.2% average annual growth rate represents 12,594 – or nearly 5 times as many – boats over 10 years. Given that the provision of storage and the demand for infrastructure relate to actual numbers rather than proportions, it is important not to overstate the significance of a slight proportional shift towards larger vessels. Accordingly, analysis of change over the 10 year assessment period suggests a greater focus on smaller vessels.

Boats less than 6m are included in the appraisal of storage needs because, while they do not require a mooring or marina berth, smaller boats still require storage whether in a backyard, a driveway or often on a public road. They also require infrastructure such as boat ramps and trailer parking. Consequently, the increase in the number of <6m boats has a significant impact on overall boat storage. Stakeholder consultation indicated that some local government bodies were becoming concerned about the number of boats parked on local roads. In order to park legally, boat trailers need current vehicle registration in order to avoid action being taken against them.

7. Power vs. sail

As indicated previously, the type of propulsion used on a vessel affects its storage needs. Sail boats with fixed keels can be awkward to store on trailers and masts represent problems for dry stack storage. In addition, the fact that the majority of sail boats required to be registered are over 6m long, means it is reasonable to conclude that nearly all sailing vessels represented in NSW Maritime data require on-water storage.

The division between power and sail is therefore important when considering future trends in boat storage needs. Figure 10 below shows the increase in the numbers of power and sail boats registered in NSW between 1999 and 2009.[11]

Figure 10: Number of power and sail boats registered 1999 and 2009

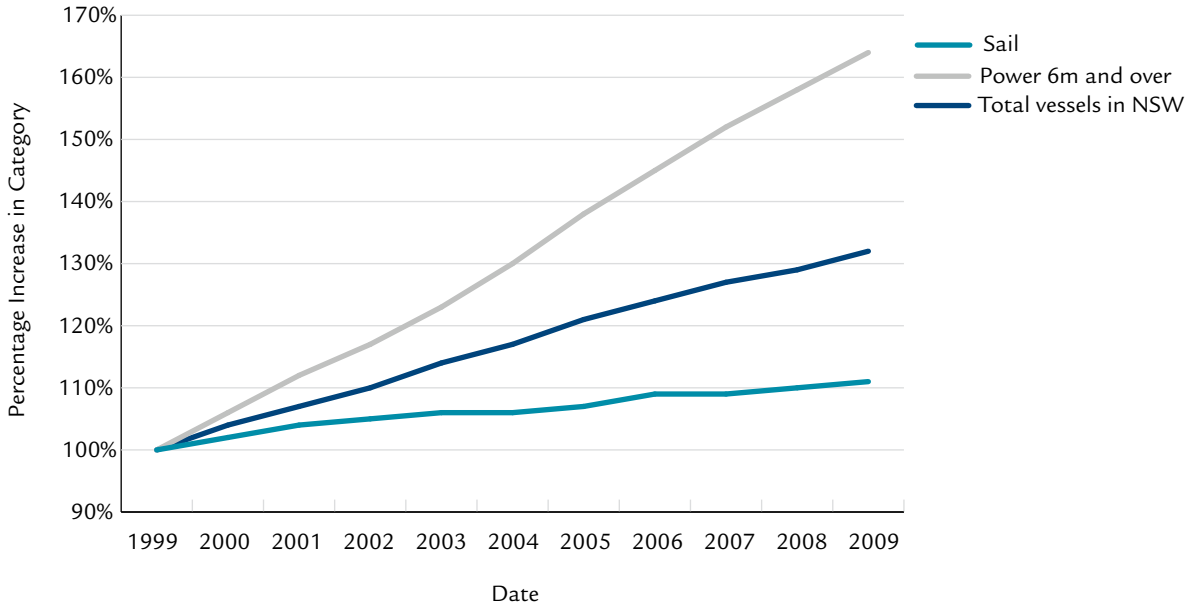
Propulsion Type	Mechanical		Sail	
Date	Under 6m	Over 6m	All	Total
1/07/1999	139 275	15 598	10 776	172 998
1/07/2009	183 326	25 566	11 917	228 643

There are considerably more mechanically powered boats than sail boats registered in NSW and there is a strong trend towards powered boats over time. Mechanically propelled boats of less than 6 metres in length dominate registrations at about 84% of total registered vessels. Because storing small powered boats in a marina berth or mooring would be very expensive, it is reasonable to assume that few of these <6 metre mechanically-propelled vessels are stored on-water.

Among boats over 6m, powered boats outnumber sail by a ratio that has risen from about 1.5:1 in 1999 to about 2.2:1 in 2009. This indicates the growing popularity of powered boating with the growth in powered boats outstripping the growth in recreational boats generally.[12]

The graph following (Figure 11) provides a clear indication of the trends in size and propulsion over time, showing the percentage growth of each category from 1 July 1999 plotted against the total growth in registered vessels over the same period:

Figure 11: Trends of growth between mechanically propelled boats over 6m and sailing vessels



Nevertheless, it is important to remember that sailing vessels and mechanically propelled vessels >6m represented only 16.4% of registered boats in NSW at 1 July 2009.

11 Mechanically propelled vessels have been divided into more or less than 6m with larger power boats, like sail, requiring on-water storage.
12 See table at Appendix C for more information.

8. Regional boat ownership

There are different patterns of boat ownership and storage across NSW and these require closer analysis for planning purposes.

Figure 12: Percentage growth in boat registrations by region 1999–2009

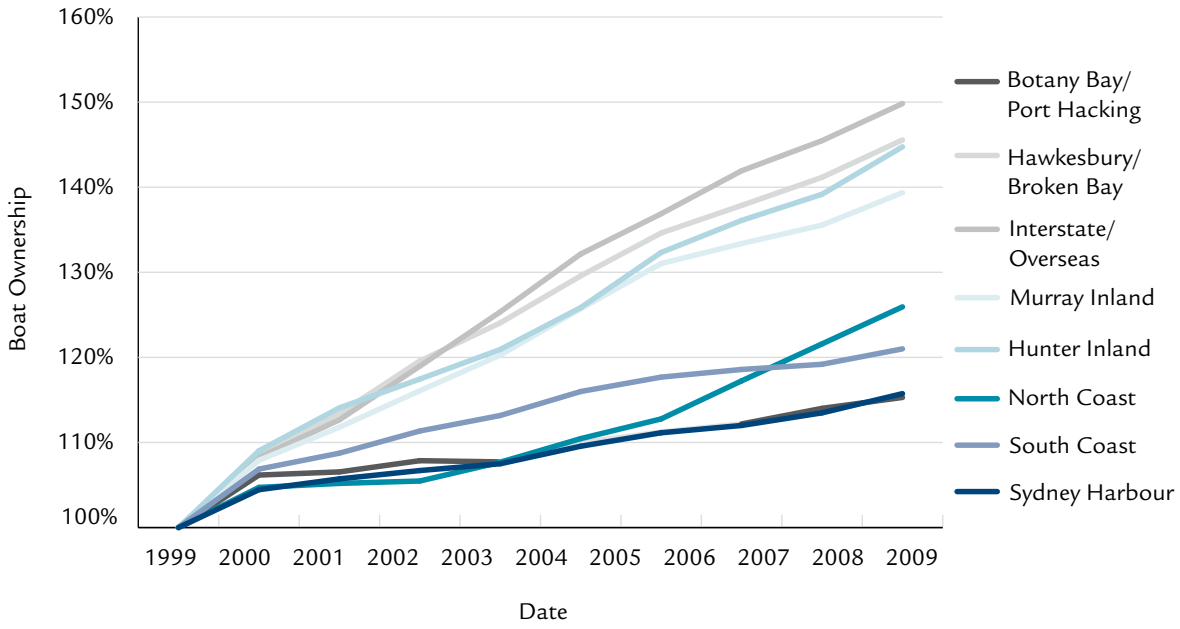


Figure 12 shows that the North Coast has experienced the most growth across all vessels while Sydney Harbour and Botany Bay/Port Hacking have had comparatively slow growth since 1999. However, this graph should be qualified in light of vessel numbers, with the 39.6% increase in the Hunter Inland representing 15,167 additional boats while a 44.7% increase in Murray Inland was made up of only 4598 boats.[13]

Regional Round Up

Figure 13: Growth rates across regions for recreational vessels 1999–2009

Region	1/07/1999	1/07/2009	Actual Change	% Change	Compound Annual Growth
Botany Bay/Port Hacking	20 734	23 977	3 243	15.6%	1.5%
Hawkesbury/Broken Bay	36 328	43 935	7 607	20.9%	1.9%
Interstate/Overseas	5 943	7 483	1 540	25.9%	2.3%
Murray Inland	10 156	14 711	4 555	44.8%	3.8%
Hunter Inland	37 729	52 889	15 160	40.2%	3.4%
North Coast	19 571	30 080	10 509	53.7%	4.4%
South Coast	21 598	31731	10 133	46.9%	3.9%
Sydney Harbour	15 798	18 011	2 213	14.0%	1.3%
Total	167 857	222 817	54 960	32.7%	2.9%

Substantial variations exist within and between NSW regions in terms of distribution and growth. Accordingly, demand must be forecast locally and any strategy for storage must pay attention to these regional differences.

13 For the analysis of individual regions the data for commercial vessels and ferries has been excluded – this step has been taken to normalise data across catchment areas because the regional distribution of commercial vessels is highly asymmetrical.

Botany Bay/Port Hacking[14]

NSW Maritime Region: Sydney/Botany Bay/Port Hacking

Botany Bay/Port Hacking forms part of the wider Sydney Region along with Sydney Harbour. Like Sydney Harbour, this Maritime Region has few boats relative to population with 29 vessels per 1,000 people over the age of 16 years (which is the minimum age that a person can register a boat).

However, there are 25 boats/km² – this compares with 51/km² in Sydney Harbour and just 0.05/km² in the Murray Inland. Botany Bay experienced relatively low growth of its recreational vessels at around 1.5% annually.

Figure 14: Statistics for Botany Bay/Port Hacking Region

Botany Bay/Port Hacking	1/07/1999	1/07/2009	Actual Change
Total Boats	20 734	23 977	3 243
% of NSW recreational total	12.3%	10.7%	–
Median boat length (metres)	4.55	4.62	0.07
Median owners' age (years)	48.5	49.8	1.37
Compound annual growth	–	–	1.5%
Rec boats/person aged 16+[15]	29/1000ppl	Rec Boats/km²	25/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	17 748	2 986	14.4%
1/07/2009	19 937	4 040	16.8%

14 The map of Sydney/Botany Bay/Port Hacking shows the full Sydney Region comprising Botany Bay/Port Hacking and Sydney Harbour regions used in this Report.

15 Population data taken from the ABS 2006 Census. For consistency, recreational boat numbers for this comparison (Recreational boats/Person) have been derived from the July 2006 fleet size statistics. 16 years of age is used because it is the minimum age at which an owner can register a boat.

Hawkesbury/Broken Bay

NSW Maritime Region: Hawkesbury/Broken Bay

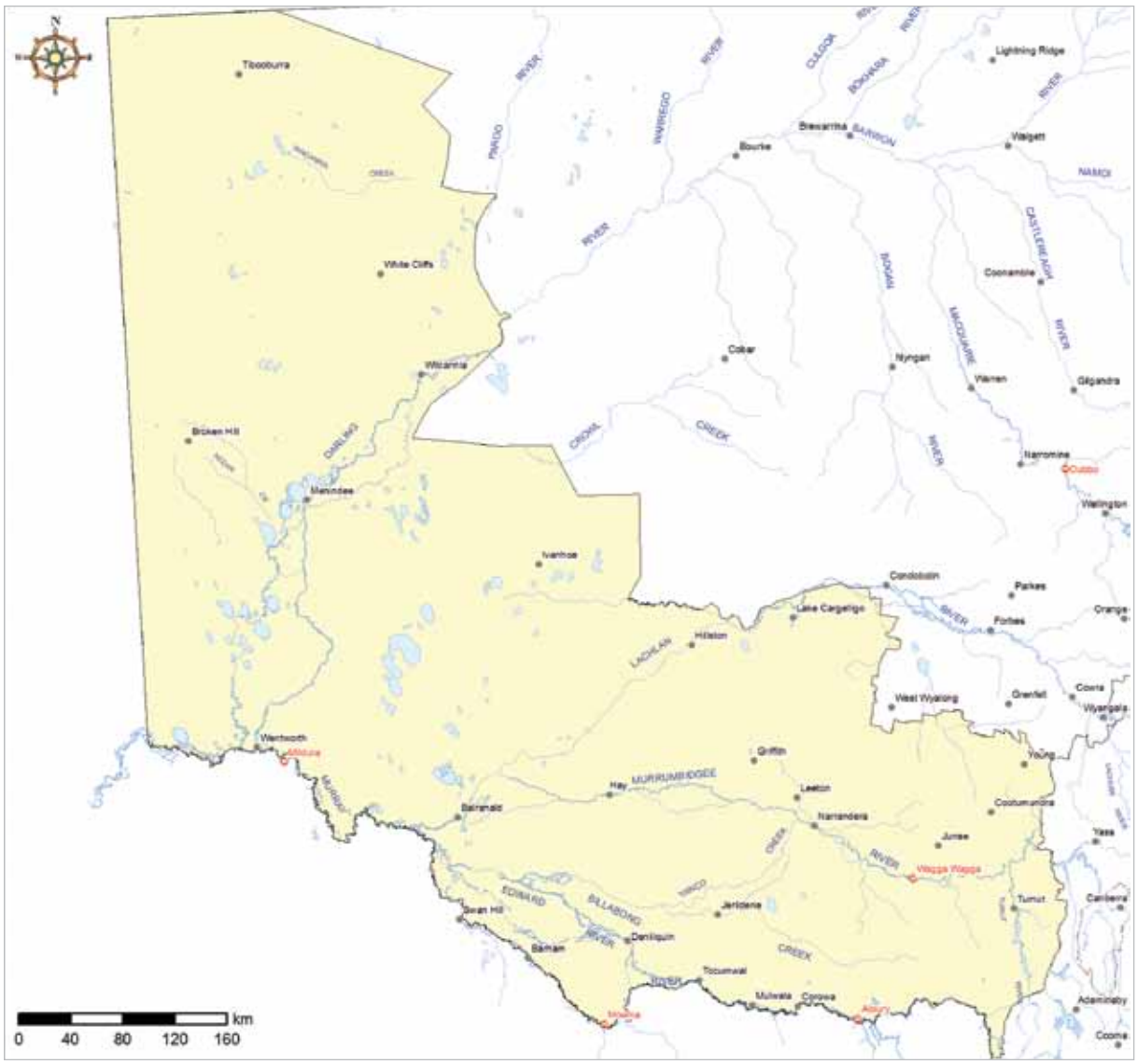
Hawkesbury/Broken Bay has the second largest number of boats among NSW regions and, while continuing to grow over the past 10 years, this region has held a declining proportion of the State's boats: from 21.6% in 1999 to 19.7% in 2009. Likewise, the Hawkesbury region has experienced relatively slow growth in recreational boating growing only 1.9% annually – while the growth rate for NSW as a whole has been 2.9%.

Figure 15: Statistics for Hawkesbury/Broken Bay Region

Hawkesbury/Broken Bay	1/07/1999	1/07/2009	Actual Change
Total Boats	36 328	43 935	7 607
% of NSW recreational total	21.6%	19.7%	–
Median boat length (metres)	4.60	4.72	0.12
Median owners' age (years)	48.6	50.4	1.85
Compound Annual Growth	–	–	1.9%
Rec boats/person aged 16+	35/1000ppl	Rec boats/km²	6.29/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	30 107	6 221	17.1%
1/07/2009	35 223	8 712	19.8%

Murray Inland

NSW Maritime Region: Murray River (Murray Inland)



While the Murray Inland region has the smallest number of recreational boats of any catchment area, because of low population densities, it has, on the other hand, the second highest number of boats per person in the State. From a very low base, the region has grown, in percentage terms, faster than the State average (3.8% over ten years compared with 2.9% for NSW). From a storage perspective, it should be noted that the number of boats over 6m in length has trebled since 1999.

Figure 16: Statistics for Murray Inland Region

Murray Inland	1/07/1999	1/07/2009	Actual Change
Total Boats	10 156	14 711	4 555
% of NSW recreational total	6.0%	6.6%	–
Median boat length (metres)	4.00	4.00	0.00
Median owners' age (years)	47.1	50.6	3.53
Compound Annual Growth	–	–	3.77%
Rec boats/person aged 16+	60/1000ppl	Rec boats/km²	0.05/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	9 893	263	2.6%
1/07/2009	13 908	803	5.5%

Hunter Inland

NSW Maritime Region: Hunter Inland

Hunter Inland is the 'powerhouse' of recreational boating in NSW with 23.7% of the State's recreational vessel fleet at 1 July 2009. In 1999 Hunter Inland had 1,400 more recreational boats than its nearest competitor – Hawkesbury/Broken Bay – but by 2009 Hunter Inland had extended the gap to some 9,000 vessels. Moreover, it had with twice the number of new boats and twice the growth rate. In real terms, the number of boats in Hunter Inland grew by 15,160 (or 3.4% annually between 1999 and 2009), the next highest absolute growth was in the North Coast region, with 10,509 additional vessels. Hunter Inland also maintains a reasonably high boat-to-population ratio at 56/1000ppl, but has just 0.12 vessels/km² across the region.

Figure 17: Statistics for Hunter Inland Region

Hunter Inland	1/07/1999	1/07/2009	Actual Change
Total Boats	37 729	52 889	15 160
% of NSW recreational total	22.5%	23.7%	–
Median boat length (metres)	4.42	4.45	0.03
Median owners' age (years)	48.4	51.1	2.7
Compound Annual Growth	–	–	3.44%
Rec boats/person aged 16+	56/1000ppl	Rec boats/km²	0.12/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	34 048	3 681	9.76%
1/07/2009	46 612	6 277	11.87%

North Coast

NSW Maritime Region: North Coast

The North Coast has had the largest growth in recreational vessels of all NSW regions to 2009 with 4.4% annually compounded. In real terms, that represents 10,509 additional boats. In addition, the region also has the highest number of vessels per person at 64/1000ppl.

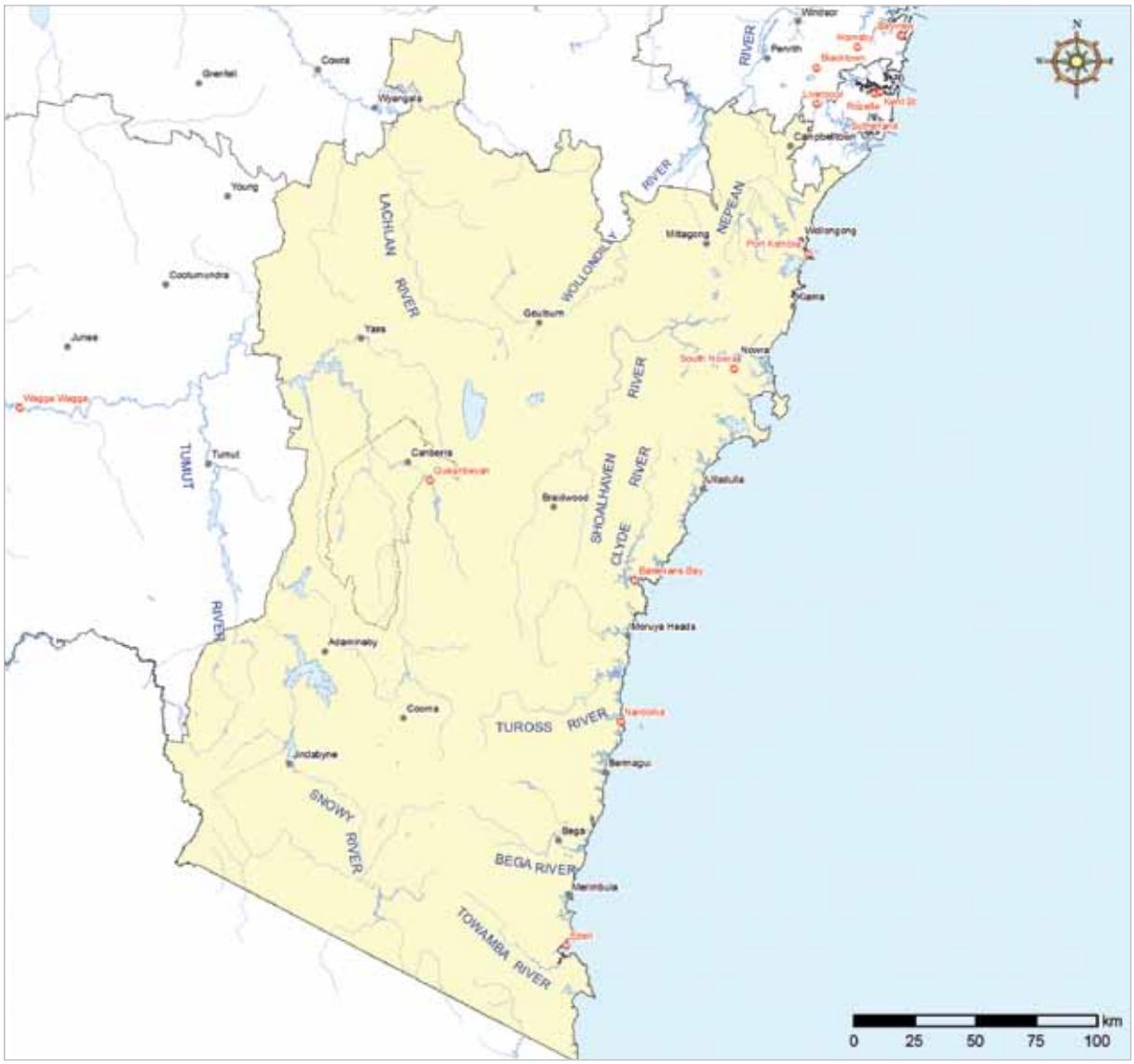
Nevertheless, despite this growth, it should be pointed out that the North Coast has the second smallest proportion of boats greater than 6m in length which suggests that most growth is in the <6m category.

Figure 18: Statistics for North Coast Region

North Coast	1/07/1999	1/07/2009	Actual Change
Total Boats	19 571	30 080	10 509
% of NSW recreational total	11.6%	13.5%	–
Median boats length (metres)	4.20	4.20	0.00
Median owner's age (years)	52.0	54.5	2.52
Compound Annual Growth	–	–	4.4%
Rec boats/person Aged 16+	64/1000ppl	Rec Boats/km²	0.66/ km²
Date	**6m and under**	**6m and over**	**% >6m**
1/07/1999	18 460	1 111	5.7%
1/07/2009	27 965	2 115	7.0%

South Coast

NSW Maritime Region: South Coast



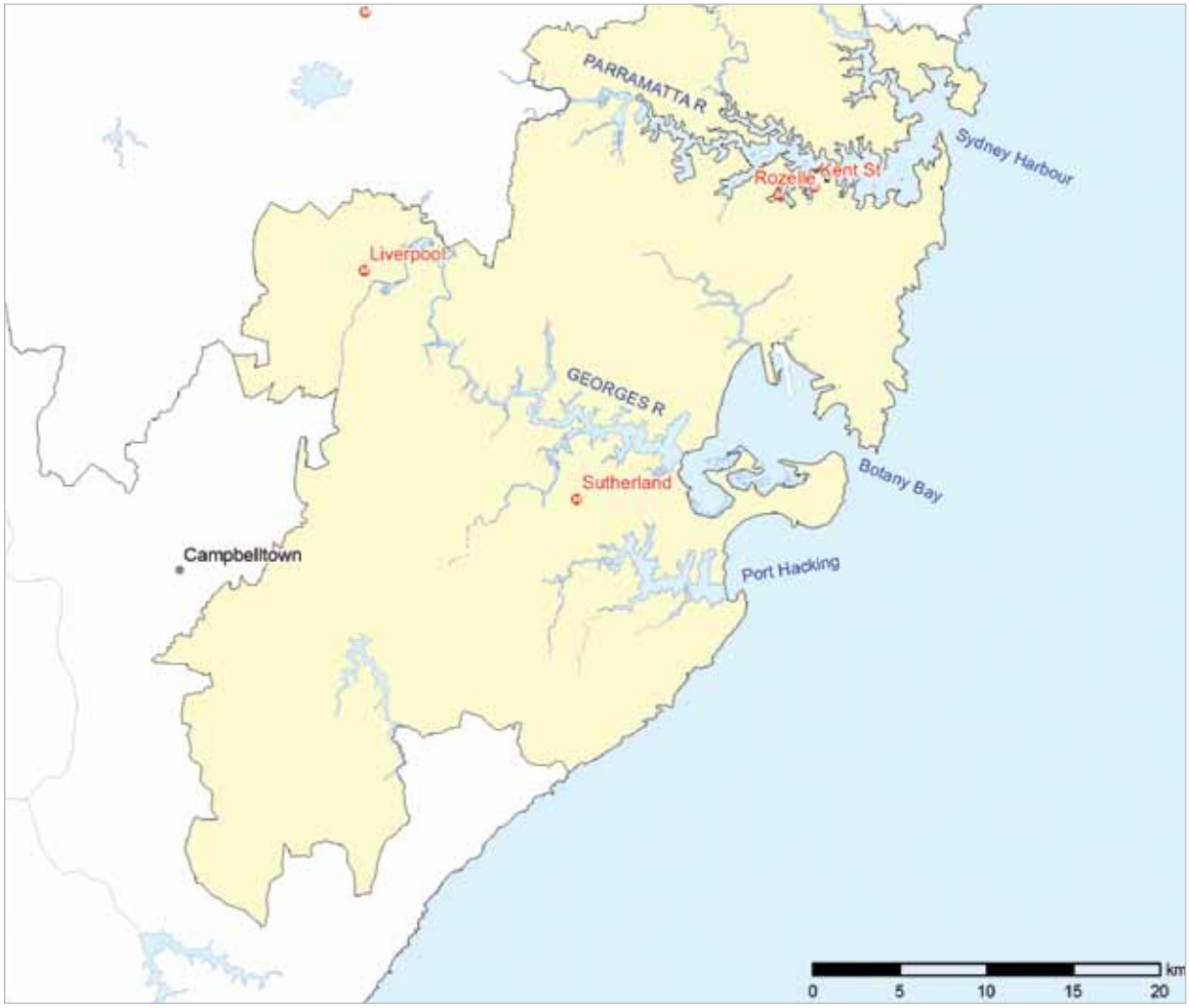
The South Coast had the second highest percentage growth (3.9%) of all regions and in 2009 had 31,731 registered recreational vessels and a density of 52/100ppl. Like the North Coast, South Coast – another low population density coastal region – has shown significant growth.

Figure 19: Statistics for South Coast Region

South Coast	1/07/1999	1/07/2009	Actual Change
Total Boats	21 598	31 731	10 133
% of NSW recreational total	12.9%	14.2%	–
Median boat length (metres)	4.42	4.45	0.03
Median owners' age (years)	49.3	52.1	2.76
Compound Annual Growth	–	–	3.9%
Rec boats/person aged 16+	52/1000ppl	Rec Boats/km²	0.44/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	20 085	1 513	7.0%
1/07/2009	28 781	2 950	9.3%

Sydney Harbour

NSW Maritime Region: Sydney/BotanyBay/Port Hacking



In many ways, the Sydney Harbour region is unique. Firstly, this outstanding environment is an extremely popular venue: the Boating Industry Association (BIA) estimated ten years ago that more than one million people use Sydney Harbour for water-based recreation activities each year.[16] This popularity has a number of consequences. Principal among these is the crowding of the waterway and a heightened risk of incidents in certain areas (Harbour Bridge-CBD) and at certain times (at night).

Congestion on the water is reflected by vehicle traffic volumes around popular boat ramp facilities (such as Lyne Park at Rose Bay), inadequate parking and increasing waiting times to launch vessels. In some areas, local councils have imposed restrictions on hours of use of boat ramps and parking in streets nearby. Moreover, the BIA has expressed the opinion in the past that the number of public boat ramp facilities within Sydney Harbour is inadequate to support existing, let alone future, demand.[17]

Secondly, Sydney Harbour's uniqueness is reflected in the fact that it has more large boats (proportionally) than the other regions with 41.5% of its boats in the 6m plus range in 2009. Indeed, of the 2,213 additional boats registered in Sydney Harbour between 1999 and 2009, 1,403 (or 63.4%) were over 6m in length. Thirdly, compared with other regions, Sydney Harbour has had the lowest annual growth at 1.3%. Consequently, its proportion of NSW recreational boats has fallen about 14% over the decade under review. Moreover, Sydney Harbour has the lowest number of boats per person at 19/1000ppl – compared with 64/1000ppl on the North Coast. As expected, given the region's population density and small size, the number of boats per square kilometre (at 51.4) is substantially higher than all other regions.

16 Quoted in accessUTS, *A Study of Public Use of Boat Ramps on Sydney Harbour: Final Report for Waterways Authority of NSW* [NSW Maritime], August 2004, p.7.
17 accessUTS, *A Study of Public Use of Boat Ramps on Sydney Harbour*, p7.

Importantly, the median recreational boat length within the Sydney Harbour area is the State's highest at 5.4 metres and has grown by 22cm since 1999 – nearly double the growth of any other region and over three times the State average. The comparatively slow growth of the recreational fleet in the Sydney Harbour region is probably due to a number of factors related to the region's popularity. These include the geographic limits of storage space (because of other competing land uses); lack of available on-water storage capacity; shortage of boat ramp facilities and space to store boat trailers on congested city streets.

Figure 20: Statistics for Sydney Harbour Region

Sydney Harbour	1/07/1999	1/07/2009	Actual Change
Total Boats	15 798	18 011	2 213
% of NSW recreational total	9.4%	8.1%	–
Median boats length (metres)	5.18	5.40	0.22
Median owners age (years)	50.5	52.4	1.87
Compound Annual Growth	–	–	1.3%
Rec boats/person aged 16+	19/1000ppl	Rec boats/km²	51.39/ km²
Date	**6m and under**	**6m and over**	**% >6m**
1/07/1999	9 733	6 065	38.4%
1/07/2009	10 543	7 468	41.5%

Interstate/Overseas

The Interstate/Overseas category includes boats registered to an address outside NSW. The trend in non-NSW ownership is accelerating with Interstate/Overseas registered vessels increasing over 11% in the ten year period. Moreover, a significant proportion of boats in this category tend to cluster over the 6m mark and have grown from 13.9% of Interstate/Overseas registered vessels in 1999 to 18.7% in 2009.

Figure 21: Statistics for Interstate/Overseas vessels

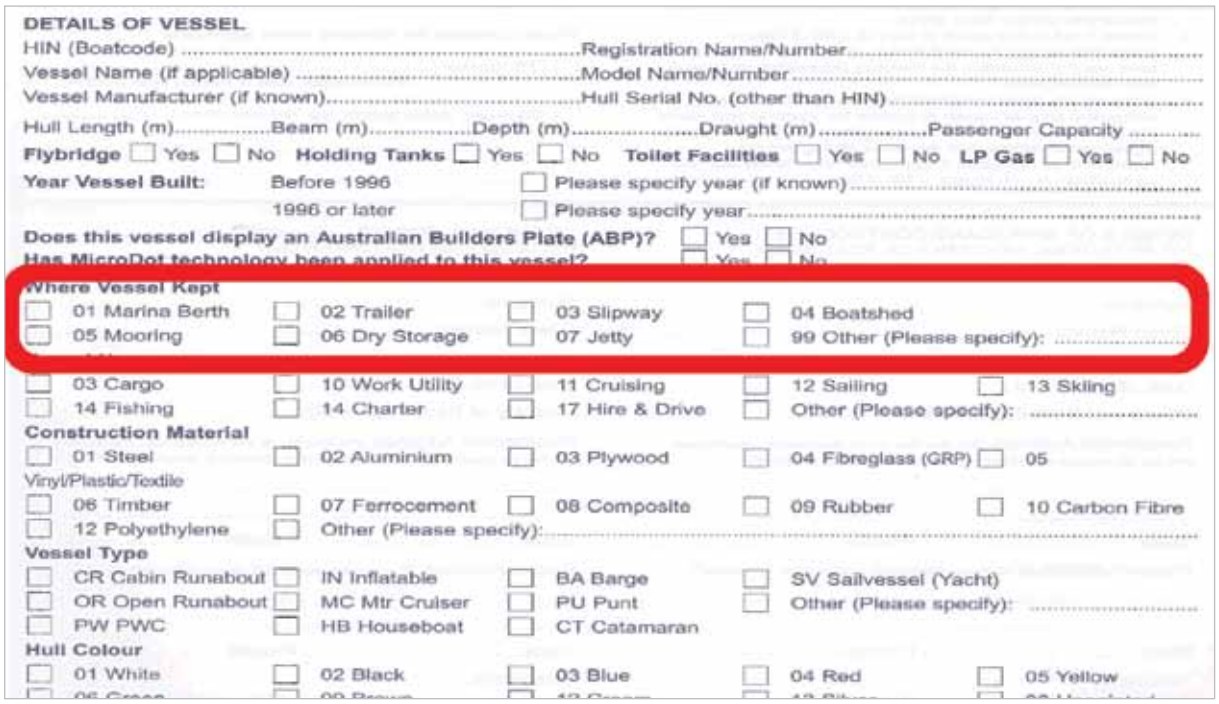
Interstate/Overseas	1/07/1999	1/07/2009	Actual Change
Total Boats	5 943	7 483	1 540
% of NSW recreational total	3.5%	3.3%	–
Median boats length (metres)	4.5	4.6	0.09
Median owners' age (years)	47.9	50.8	2.83
Compound Annual Growth	–	–	2.33%
Rec boats/person aged 16+	NA/1000ppl	Rec boats/km²	NA/ km²
Date	**6m and under**	**6m and over**	**% > 6m**
1/07/1999	5 117	826	13.9%
1/07/2009	6 083	1 400	18.7%

9. Current boat storage

Intended storage method

At a vessel's original registration, boat owners are invited to indicate their storage intentions. A copy of the form is at Figure 22 below. The field is not mandatory and contains the option "Other" which diffuses the accuracy of the data collected. Moreover, as indicated previously, there is no requirement for an owner to advise NSW Maritime should they change their storage method.

Figure 22: Registration form – indication of storage intention


DETAILS OF VESSEL
HIN (Boatcode) ..... Registration Name/Number .....
Vessel Name (if applicable) ..... Model Name/Number .....
Vessel Manufacturer (if known) ..... Hull Serial No. (other than HIN) .....
Hull Length (m) ..... Beam (m) ..... Depth (m) ..... Draught (m) ..... Passenger Capacity .....
Flybridge ☐ Yes ☐ No Holding Tanks ☐ Yes ☐ No Toilet Facilities ☐ Yes ☐ No LP Gas ☐ Yes ☐ No
Year Vessel Built: Before 1996 ☐ Please specify year (if known) .....
1996 or later ☐ Please specify year .....
Does this vessel display an Australian Builders Plate (ABP)? ☐ Yes ☐ No
Has MicroDot technology been applied to this vessel? ☐ Yes ☐ No
Where Vessel Kept
☐ 01 Marina Berth ☐ 02 Trailer ☐ 03 Slipway ☐ 04 Boatshed
☐ 05 Mooring ☐ 06 Dry Storage ☐ 07 Jetty ☐ 99 Other (Please specify): .....
☐ 03 Cargo ☐ 10 Work Utility ☐ 11 Cruising ☐ 12 Sailing ☐ 13 Skiing
☐ 14 Fishing ☐ 14 Charter ☐ 17 Hire & Drive ☐ Other (Please specify): .....
Construction Material
☐ 01 Steel ☐ 02 Aluminium ☐ 03 Plywood ☐ 04 Fibreglass (GRP) ☐ 05 Vinyl/Plastic/Textile
☐ 06 Timber ☐ 07 Ferrocement ☐ 08 Composite ☐ 09 Rubber ☐ 10 Carbon Fibre
☐ 12 Polyethylene ☐ Other (Please specify): .....
Vessel Type
☐ CR Cabin Runabout ☐ IN Inflatable ☐ BA Barge ☐ SV Sailvessel (Yacht)
☐ OR Open Runabout ☐ MC Mtr Cruiser ☐ PU Punt ☐ Other (Please specify): .....
☐ PW PWC ☐ HB Houseboat ☐ CT Catamaran
Hull Colour
☐ 01 White ☐ 02 Black ☐ 03 Blue ☐ 04 Red ☐ 05 Yellow

Despite these deficiencies, the data hold some value. The table at figure 23 below shows the intended method of storage indicated by owners of recreational vessels registered at 1 July 2009.

Figure 23: Intended storage method of registered vessels at 1 July 2009

Storage Method	Recreational Vessels
Boatshed	4 890
Dry Storage	4 866
Jetty	1 516
Marina Berth	5 951
Mooring	20 888
Not Known	1 118
Other	6 935
Slipway	767
Trailer	176 167
Total	223 098

Storage Capacity

Introduction

NSW Maritime administers wetland leases and licences on the land it owns, being Sydney Harbour, Botany Bay, Port Kembla and Newcastle Harbour while the Land and Property Management Authority (LPMA) is responsible for the rest of the State.

Domestic facilities

Domestic facilities cover boating infrastructure attached to residential waterfront properties such as jetties, ramps, pontoons, tidal baths, slipways, steps, landing platforms and boatsheds. In 2009 NSW Maritime administered approximately 1500 private wetland leases on Sydney Harbour and this number has remained relatively constant since 2004. Of these approximately 1400 include some form of vessel storage while the balance relates to non-boat storage leases such as tidal baths, reclaimed land etc. Additionally in 2009 there were 21 private marinas (ie those associated with strata developments) on Sydney Harbour, comprising 362 berths.

On land not owned by NSW Maritime, domestic waterfront licences are granted by the LPMA for the use of submerged and tidal Crown land where there is direct access to Crown land. LPMA domestic waterfront licences generally cover facilities such as jetties, boatsheds, berthing areas, boat ramps, slipways and pontoons on foreshore Crown land adjoining waterfront properties. At 1 July 2010, LPMA advises there were 6873 licensed domestic waterfront tenures of which 1810 (26%) included boat storage facilities. This number has also remained relatively stable over the past 5 years.

Commercial marina wet berths

Both NSW Maritime and the LPMA administer leases or licences for commercial marina wet berths.

Private mooring licences

At 1 July 2009, there were 15,834 private mooring licences in NSW.

Commercial moorings

At 1 July 2009 there were 4934 commercial mooring sites in NSW.

Trailer storage

NSW Maritime analysis of the distribution across NSW of registered vessels less than 6m and the distribution of registered boat trailers at 1 July 2009 shows, not surprisingly, a correlation between the two in terms of incidence and density. In other words, registered small boats are found with registered trailers.

Related to trailer storage is the condition of recreational boating infrastructure especially boat ramps. NSW Maritime has recently undertaken an internal study to identify popular areas of recreational boating, areas with low quality facilities and those that would benefit from infrastructure improvements, particularly under the Better Boating Program.[18] Of the 625 unrestricted public boat ramps, 107 were considered to have high recreational use (with delays in launching of 30 minutes or more, for example), 157 were considered to have inadequate parking and 166 were in poor or very poor condition requiring upgrading within a maximum of 1–2 years. In developing a draft Recreational Boating Facilities Plan, NSW Maritime has assembled information on these facilities and their condition in order to promote opportunities for boating facility improvements and to encourage councils and other facility owners to apply for funding assistance.

18 The Better Boating Program has been in operation since 1998. NSW Maritime provides funding on a 50-50 basis to local councils to upgrade recreational boating facilities throughout NSW.

10. Supply and demand

Moorings

Figure 24: Distribution of moorings

Region	PMLs	CML Sites	Total Moorings
Botany Bay/Port Hacking	1 698	511	2 209
Hawkesbury/Broken Bay	4 267	1 839	6 106
Murray Inland	386	204	590
Hunter Inland	3 260	518	3 778
North Coast	529	163	692
South Coast	945	221	1 166
Sydney Harbour	4 749	1 479	6 228
Total	15 834	4 935	20 769

NSW Maritime data shows that at 1 July 2009, there were 15,834 PMLs with 1,819 sites available and an overall waiting list of 2,057. These figures indicate a shortfall of 238.

These raw figures, however, probably disguise the real picture of mooring demand. Moorings are allocated on a 'first come, first serve' basis. Where space is available on a mooring site, boat owners can apply for a PML and (subject to certain conditions) immediately receive approval to moor their vessel.[19] Where space is not available at a preferred site, boat owners can apply for a site where moorings are available or join a priority waiting list at the preferred site.

Priority waiting lists exist for each mooring area where sites are not available. Applicants pay a fee (which is deducted from the eventual PML fee) to join a list and, when a site becomes available, it is offered to the applicant who has been on the list for the longest time. Should an applicant not exercise their right to the mooring when one becomes available, he or she falls to the end of the queue and the site is offered to the next eligible applicant.

Mooring areas in high demand have long priority waiting lists: at the end of 2009, North Harbour (Sydney) mooring area, with 111 moorings, had 102 applicants on its waiting list. While some areas can have rapid turnover, other locations have little movement. Johnstons Bay, at Balmain in Sydney Harbour, has 4 moorings but 20 applicants on its waiting list at the end of 2009. However, the last mooring re-allocation occurred in June 1991.

19 Up-to-date PML rules and conditions are available from www.maritime.nsw.gov.au

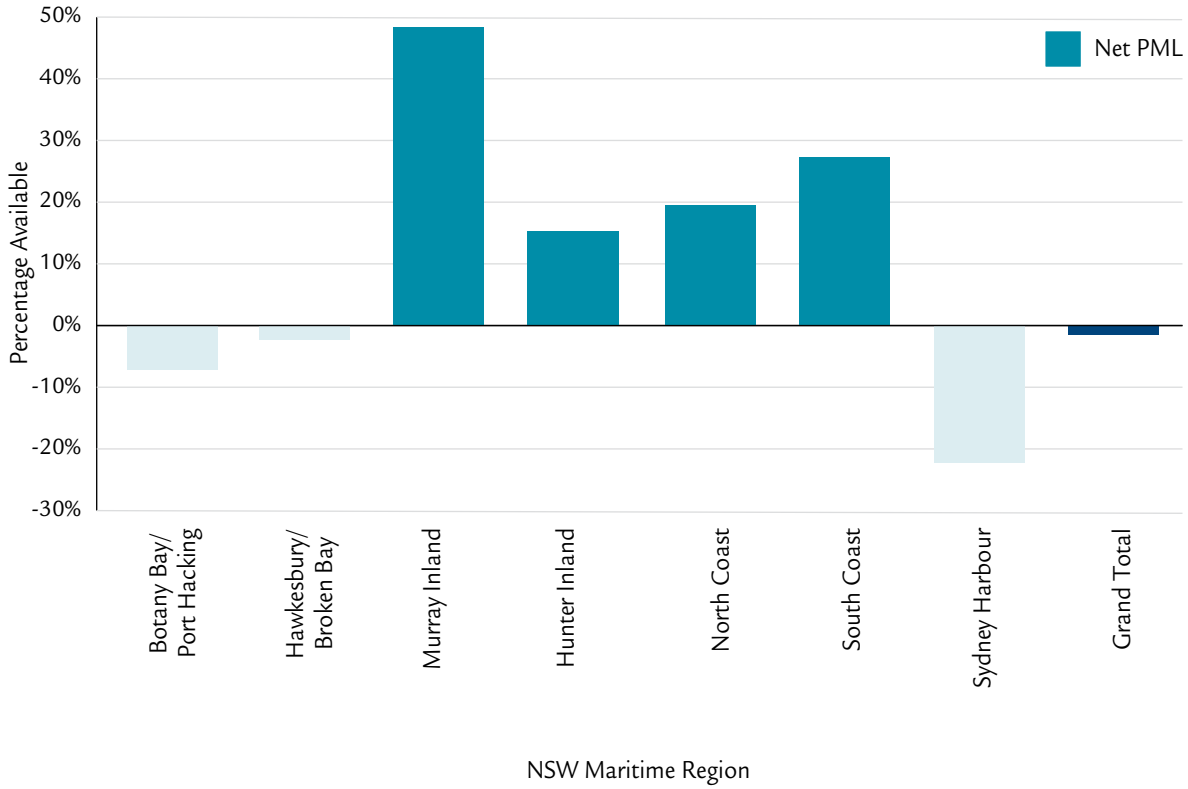
Across the state, there is varying degrees of capacity as demonstrated in Figure 25 below.

Figure 25: Aggregated PML capacity, waiting lists and available sites at 1 July 2009

Region	PML Sites	PML Sites Available	Waiting	Shortfall/ Surplus
Botany Bay/Port Hacking	1 698	145	268	-123
Hawkesbury/Broken Bay	4 267	288	390	-102
Murray Inland	386	216	29	187
Hunter Inland	3 260	587	89	498
North Coast	529	143	40	103
South Coast	945	315	57	258
Sydney Harbour	4 749	125	1 184	-1 059
Grand Total	15 834	1 819	2 057	-238

The graph below (Figure 26) shows the capacity in PML sites (or 'net PML'). Net PML is derived by subtracting the number of applicants on the priority waiting list from the number of available sites and aggregating them into regions. A negative percentage represents the size of the waiting list over capacity while a positive percentage indicates capacity available.

Figure 26: 'Net PML' showing PML demand and available capacity at 1 July 2009



As expected, the greatest demand is in Sydney Harbour (4,749 PMLs) while Murray Inland (386 PMLs) had 48% of sites unoccupied.

11. Forecasting trends and future needs

Forecasting methodology

The goal of forecasting future ownership and storage trends is to attempt to quantify boat storage needs to 2026. Ownership of recreational vessels across the State has grown consistently over the 10 years to mid 2009 with an annual growth rate of 2.9%. In attempting to forecast, this growth has been normalised against population data to extrapolate State-wide and regional projections of boat ownership.[20] The ownership and boat size forecasts can then be used to calculate demand for storage on a State and local basis.[21]

In general terms, growth in boat ownership in NSW has mirrored population growth. Moreover, there is little evidence on the effects of economic crises on boat ownership in Australia. While financial downturns have a lag effect on vessel ownership, there has been little suggestion that the Global Financial Crisis – even in its mild Australian form – has had any impact.

The projections in the report assume the availability of storage options will have the same impact on ownership decisions as they have in the past. Should the balance between supply and demand for storage change sufficiently, this could influence a boat owner's decision on the size of boat to buy or whether to buy at all.

Externalities

Certain variables may influence vessel numbers and storage infrastructure and impact upon future needs. Some of these externalities are difficult to forecast.

Local economic factors

Obviously, the broader performance of the NSW economy could have an effect on vessel ownership and demand for storage. Spending on recreational boating is clearly discretionary expenditure and, accordingly, a change in levels of disposable income – including the availability and cost of credit – could impact upon boat use. Small changes are likely to have little impact on registrations as the costs of entry (licence fees etc) and vessel disposal inhibit abrupt reactions to fluctuations. However, sustained changes in levels of disposable income could have the effect of discouraging or encouraging ownership growth in the state. Different levels of economic performance – reflected, say, in rates of unemployment – could exaggerate existing differences between regions.

Population, intrastate migration and age distribution

Population is used in this report's forecasts to normalise regional ownership data and allow more accurate planning for the storage of vessels in different areas of the State. Accordingly, ABS data, which makes broad assumptions and allowances, has been applied to the forecasts. Two components of population change worthy of specific mention are that of age distribution within the population and migration.

Like most Western nations, sustained low levels of fertility combined with increasing life expectancy at birth have contributed to an ageing Australian population.[22] By 2026, the median age of the Australian population will increase to about 40 years. However, the generation born 1946–1961 – known as the Baby Boomers – 'unlike previous generations of retirees, will be healthier for longer, more mobile and more engaged'.[23] Many will have considerable disposable income. This aspect of an ageing population is unlikely to impact adversely on boat ownership figures. Interstate migration is an interesting phenomenon. NSW has been losing population to other states (particularly Queensland) for a decade at least.[24] In 2003–4, for example, there were 120, 715 departures, a net loss (after arrivals including overseas immigrants) of 31, 098.[25] The ABS projections, however, indicate that population will continue to grow, albeit more slowly than Queensland in particular and Victoria. The following map from the ABS shows population growth across the state by local government area for 2007–08[26]:

20 Due to anomalies between the ABS census data and NSW Maritime data a small percentage of the population could not be directly attributed to a NSW Maritime administrative region. *Source*: Australian Bureau of Statistics 2006, '2006 Census of Population and Housing, Customised Data Report: Usual resident population aged 16 years and over for Postal Areas in New South Wales'. The anomalies are due to slight differences in the collection and recording of data between ABS and NSW Maritime.

21 The focus for forecasting purposes has been on recreational rather than commercial vessels because of the small size of the latter group, its volatility and the fact that commercial vessels are almost always stored on waterways.

22 ABS, 3222.0 – Population Projections, Australia, 2006 to 2101.

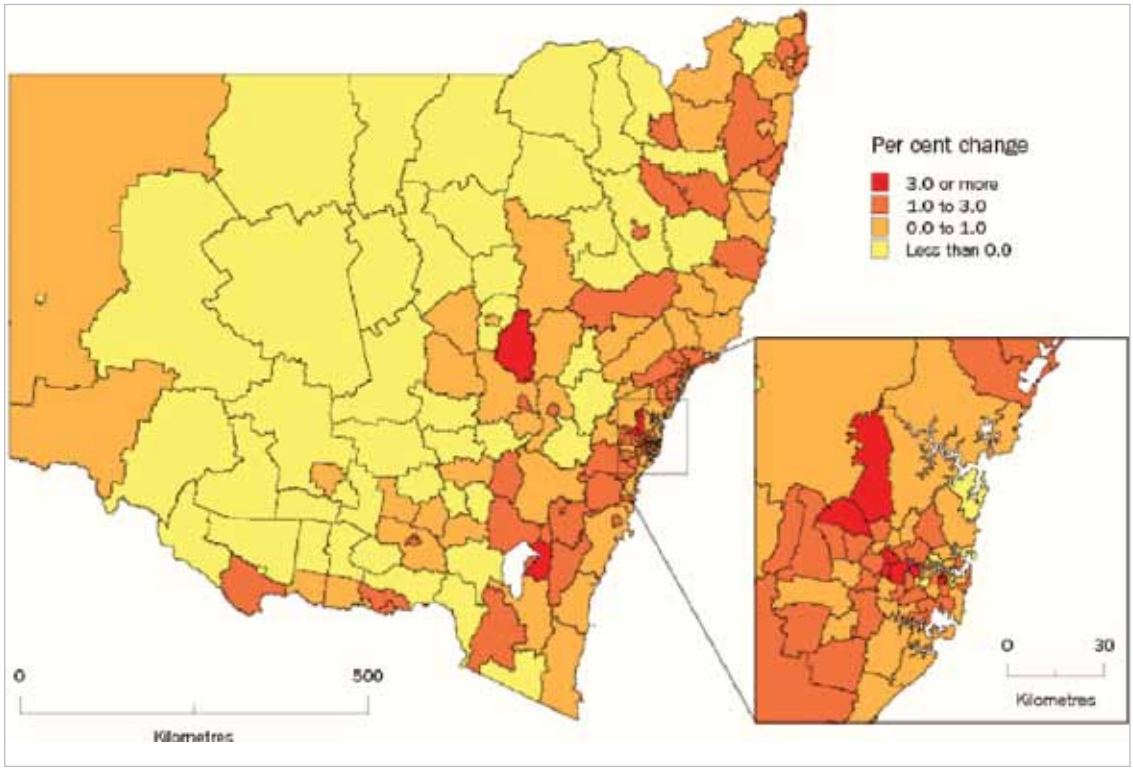
23 Quoted in Bernard Salt, KPMG *Monash Baby Boomer Study*, December 2009 at http://www.bernardsalt.com.au/media/09Monash-BabyBoomerStudy-BS0312-MAR.pdf

24 ABS, Migration 3412.0 2005–6.

25 ABS, 3101.0 – Australian Demographic Statistics, Interstate Departures NSW Sept 200–Sept 2009.

26 Australian Bureau of Statistics, 3218.0 – Regional Population Growth, Australia, 2007–08.

Figure 27: Population growth NSW



Importantly, the map shows a clear trend towards coastal population growth: this phenomenon could encourage boat ownership.

Tourism

Tourists may bring a boat to NSW (by road or sea), or hire a vessel for use on the State's waterways or use a commercial boat for water sports, eco-tourism, diving, whale watching or harbour cruising. The Tourism Forecasting Committee of Tourism Australia expects tourist activity in NSW to return to modest growth in 2011 after recent declines.[27] This indicates that tourism will probably have a negligible impact on the projections relating to recreational vessels in this document. However, as the global economy continues to strengthen, as expected, in future, international tourists may have an influence on the demand for commercial boat services in the State.

Effects of climate change

Climate change – particularly rising sea levels and changes in the height or frequency of extreme sea level events – could have significant consequences for boat ownership and storage. Global Mean Sea Level increased by 195mm between 1870 and 2004 and is continuing to rise, according to the Commonwealth Scientific and Industrial Research Organisation (CSIRO), at a 'fairly steady' rate of just over 3mm a year.[28] While the numbers relating to recent sea level rise seem trivial at first glance, the impacts of sea-level rise and how fast it is happening are significant.[29] Indeed, coastal observations confirm that sea levels have been rising around Australia since at least 1920.[30] In areas which have experienced large scale land subsidence, such as Gippsland in Victoria, sea level rise has been exacerbated.

Sea level rise has been brought about partly by melting of glaciers and ice sheets while 20th century sea-level rise has been heavily influenced by the thermal expansion of a warming ocean. During the 21st century, sea level will continue to rise. The most robust projections of 21st century sea-level rise are the Assessments of the Intergovernmental Panel on Climate Change (IPCC) of 2001 and 2007.[31]

27 *Forecast 2009 – Issue 1,* Page 92, Tourism Forecasting Committee, Tourism Research Australia.

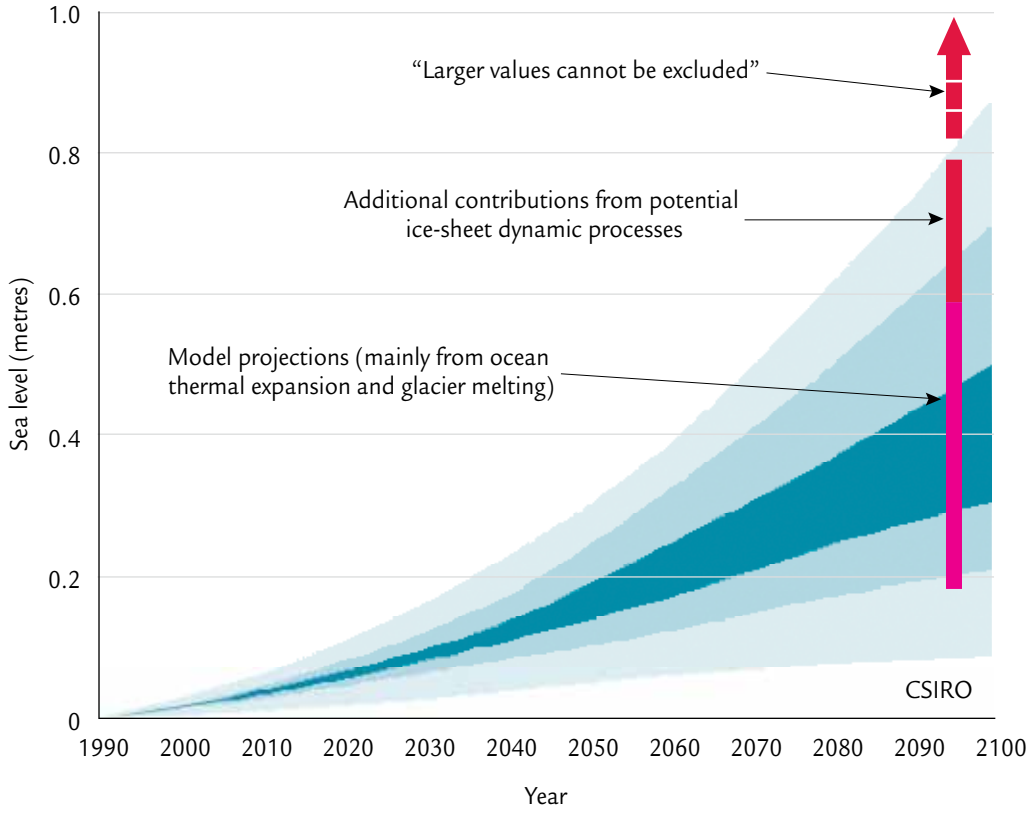
28 Sea Level Rise: Understanding the past – improving projections for the future at http://www.cmar.csiro.au/sealevel/index.html

29 *Sea-level rise: what does the future hold*, Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC) at http://www.acecrc.org.au/uploaded/117/797532_01ib03_sealevelgeneral_07.pdf

30 ACE CRC *Briefing: A post IPCC AR4 update on sea level rise*, p.8 at http://www.acecrc.org.au/uploaded/117/797655_16br01_slr_080911.pdf

31 Sea level projections at http://www.cmar.csiro.au/sealevel/sl_proj_21st.html

Figure 28: Projections of sea level change



While sea-level rises may not be hugely significant by 2026, changes in the frequency of extreme sea level events will almost certainly become so because, as mean sea level rises, extreme events of a given height tend to become more frequent.

As CSIRO explains:

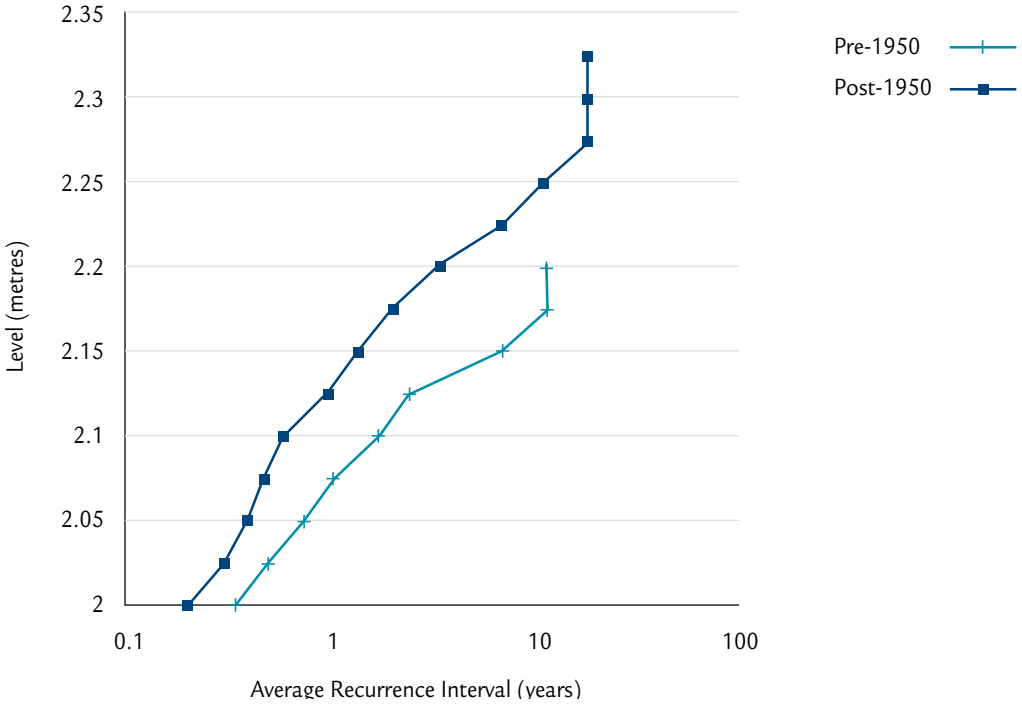
> The effect of rising mean sea levels will be felt most profoundly during extreme storm conditions when strong winds and falling pressure bring about a temporary and localised increase in sea level known as a storm surge. Storm surges occurring on higher mean sea levels will enable inundation and damaging waves to penetrate further inland increasing flooding, erosion and the subsequent detrimental impacts on built infrastructure and natural ecosystems. In the tropics storm surges are caused by tropical cyclones while elsewhere mid-latitude storms and their associated cold fronts are the main cause of storm surges.[32]

The effect of sea level rise during the 20th century is indicated in the following figure, which shows the change of 'Average Recurrence Interval' from the first half of the century to the second at Fort Denison. This Interval was reduced by a factor of around three, so that an extreme that used to occur, say, every three years, now occurs every year.[33]

32 Extreme events at http://www.cmar.csiro.au/sealevel/sl_impacts_extreme.html

33 Sea level impacts: extreme events at http://www.cmar.csiro.au/sealevel/sl_impacts_extreme.html

Figure 29: Recurrence of extreme events at Fort Denison



These events are likely to continue to increase in frequency and severity with impact upon the period of this report – one projection indicates that events that now happen very few years 'are likely to occur annually in just a decade or two…'[34] By the end of the century, the Garnaut Climate Change Review forecasts that 'Much coastal infrastructure along the early 21st century lines of settlement is likely to be at high risk of damage from storms and flooding'.[35]

The impact of climate change on inland waterways and recreational boating in NSW is likely to be no less profound. Without effective mitigation, the Garnaut Report projects that the Murray–Darling basin will, because of increased frequency of drought, reduced median rainfall and absence of runoff, lose half its agricultural production by the middle of the century and depopulation of the region will accelerate.[36] Other waterways will be similarly affected. It should be noted that these impacts have not been quantified in this report and will require further analysis which may require a future reassessment of the projections.

Forecasting boat numbers

The effect of population growth on boat ownership can be projected by taking regional population census data from 1996 and applying this to recreational vessel fleet numbers for the same regions.[37] As we have seen, the number of recreational boats in NSW has grown by 2.9% annually between 1999 and 2009.

The analysis below examines the contribution of population growth to vessel numbers between 2001 and 2009 by examining both raw data and growth normalised against available ABS population statistics.[38]

The first graph in the series (Figure 30) shows the growth in recreational vessel ownership between 1 July 2001 and 1 July 2006 for each NSW Maritime region.[39] The graph shows consistent linear growth of the recreational boat fleet in all regions of NSW.

34 ACE CRC *Sea-level rise: what does the future hold?*

35 Ross Garnaut, The Garnaut Climate Change Review: Final Report, chapter 6: Climate Change Impacts on Australia at http://www.garnautreview.org.au/domino/Web_Notes/Garnaut/garnautweb.html

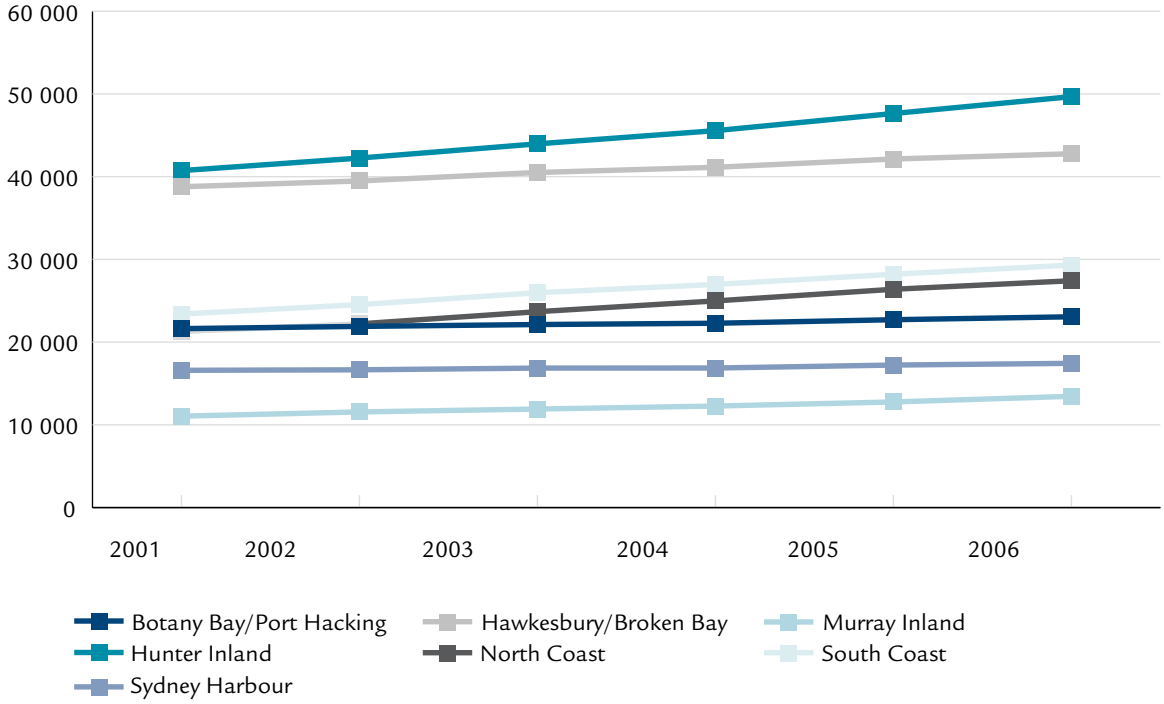
36 Garnaut Climate Change Review, Ch 6.

37 ABS, '2006 Census of Population and Housing, Customised Data Report: Usual resident population aged 16 years and over for Postal Areas in New South Wales'.

38 ABS, '2006 Census of Population and Housing, Customised Data Report: Usual resident population aged 16 years and over for Postal Areas in New South Wales'.

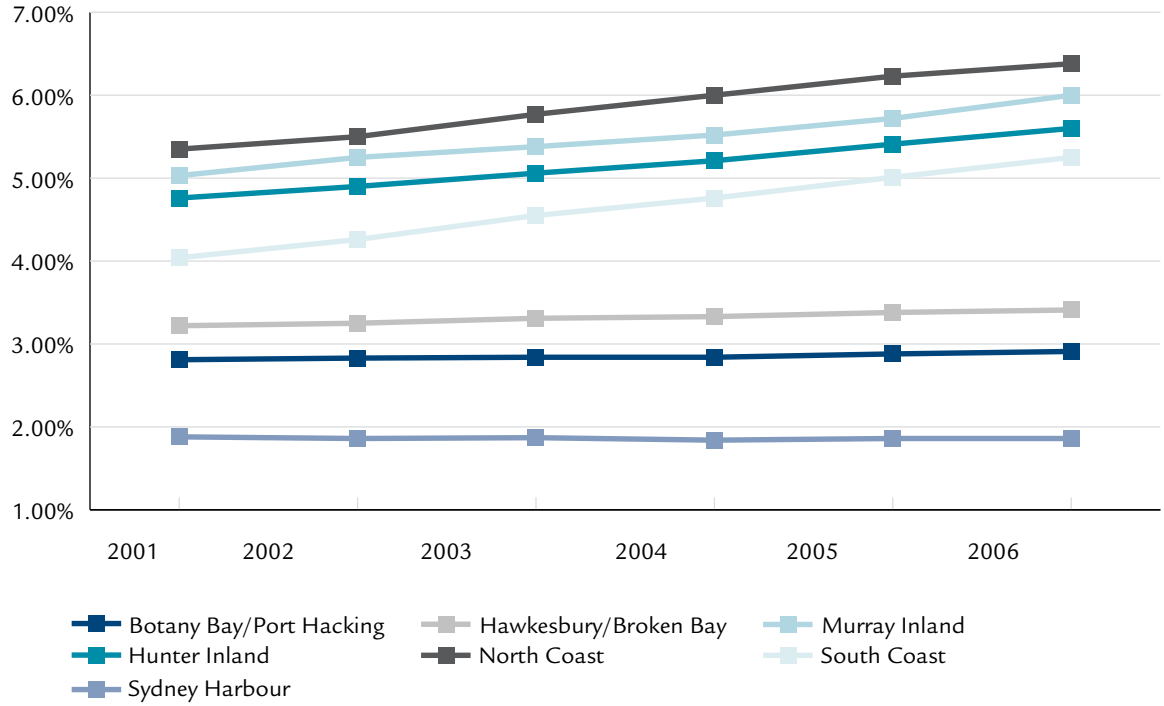
39 The timeframe has been chosen because it represents a period within which there is access to both comprehensive population statistics and reliable boat ownership data.

Figure 30: Growth in recreational vessel numbers 2001–2006



The next graph (Figure 31) normalises vessel number growth against population by showing the percentage of the population for each region which owned a boat on each sample date.[40]

Figure 31: Growth in recreational vessels normalised against population data 2001–6

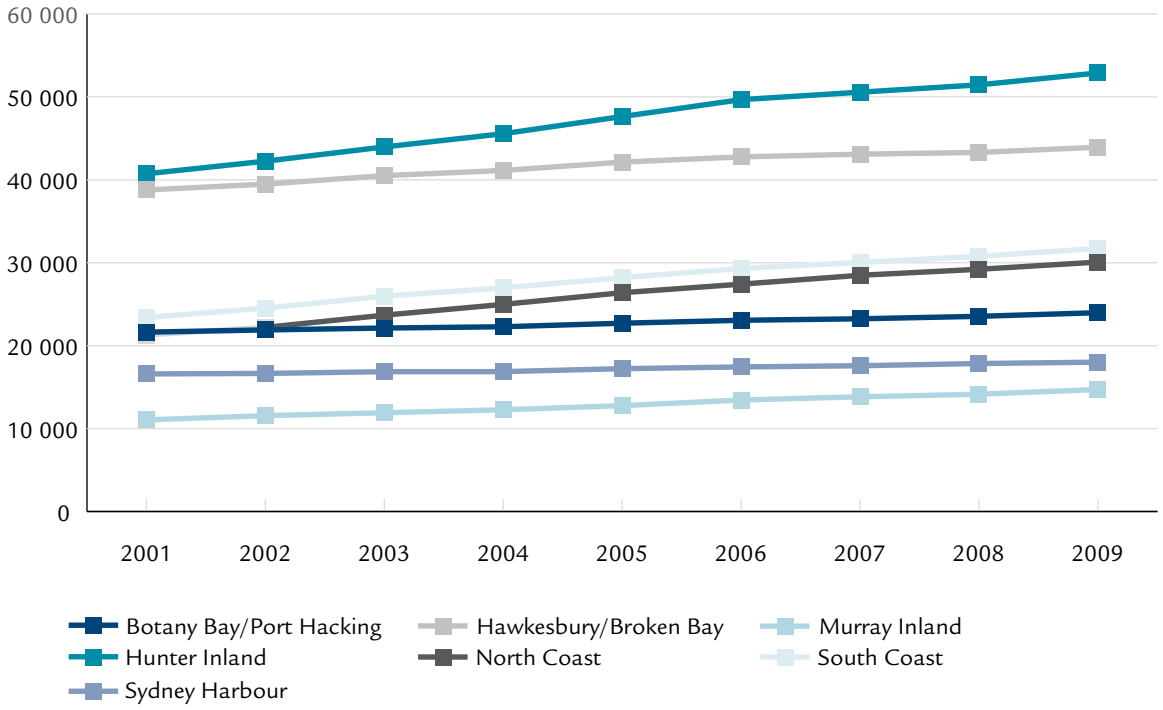


This graph demonstrates that in most regions, boat ownership has accelerated ahead of population growth in a reasonably consistent manner over the period of assessment.

40 Census information is only available for the 2001 and 2006 data samples, so for the intervening years the data has been applied as a linear extrapolation based on compound annual growth.

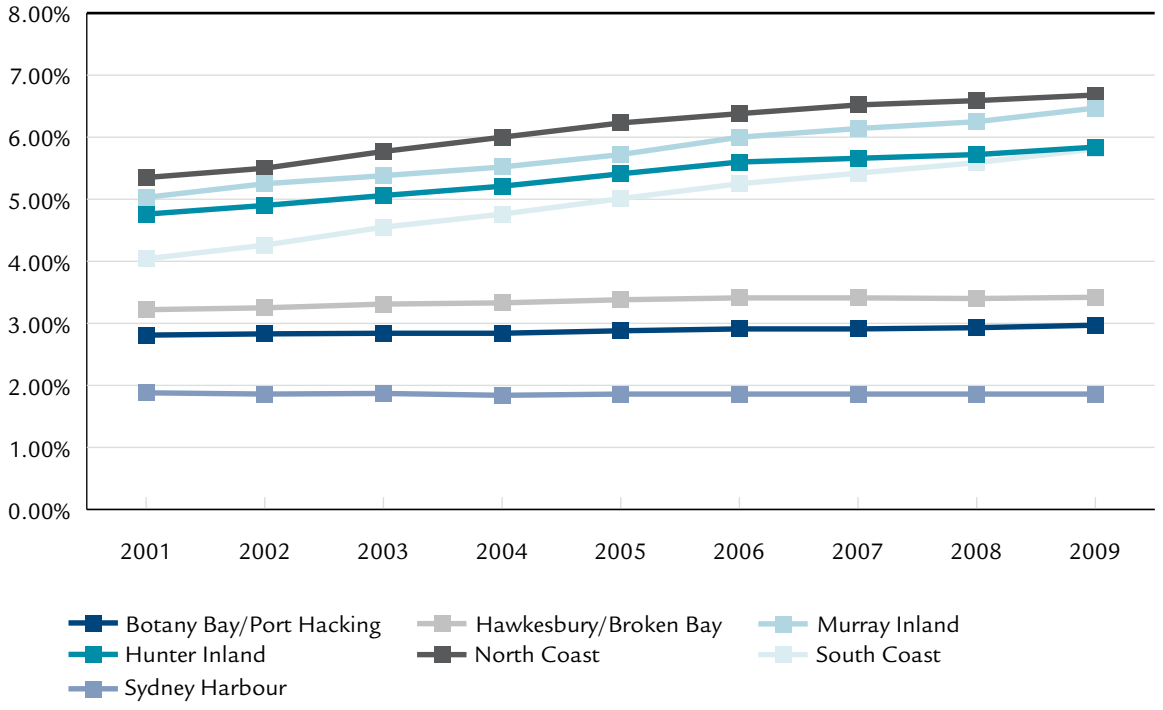
The next graph (Figure 32) shows the number of recreational boats in each NSW Maritime administrative region on 1 July of each year represented.

Figure 32: NSW Maritime regions – number of recreational boats 2001–09



This shows consistent linear growth across all regions. The following graph (figure 33) applies regional population data to the ownership statistics to illustrate population growth as an influence on fleet size.[41]

Figure 33: Population growth on fleet size by region



41 As the last available census information is from 2006, the 2007–2009 population data has been projected.

Forecast summary

Linear projection

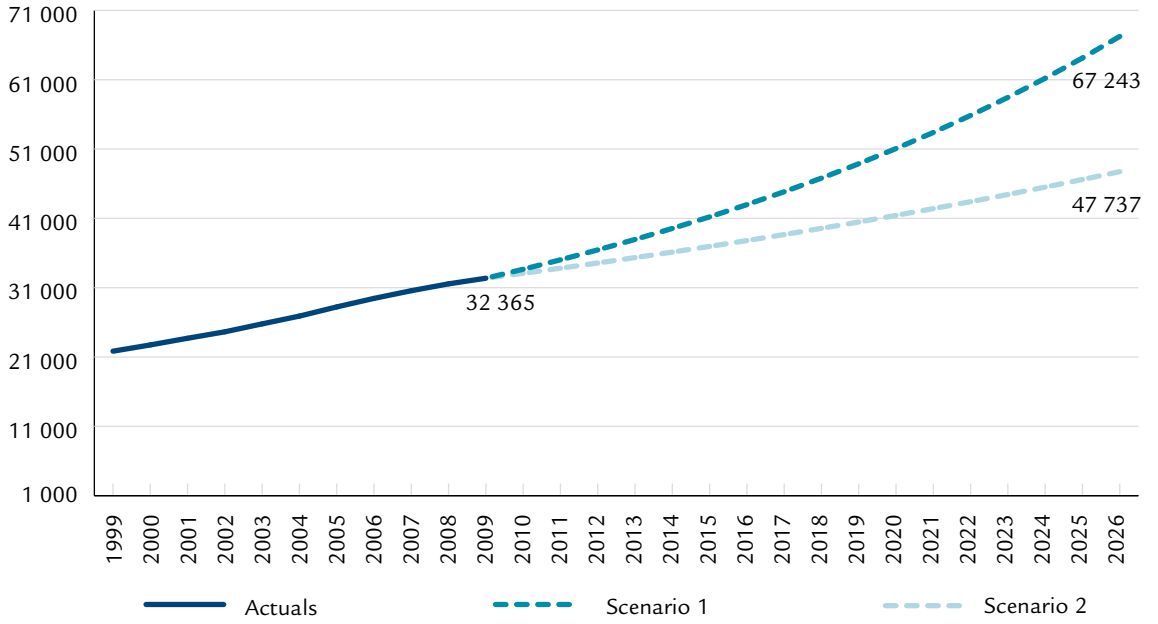
The base case scenario (or linear projection) is built on the strong historical linear growth rates for each region in New South Wales. While the percentage increases between 1999 and 2009 ranged from 1.7% to 3.7%, the compounded annual growth rate (CAGR) was around 2.9%. Based on this approach, the estimated total number of boats in New South Wales in 2026 is expected to reach **351,113**. The following table (Figure 34) summarises the forecast:

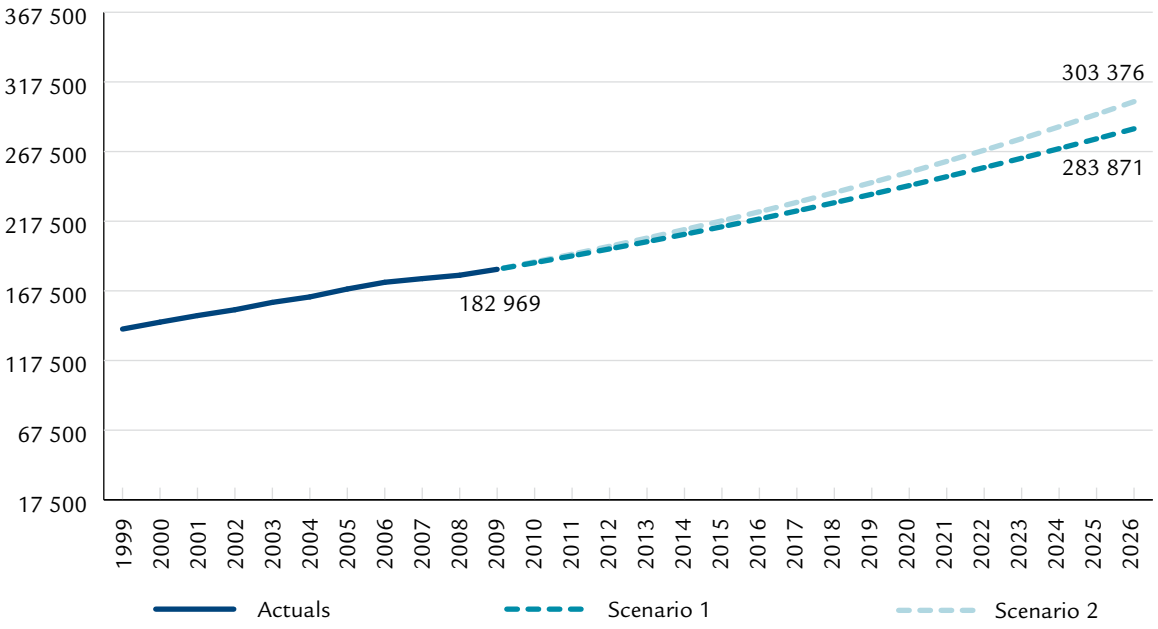
Figure 34: Forecast in number of registered vessels in NSW to 2026

Historical Data		Growth		Forecasts
1/07/1999	161 914		1/07/2010	221 374
1/07/2000	167 780	3.6%	1/07/2011	227 616
1/07/2001	173 458	3.4%	1/07/2012	234 066
1/07/2002	178 575	2.9%	1/07/2013	240 732
1/07/2003	185 013	3.6%	1/07/2014	247 622
1/07/2004	190 060	2.7%	1/07/2015	254 744
1/07/2005	197 056	3.7%	1/07/2016	262 108
1/07/2006	203 110	3.1%	1/07/2017	269 721
1/07/2007	206 844	1.8%	1/07/2018	277 593
1/07/2008	210 274	1.7%	1/07/2019	285 733
1/07/2009	215 334	2.4%	1/07/2020	294 151
			1/07/2021	302 858
CAGR 1999–2009:		2.9%	1/07/2022	311 865
			1/07/2023	321 182
			1/07/2024	330 821
			1/07/2025	340 794
			1/07/2026	351 113

The calculations in figure 34, however, distinguish between boats longer and shorter than six metres. In order to project this distribution, two different scenarios were used. The first scenario was based on the fact that the proportion of large boats to small has grown steadily over the last ten years (large boats grew from 13.5% in 1999 to 15.0% in 2009). This scenario assumed that this trend would continue in a linear fashion. The second scenario, however, assumed that the relative proportions at 1 July 2009, the latest date at which data is available, will not change in the future. The two approaches result in the same total number of boats for each year and region but with a different split between large and small boats. The two graphs (Figures 35 and 36) below show the differences for the State as a whole:

Figures 35 and 36: Projected large and small boats in NSW to 2026 using linear growth method





Projection based on population data

An alternative method is to project boat numbers based on the percentage of people who have owned boats in the past. This approach, however, lacks reliable data and a number of assumptions have to be made. As already indicated, the number of boats and the percentage of people owning boats have grown in a linear fashion. However, the latter is partly an effect of extrapolation of population data between ABS census data which is only available for 1996, 2001 and 2006. As a consequence, the percentage of people with boats in 2009 would have to be based on actual numbers for boats but only an estimate of boat owning population. The population for each region between 2006 and 2009 was estimated by calculating the annual growth rates between 2001 and 2006 for each region and then applying this growth rate on the 2006 levels. However, ABS has estimated the NSW population to 2026 (and beyond).[42] Using the percentage distribution of population by region in 2006, regional population distribution has been estimated for the entire forecast period.

The percentage of people with boats was calculated and averaged over the last six years (2004–2009). These averages were applied to population forecasts in order to estimate the number of boats in each region. The results of this analysis are shown below (Figure 37). The number of boats in 2026 is estimated to reach **334,470**, which is approximately 5% lower than in the case of linear projection. These results are subject to a number of broad assumptions, which, if they were altered, could produce very different results.[43]

Figure 37: Projection of boat numbers based on percentage of population with boats in 1996

Historical Data		Growth		Forecasts
1/07/1999	161 914		1/07/2010	224 375
1/07/2000	167 780	3.6%	1/07/2011	230 042
1/07/2001	173 458	3.4%	1/07/2012	235 852
1/07/2002	178 575	2.9%	1/07/2013	241 810
1/07/2003	185 013	3.6%	1/07/2014	247 918
1/07/2004	190 060	2.7%	1/07/2015	254 181
1/07/2005	197 056	3.7%	1/07/2016	260 602
1/07/2006	203 110	3.1%	1/07/2017	267 186
1/07/2007	206 844	1.8%	1/07/2018	273 936
1/07/2008	210 274	1.7%	1/07/2019	280 858
1/07/2009	215 334	2.4%	1/07/2020	287 954
			1/07/2021	295 231
CAGR 1999–2009:		2.9%	1/07/2022	302 691
			1/07/2023	310 340
			1/07/2024	318 183
			1/07/2025	326 225
			1/07/2026	334 470

Comment

The linear projection for determining boat numbers is probably superior to the alternative because of the lack of data and consequent assumptions in the population model. Even so, the number of boats arrived at using the linear forecast is a simplification. Nevertheless, a growth rate of 2.9% each year has been assumed and this is based on a solid historical pattern. Accordingly, by 2012 NSW will have around 18,500 additional boats while by 2026 it could have an additional 135,000.

42 ABS, 04/09/2008, 3222.0 – *Population Projections, Australia*, 2006 to 2101.

43 Alternative assumptions include, for instance, exponential population growth against linear population growth, the number of years included in the calculation of averages for percentages of people with a boat in each region, and much more.

Regional Overview

The table below (Figure 38) shows forecasts for the seven regions in New South Wales. The first section shows estimates which derive from growth rates from 1999 to 2009. Under this scenario, the number of boats in Sydney Harbour, for example, would grow from 18,011 in 2009 to 21,442 in 2026. The total estimated growth of approximately 3,400 boats should be compared with the 2,200 boats that were added between 1999 and 2009.

Figure 38: Forecasts of boat ownership for the seven regions in New South Wales

Total number of boats

Linear growth	Actuals				Forecasts			
Region	**1999**	**2003**	**2006**	**2009**	**2012**	**2015**	**2020**	**2026**
Botany Bay/Port Hacking	20 734	22 125	23 062	23 977	24 921	25 903	27 625	29 844
Hawkesbury/Broken Bay	36 328	40 504	42 766	43 935	46 041	48 248	52 164	57 285
Murray Inland	10 156	11 909	13 447	14 711	16 379	18 236	21 812	27 039
Hunter Inland	37 729	43 966	49 671	52 889	58 332	64 336	75 746	92 140
North Coast	19 571	23 678	27 417	30 080	34 247	38 991	48 402	62 741
South Coast	21 598	25 970	29 312	31 731	35 571	39 876	48 240	60 622
Sydney Harbour	15 798	16 861	17 435	18 011	18 574	19 154	20 162	21 442
Total	161 914	185 013	203 110	215 334	234 066	254 744	294 151	351 113

Population driven	Actuals				Forecasts			
Region	**1999**	**2003**	**2006**	**2009**	**2012**	**2015**	**2020**	**2026**
Botany Bay/Port Hacking	20 734	22 125	23 062	23 977	26 859	28 984	32 908	38 323
Hawkesbury/Broken Bay	36 328	40 504	42 766	43 935	49 261	53 003	59 883	69 326
Murray Inland	10 156	11 909	13 447	14 711	15 787	17 077	19 464	22 773
Hunter Inland	37 729	43 966	49 671	52 889	57 374	61 811	69 982	81 226
North Coast	19 571	23 678	27 417	30 080	31 643	33 937	38 136	43 867
South Coast	21 598	25 970	29 312	31 731	34 822	37 746	43 173	50 726
Sydney Harbour	15 798	16 861	17 435	18 011	20 107	21 623	24 408	28 228
Total	161 914	185 013	203 110	215 334	235 852	254 181	287 954	334 470

Difference between liner growth and population scenarios				
Region	**2012**	**2015**	**2020**	**2026**
Botany Bay/Port Hacking	-7.2%	-10.6%	-16.1%	-22.1%
Hawkesbury/Broken Bay	-6.5%	-9.0%	-12.9%	-17.4%
Murray Inland	3.7%	6.8%	12.1%	18.7%
Hunter Inland	1.7%	4.1%	8.2%	13.4%
North Coast	8.2%	14.9%	26.9%	43.0%
South Coast	2.2%	5.6%	11.7%	19.5%
Sydney Harbour	-7.6%	-11.4%	-17.4%	-24.0%
Total	-0.8%	0.2%	2.2%	5.0%

The second approach is based on projected population growth. Accordingly, the number of boats in Sydney Harbour would grow to 28,228 by 2026 (compared with 21,442 in the first). The last section of the table shows the difference between the two alternatives.

Regional forecast scenarios: large vs small boats

This report has already considered differences between NSW Maritime regions relating to boat ownership. The next section looks at regional projections using the first forecast alternative – linear projection of growth. Importantly, it uses two methods to evaluate the balance between smaller and larger vessels to give projections of the number of boats requiring off-water and on-water storage throughout the forecast period.

The first scenario is based on the finding that, across all regions, the proportion of large boats to small boats has grown steadily over the last 10 years. Scenario 1 models large to small vessels in each region based on linear growth of overall numbers.

Scenario 2 also uses linear growth of overall numbers but is based on the proportional difference between large and small boats at 1 July 2009. It assumes a continuation of this proportion throughout the forecast period.

The two scenarios – with different results for small and large vessels – should assist in developing a picture of possible future storage demand within each region. A comparative table of the outcomes for each region under both scenarios can be found at Appendix D.

Forecast: Hawkesbury/Broken Bay

Figure 39: Forecast for Hawkesbury/Broken Bay

Scenario 1	Actuals					Forecasts				
Hawkesbury/ Broken Bay	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	6 221	7 399	8 270	8 712	19.8%	9 540	10 447	12 154	14 575	25.4%
< 5.99	30 107	33 105	34 496	35 223	80.2%	36 501	37 801	40 009	42 709	74.6%
Total	36 328	40 504	42 766	43 935	100%	46 041	48 248	52 164	57 285	100%

Scenario 2	Actuals					Forecasts				
Hawkesbury/ Broken Bay	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	6 221	7 399	8 270	8 712	19.8%	9 130	9 567	10 344	11 359	19.8%
< 5.99	30 107	33 105	34 496	35 223	80.2%	36 911	38 681	41 820	45 926	80.2%
Total	36 328	40 504	42 766	43 935	100%	46 041	48 248	52 164	57 285	100%

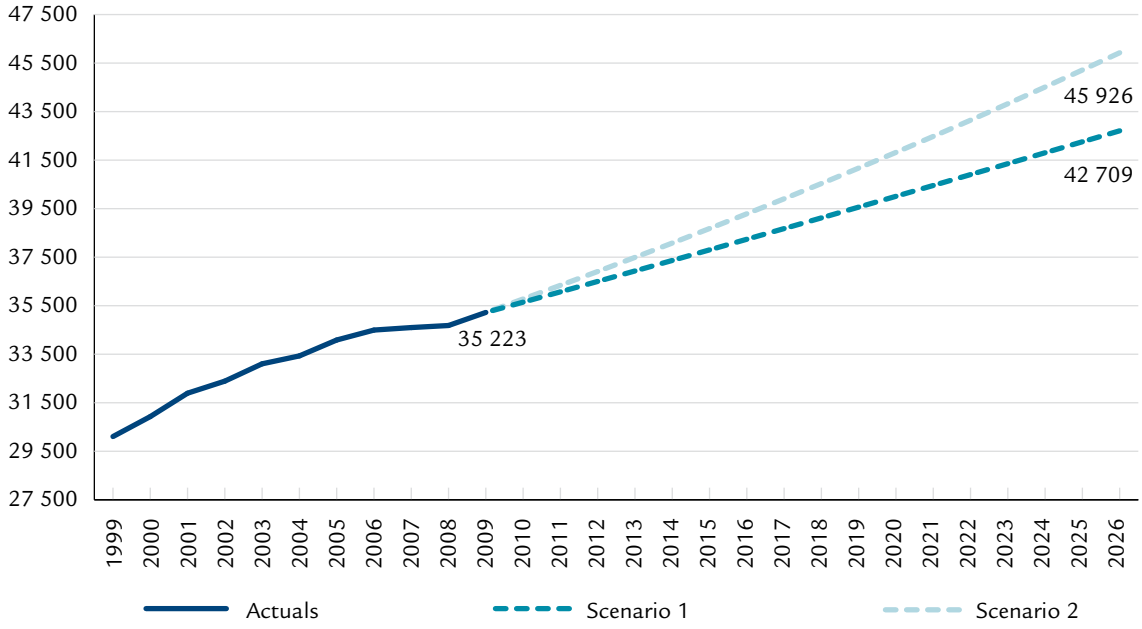
Under the linear growth model, Hawkesbury/Broken Bay would go from having the second largest numbers of boats in NSW to fourth in the table, because of its below average growth in the past. On the other hand, the size distribution projections present different outcomes for storage demand in the region.

In Hawkesbury/Broken Bay it is estimated that the total recreational vessel fleet would increase from 43,935 on 1 July 2009 to 57,285 at 1 July 2026.[44]

44 See graph at Appendix D

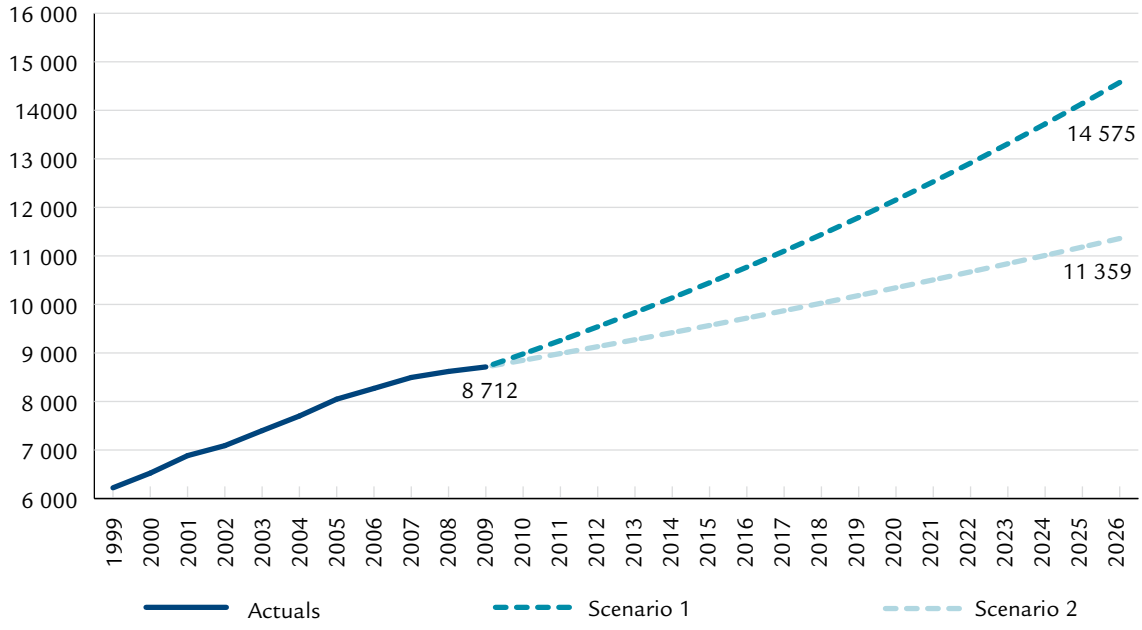
The following graph (Figure 40) shows a plot of Scenarios 1 and 2 for recreational vessels that are less 6 metres in length.

Figure 40: Projected increase small vessels Hawkesbury/Broken Bay



Scenario 1, which assumes a continuing shift towards larger vessels, shows a projected difference in boats less than 6m boats of 3,217 from Scenario 2.

Figure 41: Projected increase large vessels Hawkesbury/Broken Bay



Under Scenario 1, boats over 6m would account for 25.4% of vessels in the Hawkesbury/Broken Bay region by 2026 with 5,683 additional boats requiring on-water, or near-water, storage facilities.

Forecast: Murray Inland

Figure 42: Fleet increase Murray Inland including projection to 2026

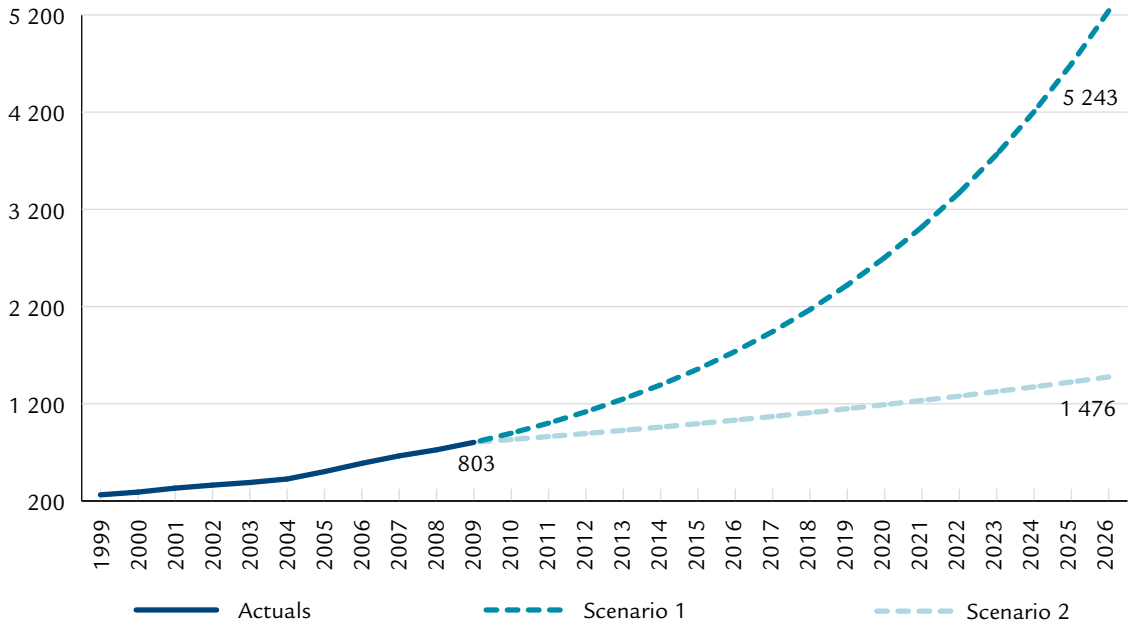
Scenario 1	Actuals					Forecasts				
Murray Inland	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	263	390	587	803	5.5%	1 118	1 557	2 704	5 243	19.4%
< 5.99	9 893	11 519	12 860	13 908	94.5%	15 261	16 679	19 108	21 796	80.6%
Total	10 156	11 909	13 447	14 711	100%	16 379	18 236	21 812	27 039	100%

Scenario 2	Actuals					Forecasts				
Murray Inland	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	263	390	587	803	5.5%	894	995	1 191	1 476	5.5%
< 5.99	9 893	11 519	12 860	13 908	94.5%	15 485	17 241	20 621	25 563	94.5%
Total	10 156	11 909	13 447	14 711	100%	16 379	18 237	21 812	27 039	100%

Murray Inland produces different results using the linear growth model and population based alternative: in the former, the region's recreational fleet grows to **27,039** by 2026 while in the latter, it reaches only **22,773**. The linear growth model, however, probably presents an optimistic view of ownership growth in the Murray region.

Turning to projections for large and small boats, Scenario 1 (as depicted by the red dotted line below) projects the distribution of boats over 6m in length by continuing the trend of balance occurring in the 10 years to 2009:

Figure 43: projected increase in large vessels Murray Inland

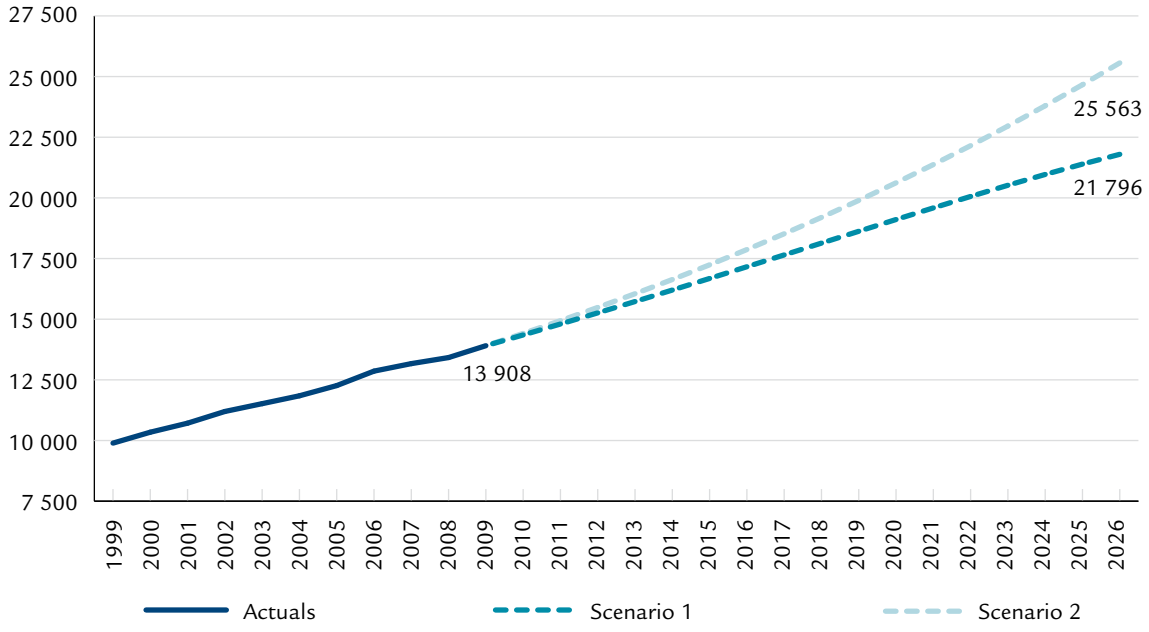


The Murray Inland region experienced annual growth in the part of its fleet over 6m of around 11.7% p.a. between 1999 and 2009 resulting in a sizable proportional shift in larger boats over a relatively short period. Scenario 1 projects this proportional difference out to 2026. As a result, the change in the relative percentage of boats longer than 6m from 5.5% of total vessels in 2009 goes to 19.4% in 2026. In real terms, this would see larger boats increase from 803 at 1 July 2009 to over 5,200 in 2026.

It is conceivable that the growth in larger boats could continue. However, the likelihood of unabated double digit growth to 2026 diminishes as the actual number of vessels rises.

Scenario 2 factors in the 2009 proportional distribution of vessel sizes (with 5.5% of the total recreational vessel fleet over 6m) and projects boat numbers accordingly. This results in a more plausible growth rate for these boats with 1,476 at 2026 (compared with more than 5200).

Figure 44: Projected increase in small vessels Murray Inland



Forecast: Hunter Inland

Figure 45: Fleet increase Hunter Inland including projection to 2026

Scenario 1	Actuals					Forecasts				
Hunter Inland	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	3 681	4 426	5 471	6 277	11.9%	7 342	8 588	11 152	15 258	16.6%
< 5.99	34 048	39 540	44 200	46 612	88.1%	50 990	55 748	64 594	76 882	83.4%
Total	37 729	43 966	49 671	52 889	100%	58 332	64 336	75 746	92 140	100%

Scenario 2	Actuals					Forecasts				
Hunter Inland	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	3 681	4 426	5 471	6 277	11.9%	6 923	7 636	8 990	10 935	11.9%
< 5.99	34 048	39 540	44 200	46 612	88.1%	51 409	56 700	66 756	81 205	88.1%
Total	37 729	43 966	49 671	52 889	100%	58 332	64 336	75 746	92 140	100%

At 1 July 2009, the Hunter Inland was the largest region for boat ownership in NSW; under both projection models used in this report it will continue its dominance. Under the linear projection alternative, the Hunter Inland recreational vessel fleet is forecast to reach **92,140** by 2026.

Furthermore, Scenario 1 projects a growth in the over 6m recreational vessel fleet from 6,277 in 2009 to 8,588 in 2015 and 15,258 in 2026. As discussed previously, Hunter Inland is the powerhouse of recreational boating in the State. This is projected to continue through the forecast period. This trend is a bit slower in the proportion-driven projections of Scenario 2.

Figure 46: projected increase in large vessels Hunter Inland

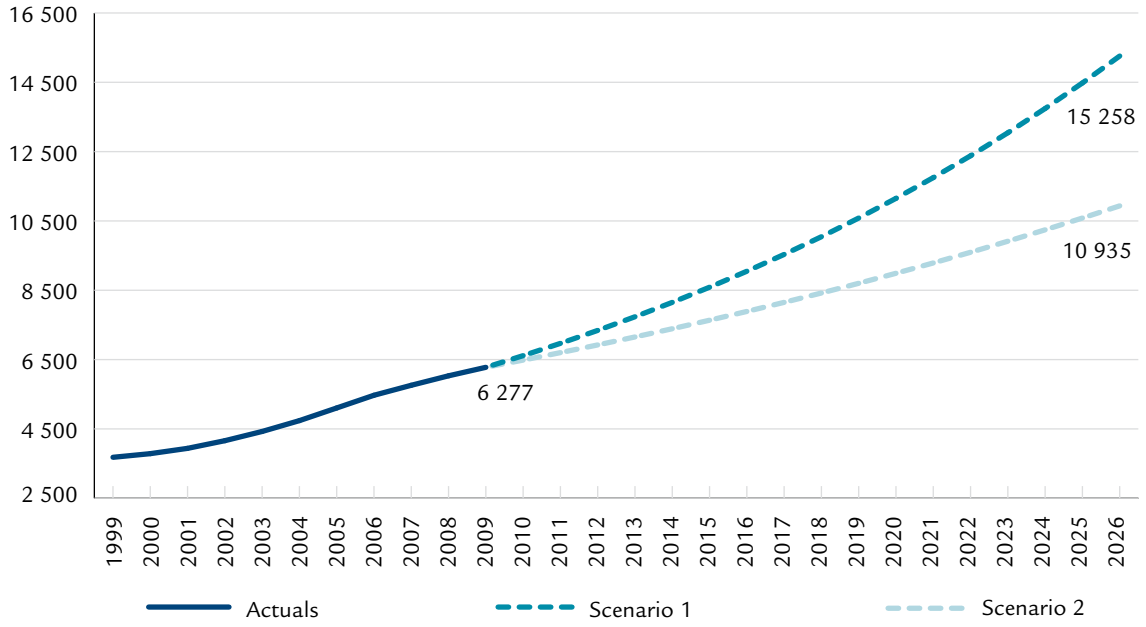
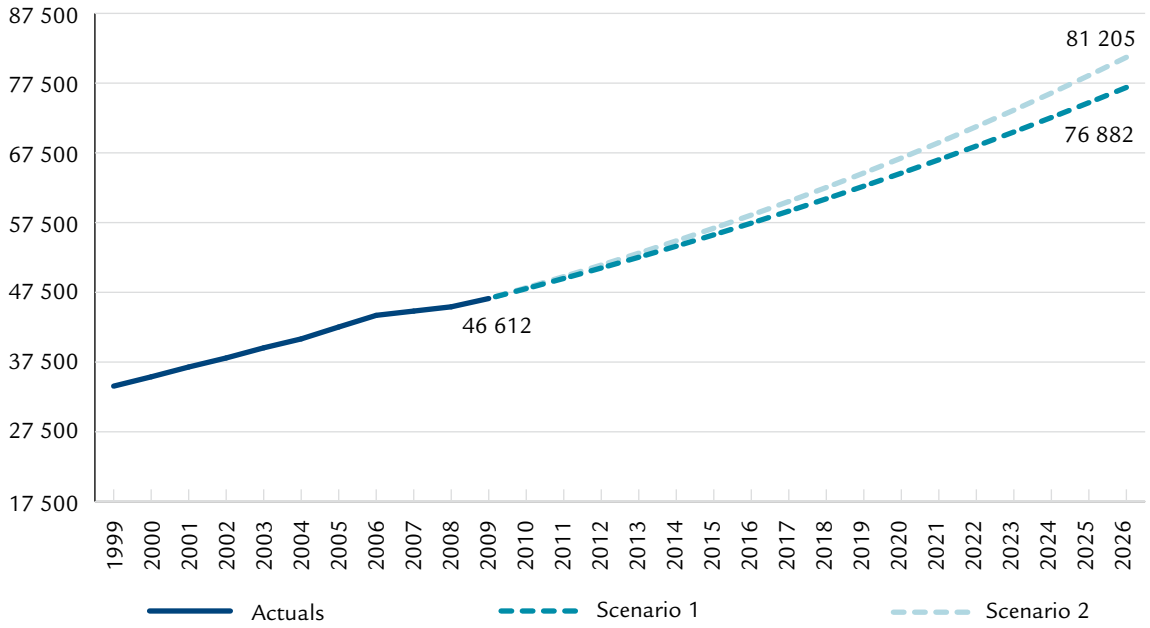


Figure 47: projected increase in small vessels Hunter Inland



Forecast: Sydney Harbour

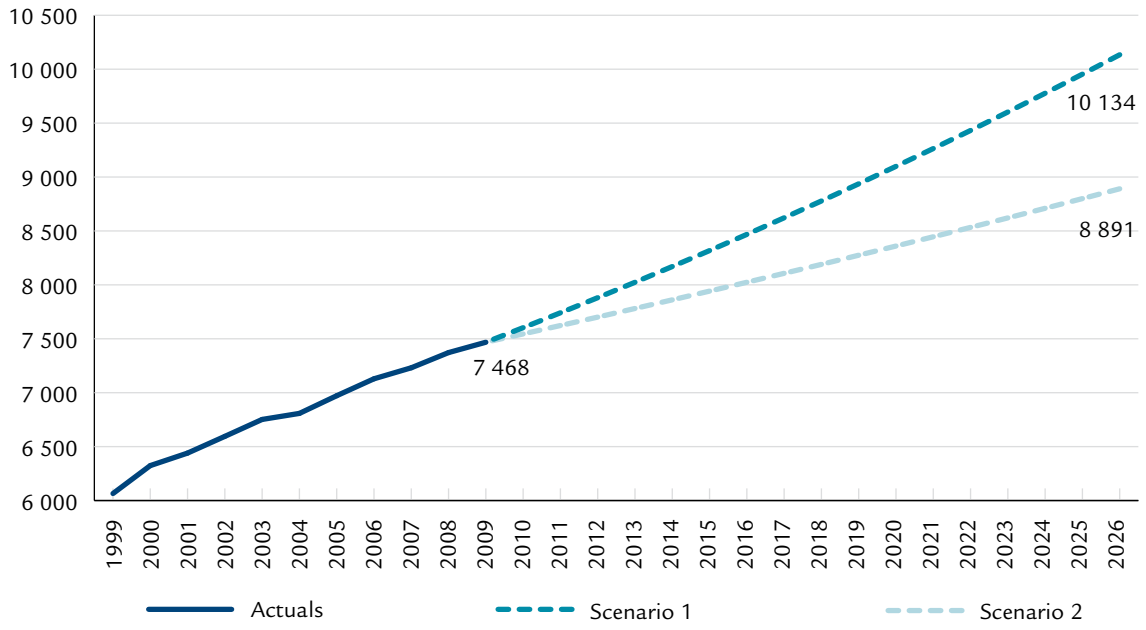
Figure 48: Fleet increase Sydney Harbour including projection to 2026

Scenario 1	Actuals					Forecasts				
Sydney Harbour	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	6 065	6 752	7 129	7 468	41.5%	7 881	8 318	9 099	10 134	47.3%
< 5.99	9 733	10 109	10 306	10 543	58.5%	10 693	10 837	11 063	11 308	52.7%
Total	15 798	16 861	17 435	18 011	100%	18 574	19 154	20 162	21 442	100%

Scenario 2	Actuals					Forecasts				
Sydney Harbour	1999	2003	2006	2009	%	2012	2015	2020	2026	%
> 6	6 065	6 752	7 129	7 468	41.5%	7 701	7 942	8 360	8 891	51.5%
< 5.99	9 733	10 109	10 306	10 543	58.5%	10 872	11 212	11 802	12 551	58.5%
Total	15 798	16 861	17 435	18 011	100%	18 574	19 154	20 162	21 442	100%

As already discussed, in the ten years to 2009, Sydney Harbour region exhibited a number of unique characteristics. Using Scenario 1, projections indicate that the split between large and small boats in Sydney Harbour could be close to parity by 2026: 47.3% will be over 6m in length. Of the additional 3,431 recreational boats projected for Sydney Harbour, 2,666 (or around 77%) are expected to be large boats.

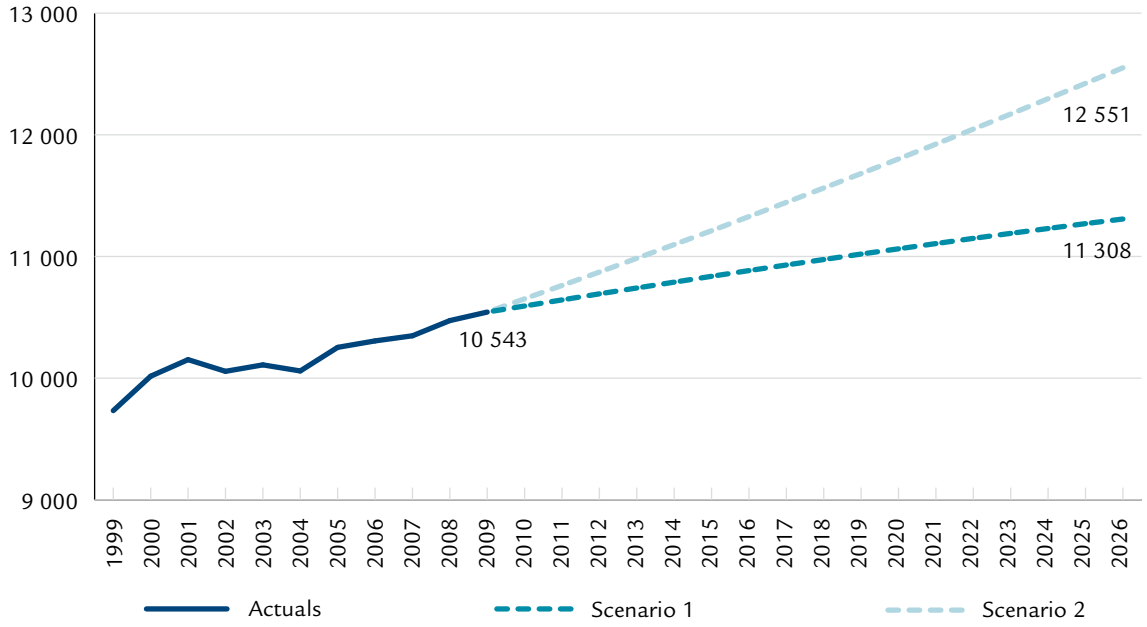
Figure 49: Projected increase in large vessels Sydney Harbour



Overall growth in Sydney Harbour is projected to be relatively modest with an annual growth rate around 1% and a growth to 2026 of around 19%. While this growth is comparatively subdued, Sydney Harbour has, nevertheless, the highest demand for on-water storage of any region in the state and relatively few avenues for expansion.

The following graph, Figure 50, demonstrates the projected scenarios for recreational vessels in Sydney Harbour under 6m in length.

Figure 50: Projected increase small vessels Sydney Harbour

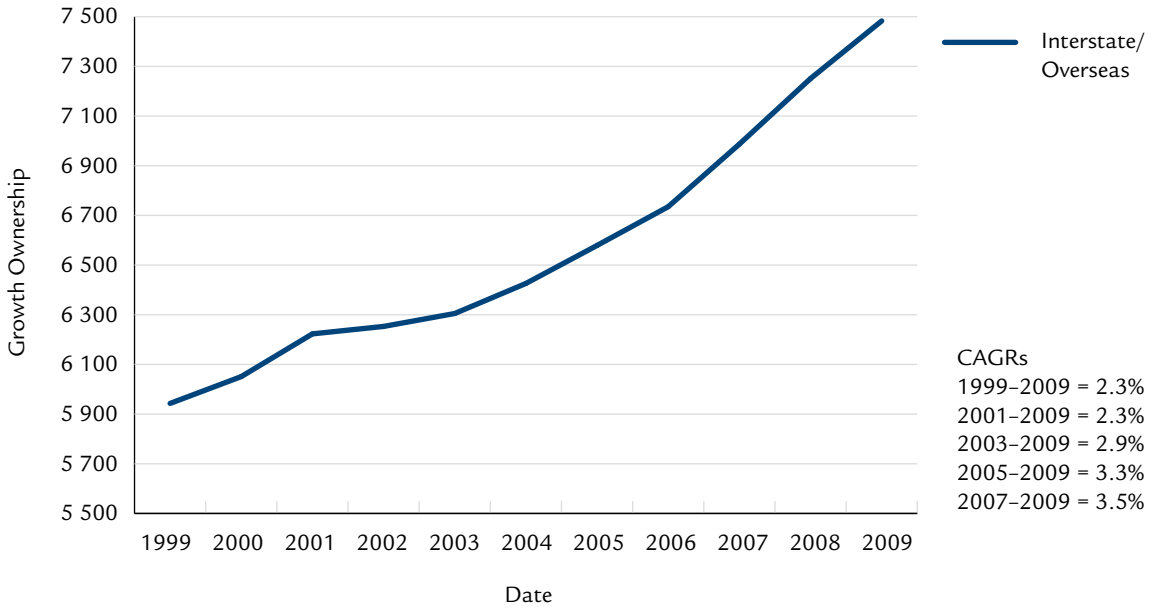


Forecast: Interstate/overseas

The number of boats owned by interstate/overseas residents has increased steadily over the last ten years. The annual growth rate from 1999–2009 was 2.3%, rising to 3.5% for 2007–2009.

The graph (Figure 51) shows the steady growth in the number of boats (the columns) and the year-on-year growth rates. These reveal that while the number of boats has increased every year, the growth rates have decreased twice: after 2001 and 2008.

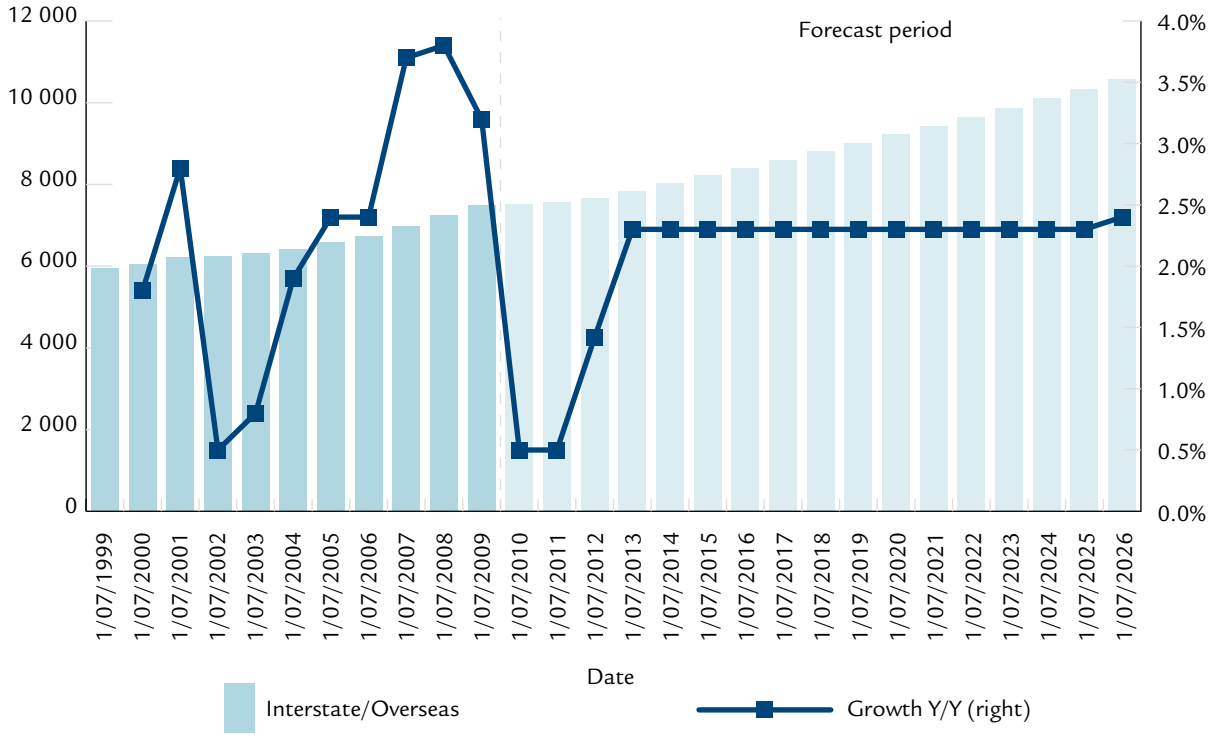
Figure 51: Growth in boats owned by interstate/overseas residents



Assuming that overseas boat ownership is sensitive to global economic cycles and the fact that there is no population forecast for this boat category, a slightly different approach has been used to that for New South Wales regions. Because of the uncertainty of the future health of the global economy, pace of growth has been forecast at only 0.5% in 2010 and 2011 before returning to the annual growth rate of 2.3% p.a experienced between 1999 and 2009. Based on these assumptions, the number of boats will increase from 7,483 to about 8,000 in 2014 and may pass the 10,000-mark by 2026.

The table (figure 52) shows the base case (linear projection) scenario:

Figure 52: Forecast for interstate/overseas vessels



Without reductions in the annual growth rate in 2010–2012, the total number of boats by 2026 would be 11,071.[45]

In terms of boat size, the proportion of boats above six metres has increased from 13.9% in 1999 to 18.7% in 2009. It should be noted, however, that this growth occurred from a relatively low base. Appendix E presents three alternative forecasts to 2026 for the number of large and small boats, registered to interstate/overseas owners.

Regional trends for each boat size category

Appendix F contains graphs which provide an overview of the number of boats for each category (above and below six metres) and year-on-year growth for each per boat size category between 1999 and 2009.

It is evident that results are similar across most regions: year-on-year growth rates for both categories of boats, while fluctuating, have always stayed positive. More importantly, the absolute number of boats in almost every category and in every region experienced positive growth between 1999 and 2009. The exception is Sydney Harbour where year-on-year growth rates for boats less than 6 metres twice dipped below the zero-mark in 2002 and 2004. However, as we have seen, Sydney Harbour is unique, not only because of the predominance of large boats. Lastly, the proportion of larger boats has grown almost constantly in each region in every year with the growth rates for larger boats, in almost every instance, remaining above that of smaller boats.[46]

45 Assuming slower growth to 2013 restricts the projected growth to 10,583 vessels in 2026.

46 Only in Hawkesbury / Broken Bay did the year-on-year growth rate for small boats exceed that of large boats in the year ended June 2009.

12. Discussion

This report is intended to provide reliable projections for use in planning discussions. It is not a strategy document, but a resource for future planning and policy work.

Clearly these projections have a number of implications for NSW Maritime as well as the other various stakeholders involved in recreational boating in NSW. Set out below, as examples, are issues arising for NSW Maritime from this report. This is not a comprehensive list, but some of the implications NSW Maritime will address in its short and medium term planning. A broader range of government agencies and industry bodies will need to use this data to inform their own policy development.

1. Mooring policy and planning

It is probable that NSW Maritime's policies relating to moorings will be reviewed in the light of increasing numbers of large boats, especially in waterways already subjected to strong demand. Issues which would need review could include:

- Consideration of how mooring ceilings are set at locations (depth of water, space, swing patterns, size of vessels) and how to increase capacity
- Priority areas for the development of mooring management plans
- Potential for changes in mooring styles to create greater efficiency and capacity
- Implications of increasing turnover in mooring sites and application of market pricing ('congestion tax' for areas in high demand)
- Development of mooring management plans for regional waterways (e.g. Hunter).

2. Sydney Harbour

Given Sydney Harbour's unique position among NSW Maritime Regions, development of strategies for better integrated planning, management and satisfaction of demand are needed:

- Integrated urban planning for the Sydney Metropolitan area taking into consideration increasing demand for recreational boating and related storage needs
- Encouragement of development of boating facilities in areas on the outskirts of Sydney including Port Hacking, Botany Bay and Broken Bay
- Matching supply of marina berths with demand
- Consultation with local councils for boat ramp traffic and trailer parking management to prevent undue waiting times at congested locations, especially at holiday and weekend peaks
- Identification of new sites and funding sources for moorings and other options such as dry stack storage for smaller boats such as dinghies
- Consideration of alternative strategies for increasing on-water storage such as converting swing moorings to marina style moorings
- Local Councils dealing effectively and equitably with dinghy storage around foreshores and trailer parking on city and suburban streets
- Expanding spare capacity of transient boating infrastructure for visiting vessels.

3. Congestion management

As shown previously, with increasing and competing use of waterways, incidents involving collisions between vessels become more frequent and will continue to do so as waterways other than Sydney Harbour become more congested. The implications of this are:

- The ongoing need for a boating regulator
- Priority areas for the development of safe boating plans for usage and congestion management strategies
- The needs for safety on and around the water to become a paramount consideration in the development of sites
- Consideration of strategies which limit the growth of vessel traffic and usage in certain areas which may reach capacity
- The development of education programs for vessel operators.

4. Recreational boat ramps

NSW Maritime studies (as previously indicated) show that many facilities already need to be better maintained or are unable to cope with current usage levels. Ongoing investment in boating infrastructure will be important.

5. Regional opportunities

The increasing number of recreational boats represents opportunities for regions – especially outside Sydney Harbour – to meet the needs of local communities and attract tourists and holiday makers to their waterways. The implications of this are:

- The need to develop boating facilities (such as the redevelopment of the Greenwell Point boat ramp on the Shoalhaven waterways) to boost regional tourist potential
- The opportunities for local government in Northern New South Wales to benefit from the saturation of the Queensland Gold Coast as a recreational boating destination by the maintenance and development of recreational boating facilities
- The opportunity to direct recreational boat owners away from environmentally sensitive areas (such as Clarence Town in the Hunter) towards more robust waterfronts
- Whether the funds available under the Better Boating Program are sufficient to meet demand, whether funding matches areas of demand and whether other sources are available for infrastructure development and maintenance.

13. Conclusion

This report has demonstrated that growth in recreational vessel numbers in NSW is expected to continue strongly into the 2020s. This will create demand for on-water storage infrastructure such as marinas as well as upgraded and expanded recreational boating facilities such as boat ramps. Impacts on local traffic and parking can be anticipated along with competing demands for residential amenity at popular waterway venues. With the information in this report, all those involved in land use planning and waterways management in NSW can be better prepared to provide for orderly development and to make the most of opportunities for urban and regional growth and renewal.

Appendix A

Vessels by region and size

Recreational vessels in NSW by region and size:

Region	Under 4m	4 to 6m	6 to 8m	8 to 10m	10 to 12m	12 to 14m	14m and over	Total
Botany Bay/ Port Hacking	6 404	13 533	2 430	707	514	228	161	**23 977**
Hawkesbury/ Broken Bay	10 277	24 946	4 842	1 780	1 225	523	342	**43 935**
Interstate/Overseas	2 096	3 987	574	219	162	204	241	**7 483**
Murray Inland	7 108	6 800	633	46	29	40	55	**14 711**
Hunter Inland	16 248	30 364	3 907	1192	734	305	139	**52 889**
North Coast	12 564	15 401	1 351	283	260	148	73	**30 080**
NSW Other	79	159	26	7	7	2	1	**281**
South Coast	9 439	19 342	2 162	381	250	88	69	**31 731**
Sydney Harbour	3 364	7 179	2 988	1 930	1 375	635	540	**18 011**
NSW Total	67 579	121 711	18 913	6 545	4 556	2 173	1 621	223 098
% of NSW Total	30%	55%	8%	3%	2%	1%	1%	

Commercial vessels in NSW by region and size:

Region	Under 4m	4 to 6m	6 to 8m	8 to 10m	10 to 12m	12 to 14m	14m and over	Total
Botany Bay/ Port Hacking	36	128	88	28	31	36	58	**405**
Hawkesbury/ Broken Bay	75	252	160	64	88	95	64	**798**
Interstate/Overseas	20	53	56	15	30	27	104	**305**
Murray Inland	40	46	10	1	3	8	54	**162**
Hunter Inland	105	345	147	75	43	37	62	**814**
North Coast	86	558	254	111	89	48	103	**1 249**
NSW Other	10	13	7	4	4	2	5	**45**
South Coast	63	262	141	33	51	42	56	**648**
Sydney Harbour	170	280	152	89	92	69	232	**1 084**
NSW Total	605	1 937	1 015	420	431	364	738	5 510
% of NSW Total	11%	35%	18%	8%	8%	7%	13%	

Appendix B

Growth in numbers of medium sized boats 1999–2009

Length	1/07/1999	1/07/2009
Under 3m	6 658	4 409
3 to 4m	46 224	63 775
4 to 5m	63 609	80 121
5 to 6m	30 860	43 527
6 to 7m	**7 382**	**13 397**
7 to 8m	5 662	6 533
8 to 9m	3 010	3 670
9 to 10m	2 692	3 295

Appendix C

Comparison of growth between sail and powered vessels

Comparison of growth between sail and powered vessels greater than 6m 1999–2009

Propulsion Type	1/07/1999	1/07/2001	1/07/2003	1/07/2005	1/07/2007	1/07/2009
Sail	10 776	11 156	11 437	11 575	11 786	11 917
Powered 6m and Over	15 598	17 451	19 123	21 524	23 699	25 566
Total Vessels	172 998	185 349	196 518	209 064	219 282	228 643

Propulsion Type	1/07/1999	1/07/2001	1/07/2003	1/07/2005	1/07/2007	1/07/2009
Sail	100%	104%	106%	107%	109%	111%
Powered 6m and Over	100%	112%	123%	138%	152%	164%
Total Vessels in NSW	100%	107%	114%	121%	127%	132%

Appendix D

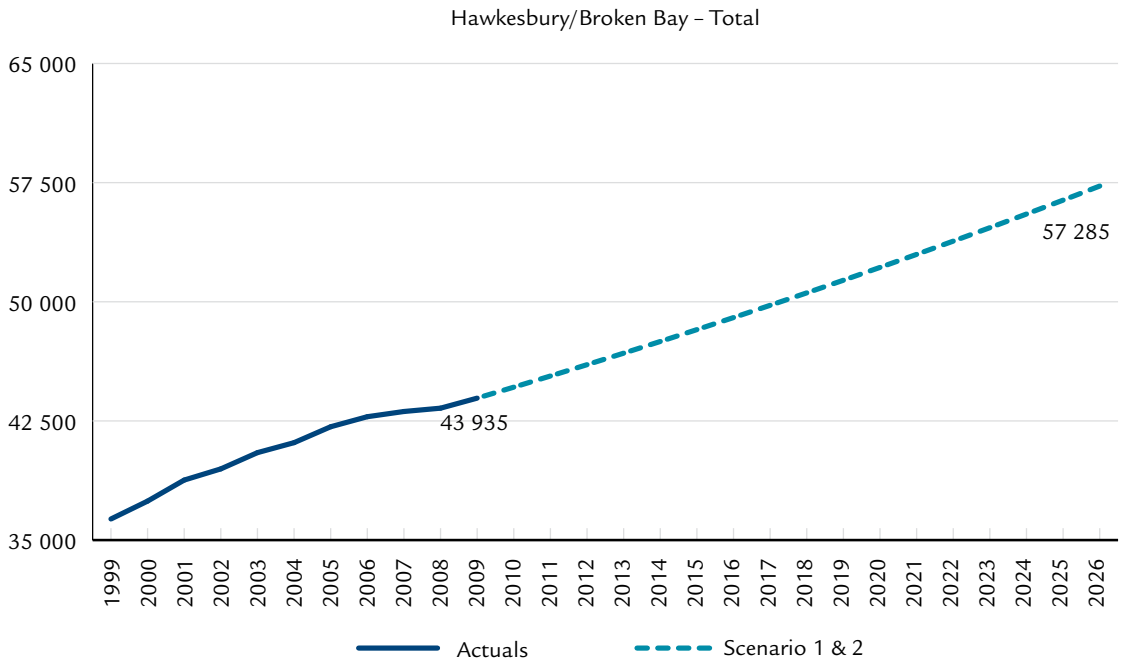
Regional fleet projections to 2026

The following table gives projections under Scenarios 1 & 2 split regionally, by size and against observed statistics for the ten years of data.

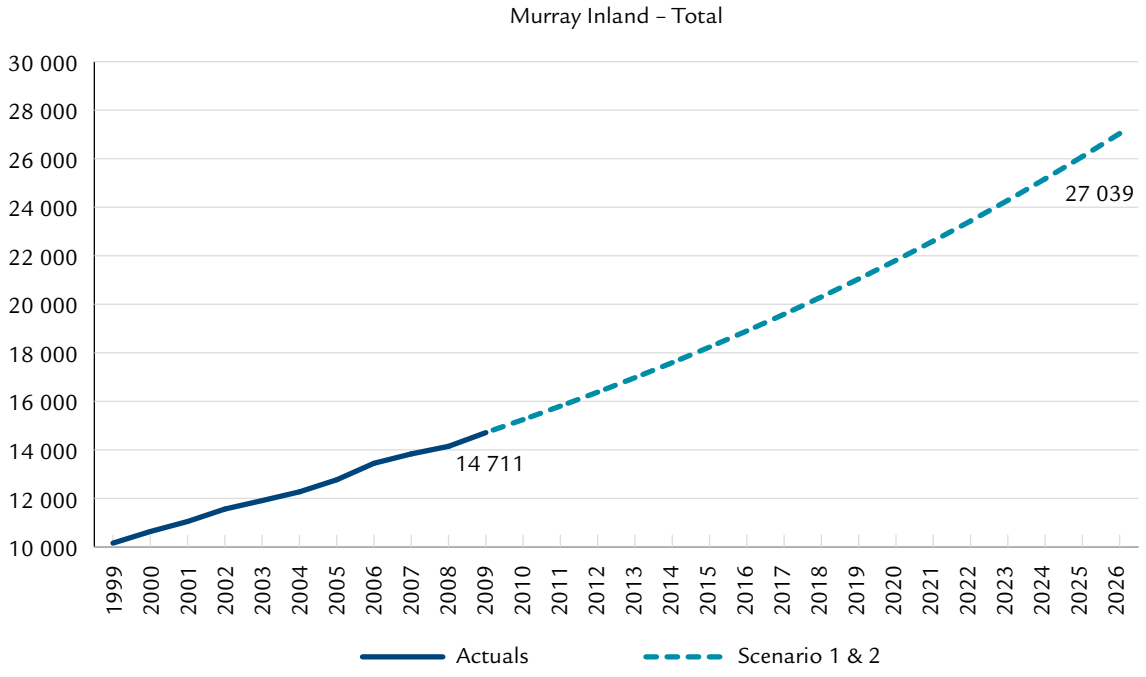
Scenario 1	Actuals					Forecasts				
	1999	2003	2006	2009	%	2012	2015	2020	2026	%
Botany Bay/Port Hacking										
> 6	2 986	3 422	3 718	4 040	16.8%	4 402	4 796	5 532	6 567	22.0%
< 5.99	17 748	18 703	19 344	19 937	83.2%	20 520	21 107	22 093	23 278	78.0%
Total	20 734	22 125	23 062	23 977	100%	24 921	25 903	27 625	29 844	100%
Hawkesbury/Broken Bay										
> 6	6 221	7 399	8 270	8 712	19.8%	9 540	10 447	12 154	14 575	25.4%
< 5.99	30 107	33 105	34 496	35 223	80.2%	36 501	37 801	40 009	42 709	74.6%
Total	36 328	40 504	42 766	43 935	100%	46 041	48 248	52 164	57 285	100%
Murray Inland										
> 6	263	390	587	803	5.5%	1 118	1 557	2 704	5 243	19.4%
< 5.99	9 893	11 519	12 860	13 908	94.5%	15 261	16 679	19 108	21 796	80.6%
Total	10 156	11 909	13 447	14 711	100%	16 379	18 236	21 812	27 039	100%
Hunter Inland										
> 6	3 681	4 426	5 471	6 277	11.9%	7 342	8 588	11 152	15 258	16.6%
< 5.99	34 048	39 540	44 200	46 612	88.1%	50 990	55 748	64 594	76 882	83.4%
Total	37 729	43 966	49 671	52 889	100%	58 332	64 336	75 746	92 140	100%
North Coast										
> 6	1 111	1 355	1 771	2 115	7.0%	2 568	3 117	4 306	6 347	10.1%
< 5.99	18 460	22 323	25 646	27 965	93.0%	31 679	35 874	44 096	56 394	89.9%
Total	19 571	23 678	27 417	30 080	100%	34 247	38 991	48 402	62 741	100%
South Coast										
> 6	1 513	2 036	2 511	2 950	9.3%	3 600	4 393	6 123	9 118	15.0%
< 5.99	20 085	23 934	26 801	28 781	90.7%	31 971	35 483	42 117	51 504	85.0%
Total	21 598	25 970	29 312	31 731	100%	35 571	39 876	48 240	60 622	100%
Sydney Harbour										
> 6	6 065	6 752	7 129	7 468	41.5%	7 881	8 318	9 099	10 134	47.3%
< 5.99	9 733	10 109	10 306	10 543	58.5%	10 693	10 837	11 063	11 308	52.7%
Total	15 798	16 861	17 435	18 011	100%	18 574	19 154	20 162	21 442	100%
Total										
> 6	21 840	25 780	29 457	32 365	15.0%	36 451	41 216	51 071	67 243	19.2%
< 5.99	140 074	159 233	173 653	182 969	85.0%	197 614	213 528	243 081	283 871	80.8%
Total	161 914	185 013	203 110	215 334	100%	234 066	254 744	294 151	351 113	100%

Scenario 2	Actuals					Forecasts				
	1999	2003	2006	2009	%	2012	2015	2020	2026	%
Botany Bay/Port Hacking										
> 6	2 986	3 422	3 718	4 040	16.8%	4 199	4 364	4 655	5 029	16.8%
< 5.99	17 748	18 703	19 344	19 937	83.2%	20 722	21 538	22 971	24 815	83.2%
Total	20 734	22 125	23 062	23 977	100%	24 921	25 903	27 625	29 844	100%
Hawkesbury/Broken Bay										
> 6	6 221	7 399	8 270	8 712	19.8%	9 130	9 567	10 344	11 359	19.8%
< 5.99	30 107	33 105	34 496	35 223	80.2%	36 911	38 681	41 820	45 926	80.2%
Total	36 328	40 504	42 766	43 935	100%	46 041	48 248	52 164	57 285	100%
Murray Inland										
> 6	263	390	587	803	5.5%	894	995	1 191	1 476	5.5%
< 5.99	9 893	11 519	12 860	13 908	94.5%	15 485	17 241	20 621	25 563	94.5%
Total	10 156	11 909	13 447	14 711	100%	16 379	18 237	21 812	27 039	100%
Hunter Inland										
> 6	3 681	4 426	5 471	6 277	11.9%	6 923	7 636	8 990	10 935	11.9%
< 5.99	34 048	39 540	44 200	46 612	88.1%	51 409	56 700	66 756	81 205	88.1%
Total	37 729	43 966	49 671	52 889	100%	58 332	64 336	75 746	92 140	100%
North Coast										
> 6	1 111	1 355	1 771	2 115	7.0%	2 408	2 742	3 403	4 411	7.0%
< 5.99	18 460	22 323	25 646	27 965	93.0%	31 839	36 249	44 999	58 330	93.0%
Total	19 571	23 678	27 417	30 080	100%	34 247	38 991	48 402	62 741	100%
South Coast										
> 6	1 513	2 036	2 511	2 950	9.3%	3 307	3 707	4 485	5 636	9.3%
< 5.99	20 085	23 934	26 801	28 781	90.7%	32 264	36 169	43 755	54 986	90.7%
Total	21 598	25 970	29 312	31 731	100%	35 571	39 876	48 239	60 622	100%
Sydney Harbour										
> 6	6 065	6 752	7 129	7 468	41.5%	7 701	7 942	8 360	8 891	51.5%
< 5.99	9 733	10 109	10 306	10 543	58.5%	10 872	11 212	11 802	12 551	58.5%
Total	15 798	16 861	17 435	18 011	100%	18 574	19 154	20 162	21 442	100%
Total										
> 6	21 840	25 780	29 457	32 365	15.0%	34 562	39 954	41 427	47 737	13.6%
< 5.99	140 074	159 233	173 653	182 969	85.0%	199 503	217 791	252 724	303 376	86.4%
Total	161 914	185 013	203 110	215 334	100%	234 066	254 744	294 151	351 113	100%

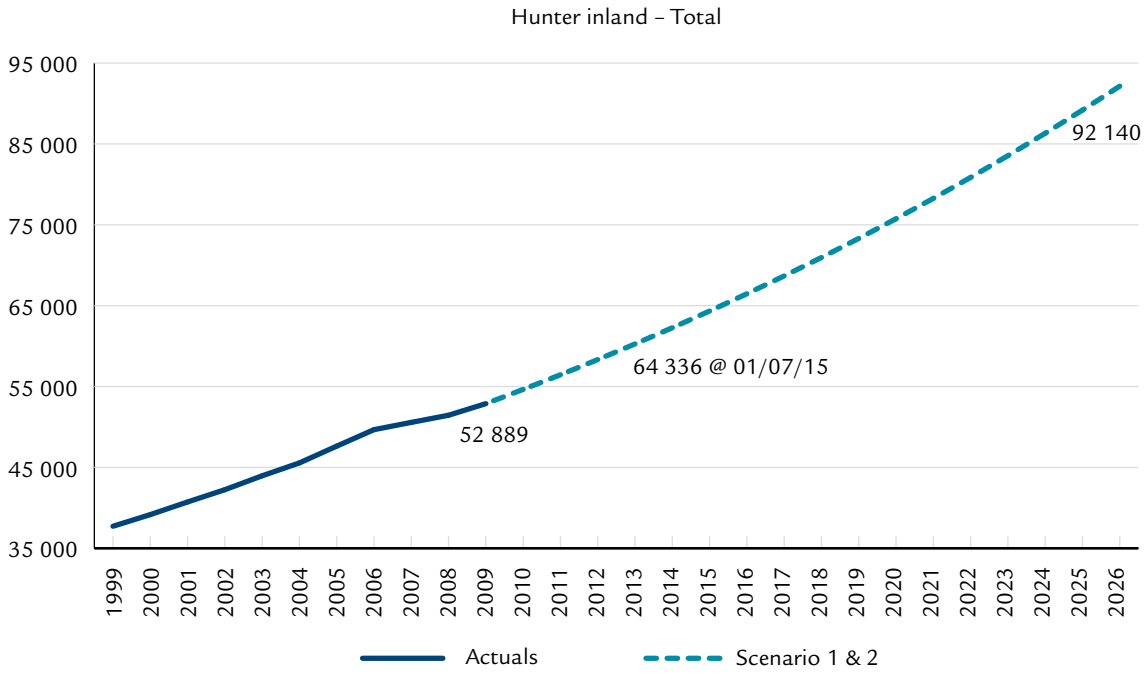
Total increase Hawkesbury/Broken Bay including projection to 2026



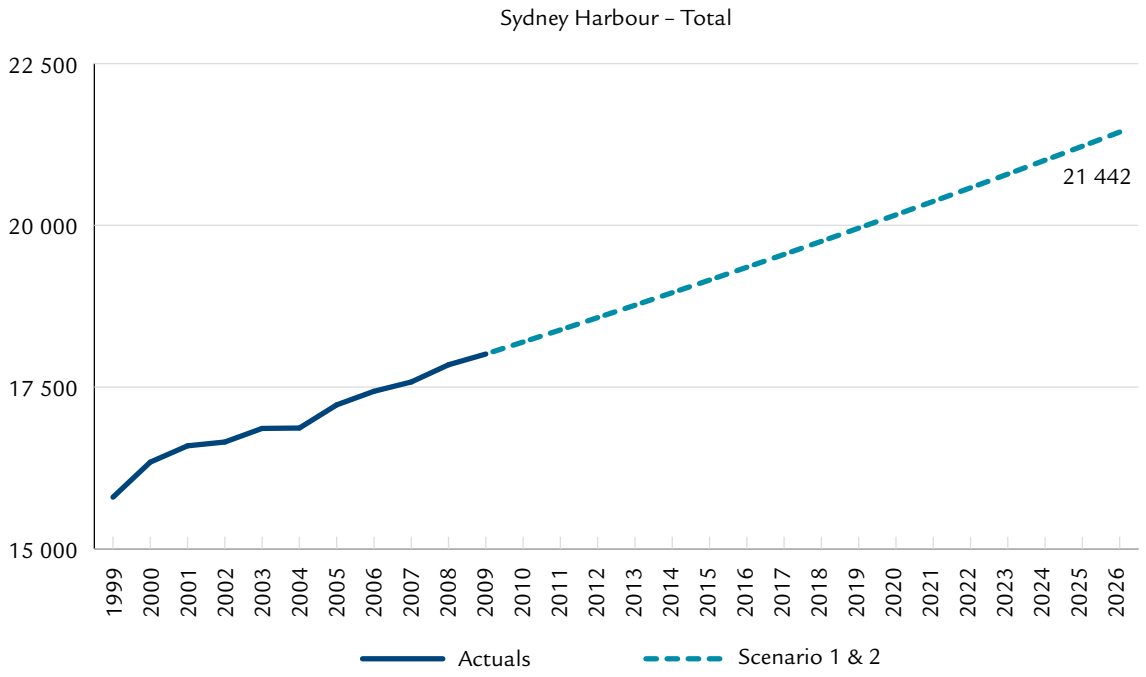
Total increase Murray Inland including projection to 2026



Total increase Hunter Inland including projection to 2026



Total increase all recreational vessels Sydney Harbour including projection to 2026



Appendix E

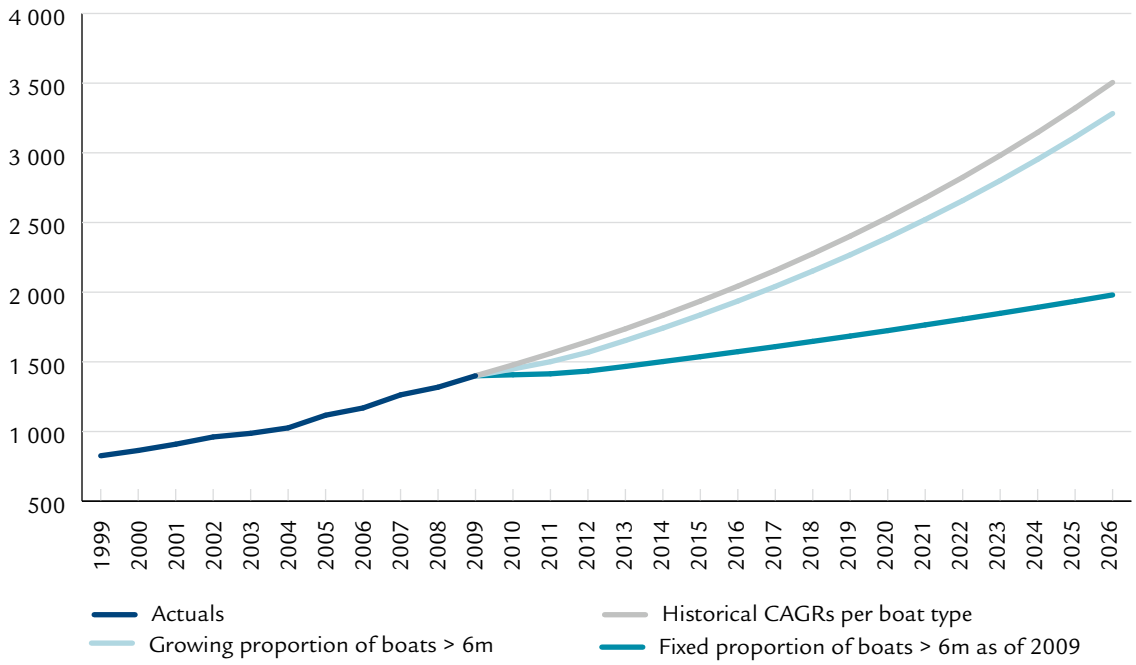
Interstate and overseas vessels: forecasts to 2026

Note: Scenario A assumes that the relative proportion of boats longer than six metres continues to grow in line with historical trends. Scenario B uses relative proportions as they were in 2009. Finally, Scenario C applies the historical compounded annual growth rates from the period 1999 to 2009 to the values in 2009. As noted previously, it is reasonable to predict a slight decrease in the annual growth rate for this category (because the 'overseas' component could be influenced by global economic uncertainty) so Scenarios A or B are preferred. While the annual growth rates for larger boats have been significant over the last ten years, it is questionable whether this growth is sustainable in the long run.

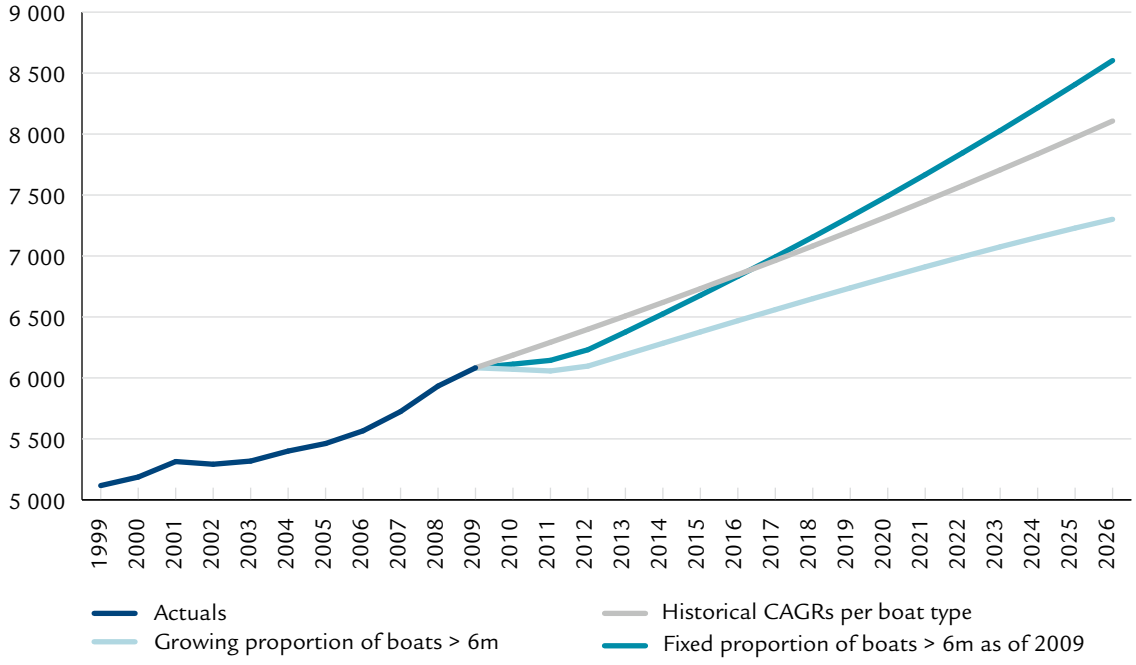
Interstate/overseas vessels: Scenarios for the boats over 6m and under 6m to 2026

	Actuals			Proportions		A			B			C		
	> 6m	<5.99m	Total	> 6m	<5.99m	> 6m	<5.99m	Total	> 6m	<5.99m	Total	> 6m	<5.99m	Total
1/7/99	826	5,117	**5,943**	13.9%	86.1%									
1/7/00	864	5,187	**6,051**	14.3%	85.7%									
1/7/01	909	5,314	**6,223**	14.6%	85.4%									
1/7/02	961	5,292	**6,253**	15.4%	84.6%									
1/7/03	987	5,318	**6,305**	15.7%	84.3%									
1/7/04	1,026	5,400	**6,426**	16.0%	84.0%									
1/7/05	1,117	5,462	**6,579**	17.0%	83.0%									
1/7/06	1,169	5,566	**6,735**	17.4%	82.6%									
1/7/07	1,263	5,724	**6,987**	18.1%	81.9%									
1/7/08	1,318	5,933	**7,251**	18.2%	81.8%									
1/7/09	1,400	6,083	**7,483**	18.7%	81.3%									
1/7/10						1,449	6,071	**7,520**	1,407	6,113	**7,520**	1,478	6,187	**7,664**
1/7/11						1,501	6,057	**7,558**	1,414	6,144	**7,558**	1,560	6,292	**7,852**
1/7/12						1,568	6,097	**7,665**	1,434	6,231	**7,665**	1,646	6,399	**8,045**
1/7/13						1,653	6,191	**7,844**	1,467	6,376	**7,844**	1,737	6,508	**8,246**
1/7/14						1,742	6,284	**8,026**	1,502	6,525	**8,026**	1,834	6,619	**8,453**
1/7/15						1,837	6,377	**8,214**	1,537	6,677	**8,214**	1,936	6,732	**8,667**
1/7/16						1,936	6,469	**8,405**	1,573	6,833	**8,405**	2,043	6,847	**8,890**
1/7/17						2,041	6,560	**8,601**	1,609	6,992	**8,601**	2,156	6,963	**9,119**
1/7/18						2,152	6,650	**8,801**	1,647	7,155	**8,801**	2,276	7,082	**9,358**
1/7/19						2,268	6,738	**9,007**	1,685	7,322	**9,007**	2,402	7,203	**9,605**
1/7/20						2,391	6,825	**9,217**	1,724	7,492	**9,217**	2,535	7,325	**9,861**
1/7/21						2,521	6,911	**9,431**	1,765	7,667	**9,431**	2,676	7,450	**10,126**
1/7/22						2,657	6,994	**9,651**	1,806	7,846	**9,651**	2,824	7,577	**10,401**
1/7/23						2,801	7,075	**9,876**	1,848	8,028	**9,876**	2,981	7,706	**10,687**
1/7/24						2,953	7,153	**10,106**	1,891	8,216	**10,106**	3,146	7,837	**10,984**
1/7/25						3,113	7,229	**10,342**	1,935	8,407	**10,342**	3,321	7,971	**11,292**
1/7/26						3,282	7,301	**10,583**	1,980	8,603	**10,583**	3,505	8,107	**11,612**

Interstate/Overseas – boats > 6m



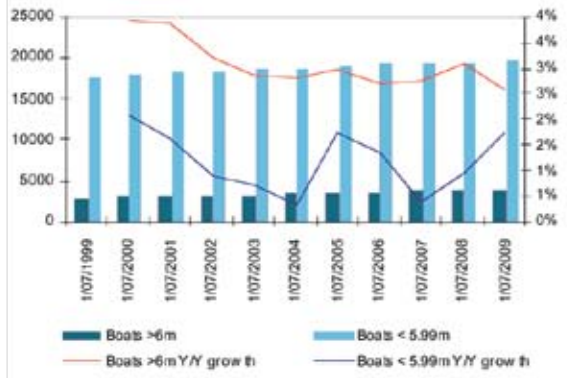
Interstate/Overseas – boats 5.99m



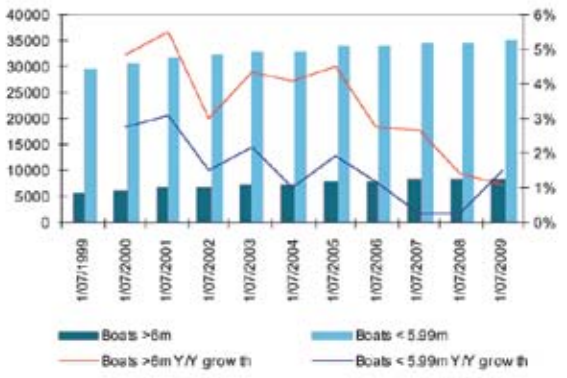
Appendix F

Regional trends by boat size 1999–2009

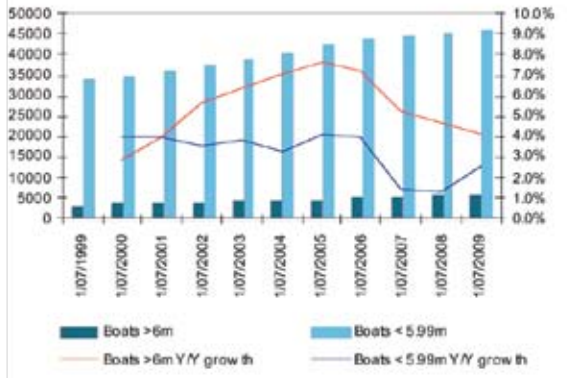
Botany Bay / Port Hacking



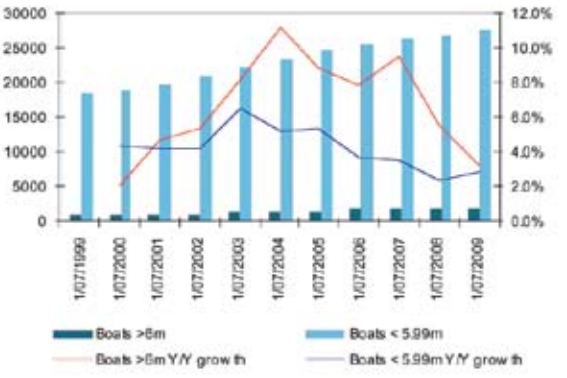
Hawkesbury / Broken Bay



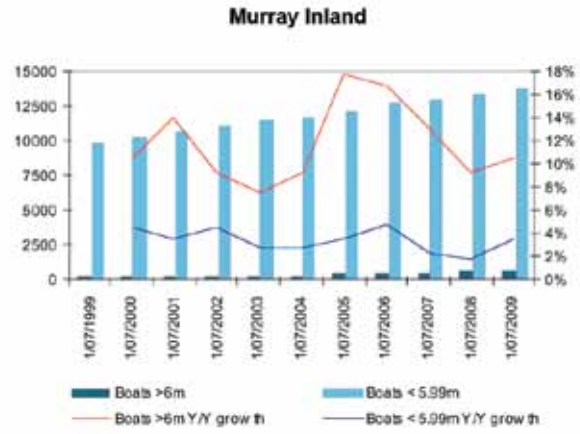
Hunter Inland



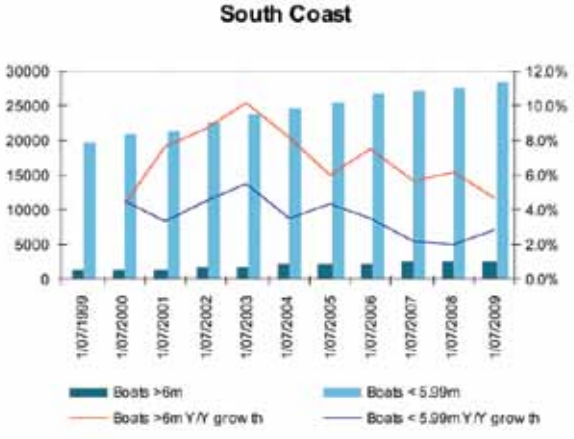
North Coast



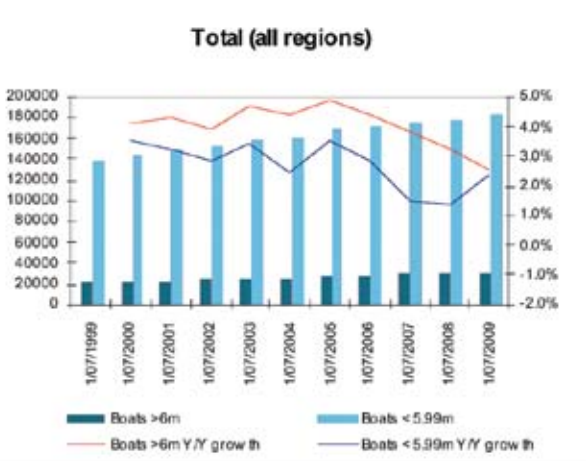
Murray Inland

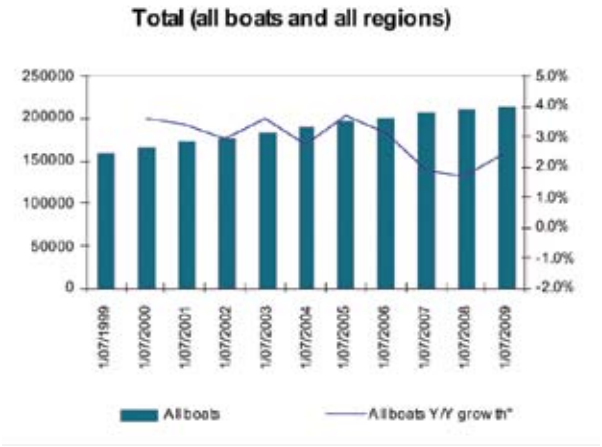


South Coast




Sydney Harbour
12000
10000
8000
6000
4000
2000
0
4.0%
3.0%
2.0%
1.0%
0.0%
-1.0%
-2.0%
1/07/1999
1/07/2000
1/07/2001
1/07/2002
1/07/2003
1/07/2004
1/07/2005
1/07/2006
1/07/2007
1/07/2008
1/07/2009
Boats >6m
Boats < 5.99m
Boats >6m Y/Y growth
Boats < 5.99m Y/Y growth


Total (all regions)
200000
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
-1.0%
-2.0%
1/07/1999
1/07/2000
1/07/2001
1/07/2002
1/07/2003
1/07/2004
1/07/2005
1/07/2006
1/07/2007
1/07/2008
1/07/2009
Boats >6m
Boats < 5.99m
Boats >6m Y/Y growth
Boats < 5.99m Y/Y growth


Total (all boats and all regions)
250000
200000
150000
100000
50000
0
5.0%
4.0%
3.0%
2.0%
1.0%
0.0%
-1.0%
-2.0%
1/07/1999
1/07/2000
1/07/2001
1/07/2002
1/07/2003
1/07/2004
1/07/2005
1/07/2006
1/07/2007
1/07/2008
1/07/2009
All boats
All boats Y/Y growth*

Transport for NSW

Draft Sydney Harbour Boat Storage Strategy

April 2013

NSW GOVERNMENT | Transport for NSW

CONTENTS

Introduction

The Government's Maritime Policy Agenda commits to the development of a Boat Storage Strategy that considers boat storage capacity requirements in NSW on a waterway-by-waterway basis, starting with Sydney Harbour[1].

As part of the strategy the Government will also explore options to encourage the development of major dry-stack storage facilities on Sydney Harbour and work with local Councils to try to address increasing concerns caused by long-term boat trailer parking on residential streets. The Maritime Advisory Council has identified that a lack of boat storage capacity is a key factor driving the trend for more boats to be left on trailers in residential streets of waterside suburbs.

The first section of this report uses trends in vessel registration figures to estimate demand for boat storage in and around Sydney Harbour to 2021. The report then provides a stocktake of current boat storage facilities in and around Harbour to identify the likely increase in capacity that will be required to keep pace with demand.

2021 is used as the timeframe for the Strategy to align with the timeframe for broader NSW Government goals and targets as outlined in *NSW 2021: A plan to make NSW number one*.

Demand for Boat Storage in Sydney Harbour

Forecasting demand for boat storage in a particular geographic region is intrinsically challenging. While Roads and Maritime Services' registration databases record the residential addresses of boat owners, not all boat owners in a particular region store their boat in or around the nearest waterway. Likewise, not all boats in and around a particular waterway are owned by people who live in the region. The analysis is particularly difficult for Sydney where boat owners have ready access to other major waterways immediately to the South (Georges River/Botany Bay) and North (Pittwater/Hawkesbury).

The analysis below is therefore largely based on the application of state-wide trends in the growth of vessel registrations to Sydney Harbour. The purpose of the analysis is to provide an indicative illustration of the boat storage challenge on Sydney Harbour to help inform future Government policy decisions and promote awareness and understanding among boating stakeholders of the task ahead.

Recreational Vessels

Recreational vessel registrations have continued to rise in NSW. For example in 1999, there were 160,000 registered (recreational) vessels, excluding personal watercraft (PWCs). In 2012 this has increased to 217,000.

In 2010, the then NSW Maritime released a report, *'NSW Boat Ownership and Storage: Growth Forecasts to 2026'* (The 2010 Report). Key findings of the 2010 report include:

- In the preceding ten years growth in vessel registrations grew at an average of 2.9% annually across NSW, with a similar growth trend forecast to 2026.
- Sydney Harbour has approximately 8% of the State's recreational vessels and 20% of the State's commercial vessels
- Sydney Harbour has a greater proportion of large (> 6 metres) vessels than other regions in NSW

Note: 6 metres is an important threshold as it is at 6 metres or longer that storage methods begin to change, generally from 'trailerable' to on-water or dry storage.

The 2010 Report found that vessel growth in Sydney Harbour was below the State average and in fact was the lowest of all major waterways. However, as noted in the 2010 Report, a key factor in the apparent lower growth in Sydney Harbour is likely to be the lack of on-water storage capacity and the limited space to store trailerable vessels given Sydney's higher housing densities. This latent demand is evidenced in the lengthy waiting lists for private moorings in many parts of the Harbour. The

[1] For the purposes of defining the area referred in this report, Sydney Harbour includes Sydney and Middle Harbour, Parramatta and Lane Cove Rivers and adjacent lands unless stated otherwise.

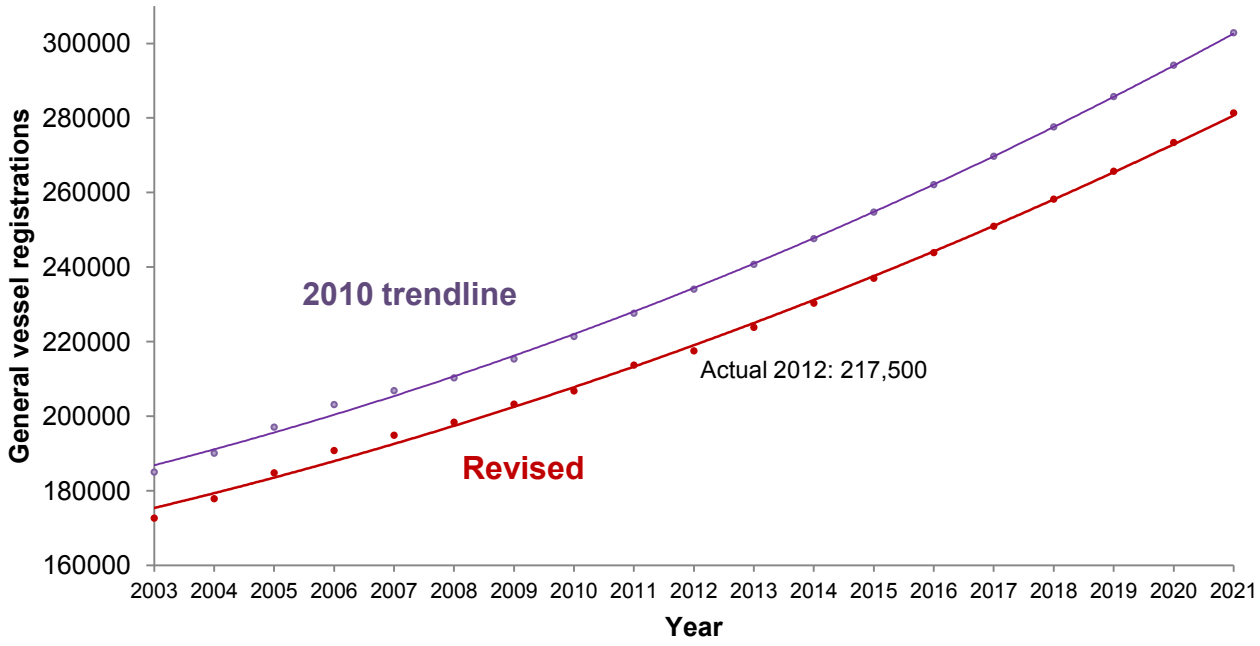
sustained growth of boating numbers continues to be acknowledged across industry and the boating community.

Since 2010 Roads and Maritime Services (RMS) has changed the way it measures vessel registrations, necessitating an update to the forecasts in the 2010 report. The 2010 report included those recreational vessel registrations that were current, as well as those less than 90 days after expiry. The vessel registration figures provided by RMS are now only limited to registered vessels.

The actual number of NSW vessel registrations in 2012 was 217,000. This compares to the forecast figure in the 2010 report of 234,000.

Figure 1 re-bases the 2010 forecast using the actual number of vessel registrations in 2012 to predict a revised estimate of the expected growth in NSW vessel registration numbers to 2021. Assuming Sydney Harbour vessels continue to make up 8% of the NSW recreational fleet, the estimated number of recreational vessels in the Harbour by 2021 is approximately 22,400 – an increase of around 5,000.

Fig. 1 *NSW Recreational Vessel Registrations: Revised Forecast to 2021*



Commercial Vessels

While fewer in number, it is also important to consider the future storage requirements for commercial vessels. Commercial vessels are primarily stored on water and many have similar storage requirements to recreational vessels. However, a number require access to specialist on-shore facilities.

The 2010 Report estimated that Sydney Harbour is home to approximately 20% of the 9,000 commercial vessels in NSW. A closer analysis of commercial vessel registrations suggests that there was strong growth in the Sydney Harbour commercial fleet in the early 2000s with numbers increasing from 569 vessels in 2003 to 1,419 vessels in 2012. The number of commercial vessels over 6 metres grew from 362 in 2003 to 745 in 2009 and 877 in 2012, suggesting a slowing in the growth of larger commercial vessels on the Harbour in recent years.

As with recreational vessels, a lack of on-water storage capacity may be a factor driving the slower growth rate in recent years. However, the size of the commercial fleet is also strongly influenced by economic conditions.

Stocktake of Boat Storage Capacity on Sydney Harbour

The stocktake was based on the following sources:

- actual numbers stored on private swing moorings based on RMS records
- actual numbers stored on commercial swing moorings (excluding those attached to commercial marinas and boat repair facilities)
- storage spaces provided at commercial marinas and boat repair facilities based on RMS records
- storage spaces provided at private marinas and domestic tenancies based on RMS records
- actual numbers of commercial vessels > 6 metres in Sydney based on RMS records
- interviews with commercial operators (marinas, boating facilities) in relation to current and proposed storage spaces (development application either approved or currently undergoing assessment)
- information provided by RMS in relation to tenancies, leases and licences

The current spaces in Sydney Harbour are categorised in Figure 2:

Fig 2. *Current storage numbers in Sydney Harbour*

Private moorings (Maritime issued licences below the mean high water mark (BMHWM)	**>5300**	RMS administered licences
Commercial moorings (other including charter vessels and other commercial vessels)	**>100**	RMS administered commercial licences
Commercial /club moorings (mooring licences assigned to commercial marinas or boat repair facilities yacht and sailing clubs)	**>820**	RMS administered commercial licences that are usually attached to a commercial marina or repair facility (land-based) (BMHWM)
Commercial marina berths (including yacht and sailing clubs). Includes some hardstand, usually at yacht clubs	**>1700**	RMS administered commercial leases (BMHWM)
Commercial marina visitor and charter vessel berths not included above	**>220**	RMS administered commercial leases
Domestic berths, moorings and other associated storage spaces ∞	**>1680**	RMS administered private licences or leases attached to a private property and may include reclaimed land
Private Marina berths or structures (domestic waterfront tenancies).	**>480**	Privately (usually strata) administered spaces
Dry-stack (and/or dry storage) spaces	**Nil**	None currently in Sydney
Total	**10,300**	

∞*This figure includes 'domestic' boatsheds and does not indicate actual number of vessels stored*

Commercial Marina Berths

The Australian Standard®, AS 3962—2001, (Incorporating Amendment No. 1), Guidelines for design of marinas, defines:

- A berth as an area of water allocated for the wet storage of boats attached to a fixed or floating marina and allowing for walk-on access to boats
- Fixed berths as berths consisting of piled walkways (jetties) and mooring piles, and,
- Floating berths as consisting of walkways that are buoyant and not supported by any other structure..... may be located by means of guide piles, anchor chains or cables.... The boats are moored in either single or double berths, with finger pontoons or along-side berth configuration.

AS 3962—2001 also sets minimum requirements for parking. This standard is now over 12 years old and there is a strong view that it is a constraint on growth and should be reviewed to reflect the increased availability of alternate parking and transport solutions. A more flexible approach from consent authorities will make it easier for commercial marinas to respond to increased demand.

In Sydney Harbour, commercial marina leases are administered by RMS as owner of the seabed below the mean high water mark. Adjacent landside facilities are managed by either the Department of Primary Industry (Crown Lands), or are private property. Commercial marinas are permitted in four of the zones under the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005, the 'SHREP'.

Commercial marina fees vary according to location and the level of service provided and for Sydney Harbour can range from $1100 to $1500 per month for a 10 metre vessel.

Examples of floating berths in Sydney Harbour are shown below. Most commercial marinas as well as private marinas provide floating rather than fixed berths and the majority of sites on Sydney Harbour also provide commercial moorings, described below.

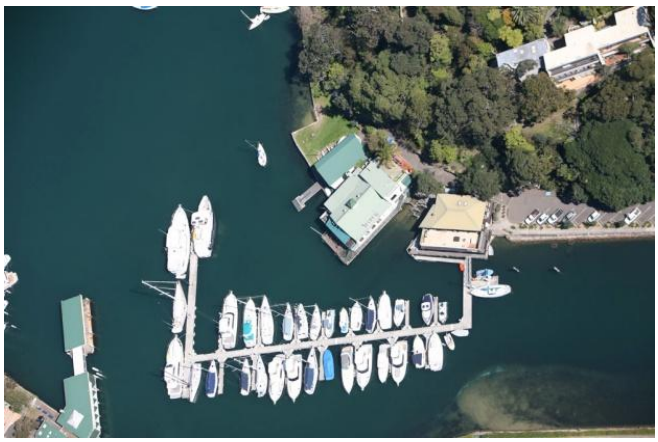


Fig. 3, 4 & 5 – *Commercial Marina Berths*

Superyacht Storage

Superyachts are vessels over 24 metres in length. Built for the 2000 Olympic Games, the Sydney Superyacht Marina at Rozelle Bay is capable of storing up to 45 vessels and is the only dedicated marina for this size of vessel. In the lead-up to and following the Sydney 2000 Olympics, a select number of Sydney Harbour marinas provide a small number of longer berths suited to these larger vessels. Industry suggests that demand for longer berths continues to rise.

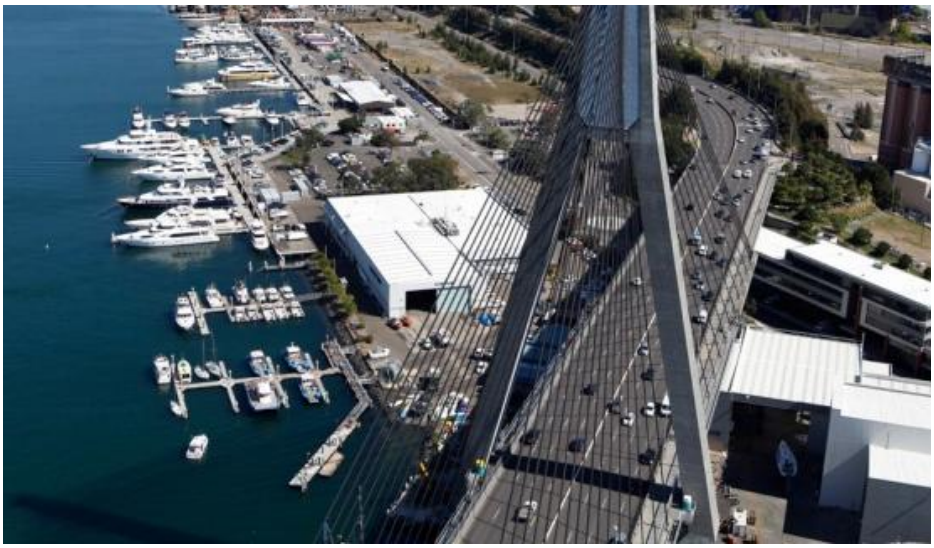


Fig. 6 - *Rozelle Superyacht Marina*

Commercial and Club Moorings

Commercial and club moorings are most often associated with a land-based site such as a marina, yacht or sailing club or boat repair facility and are only distinguishable by the colour of the mooring buoy, generally orange for commercial and club moorings. Commercial mooring fees range from $280-$600 per month depending on location and the size of the vessel.

Yacht, Sailing and Motor Clubs

Yacht and other clubs can also be classed as marinas, and leases or licences are administered by RMS below the mean high water mark. Occupation of berths and moorings at yacht and sailing and motor clubs is almost exclusively for members and fees vary greatly across clubs as the fees may include membership benefits as well as access to berths in selected instances. As an example, at the Cruising Yacht Club of Australia, non-member vessels are provided storage access in preparation for the Sydney to Hobart Yacht race annually, and this practice of allowing non-members for regattas/events across the different types of clubs is common. The image below shows a combination of hard stand, commercial moorings and berths at a yacht club.

Fig. 7 – *Combination of facilities*

Private Swing Moorings

Moorings in NSW are administered by RMS, except for a small number in National or Marine Parks such as Cowan Water or Myall Lakes. There are currently (November 2012) over 5300 private swing moorings across Sydney Harbour, with over 4200 of these showing postcodes within the Sydney Harbour Catchment. Private swing moorings currently account for around 50% of vessel storage on the Harbour.

Mooring areas in Sydney have been in high demand for many years, with lengthy waiting lists in many areas of the Harbour - particularly east of the Sydney Harbour Bridge and in bays around the Balmain peninsula. Waiting lists across the Harbour currently total around 1,000, although this may be somewhat inflated by the tendency for some people to register their interest in multiple lists. For some areas, mainly west of the Harbour Bridge, there are no waiting lists with moorings readily available and where spaces occur, is usually due to the bays' exposure to wind and waves or where there is poor access to the mooring.

Mooring fees are determined by RMS and currently range from $297 for <7 metres, $700 for 10-11 metres and $6472 for 39-40 metres in the western Harbour areas and $464 for <7 metres, $1088 for 10-11 metres and $10,049 for 39-40 metres in the eastern Harbour.

The images below provide examples of private swing moorings scattered across bays.

Fig. 8 & 9 – *Cluttered bays*

Private Marina Berths

Private marinas are generally administered by an owners' corporation or leasing agent. Under the 'SHREP 'private marinas' are permitted in one zone. Private marinas in other zones were approved and built prior to the changes to the former REP. Formerly defined as 'multiple moorings', the current definition in the SHREP and the Sydney Harbour Foreshores and Waterways Area Development Control Plan is:

> *an apparatus or structure located on or in the waterway and used for restraining two or more vessels, but does not include a commercial marina or mooring pen*

Fig. 10 – *Walsh Bay*

Fig. 11 – *Private Marina*

Domestic jetties, slipways, domestic boatsheds, berths or fore & aft moorings

These storage spaces, attached to private properties, are found across the Harbour and since 2005 are limited to zones as allowable under the SHREP. Tenancies are administered by RMS as either licences or leases and fees are determined by the Independent Pricing and Regulatory Tribunal based on the Statutory Land Values. Storage typically is through jetties, pontoons and fore and aft moorings or slipways. Boatsheds may also be present, however in many instances these are used for purposes other than boat storage, for example, safety equipment, tools for maintaining and repairing vessels. Examples east and west of the Harbour Bridge are shown below.

Fig. 12 & 13 – *Domestic leases*

Commercial vessel berths

Commercial vessels are scattered across Sydney Harbour, primarily in commercial berths and moorings. Leases are administered by RMS. The main clusters for commercial vessels are Circular Quay, Blackwattle Bay, King St and Jones Bay Wharves and Neutral Bay. Commercial Vessels require different land-based facilities than commercial marinas generally offer (E.g. provisioning / pick-up & drop-off). Additionally whilst commercial vessels can be berthed at commercial marinas, permission to operate from most marinas may require special approvals.


Fig. 14 & 15 – *Commercial storage*

Dry storage (dry-stack) and hardstand

There are currently no dry-stack storage facilities in Sydney Harbour. The nearest dry-stack facility is at Akuna Bay (Figure 18). Sydney Harbour has some minimal hardstand storage space, usually associated with yacht/sailing clubs.

Dry-stack is best suited for motor-boats between 6-12 metres as yachts cannot be stored in a rack system, usually due to masts and keels. Fees at a dry-stack facility vary depending on the age and location of the site and amenities and services offered. Dry-stack fees generally reflect those charged for similar sized vessels at commercial marinas, and would equate to around $1000-$1300 per month for a 10 metre vessel. However, when compared to wet-storage, a boat owner may save, for example, up to $2,000-$2500 per annum for 8-10 metre vessels, by avoiding the annual servicing costs associated with wet-storage options

The images below show a dry storage facility in Auckland. As a comparison to Sydney, (pop.4,600,000) Auckland (pop. 1,500,000) has over 500 dry berths in close proximity to the city centre and a number of other facilities within 30 minutes to 2 hours from Auckland. Dry-stack facilities require a number of 'holdover' berths on-water for owner access as shown below.

Fig. 16 - *Orams dry-stack, Auckland*

Fig. 17 - *internal shed and external holding area*

Fig. 18 - *Akuna Bay dry-stack at d'Albora Marina*

Fig. 19 - *Hardstand storage*

Trailer storage

With an approximate number of 17,400 recreational vessels in Sydney and existing storage spaces of 10,300, it is clear that the largest method of boat storage in the region is on trailers. While the majority of the trailers are kept on private property, many are also stored on residential streets. In most areas the practice of a boat owner storing their boat trailer on the street in the front of their house is tolerated by local residents. However, a number of Councils, particularly in higher-density waterside areas, report an increasing number of complaints from local residents concerned about the impact of congested local streets being used as a long-term storage option for boat trailers.

Other types of dry storage

While not currently available in Sydney Harbour, other types of dry-storage are available in regional areas of NSW, other states and overseas and include dedicated trailer boat parks and hardstand facilities. An example of a dedicated hardstand area is found at Oyster Cove (Port Stephens) with storage for up to 70 vessels on industrial (zone) land as shown in the image below. More recently, in the United States for example, remote dry storage (15-30 minutes from the waterways) facilities have emerged. Often this kind of facility offers owners a 'valet' service so that the owner can access their vessel directly at the land-water interface which is likely to be either a floating berth system or a boat ramp. Alternatively, remote dry storage can offer self-service.

Fig. 20 - *Hard stand*

Fig 21 - *Remote dry storage*

Fig 22 – *Remote storage with Valet*

Dinghy and Paddlecraft storage

Storage requirements for smaller vessels include rowing boats, kayaks and dinghies also need to be considered. Rowing clubs usually have storage sheds and recently a number of commercial marina sites have started to provide kayak storage as part of their land-based facilities. Dinghy storage is relevant insofar as the only way to access private swing moorings is through a privately owned dinghy: the majority of dinghy storage is on Council land and some of the storage issues have been resolved in part through the Government's Better Boating Program which provides funding to improve recreational boating infrastructure, including funding for the installation of dinghy / other vessel racks.

Fig 23 – *Kayak storage in a Sydney Harbour marina*

Fig 24 - *Dinghy Storage*

Transport (ferries) and police vessel storage

Balmain (ferries) and Cameron's Cove (police), shown below, provide exclusive storage for Government owned ferries and police boats. While beyond the scope of this report, continuing to ensure sufficient storage capacity for these vessels is a key consideration for Government.

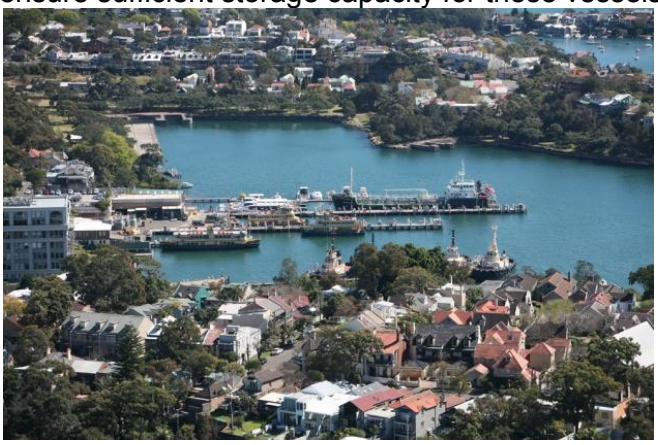


Fig 25 – *Sydney Ferry Yard Balmain*

Fig 26 – *Sydney Water Police Camerons Cove*

Matching Capacity to Growth

The demand analysis suggests that the number of boats to be stored in and around Sydney Harbour is likely to increase by around 5,000 by 2021. While accommodating this growth will likely require an expansion in all categories of boat storage, it is important for Government and industry to work together to help ensure the most efficient outcome for the boating community and to minimise the impact of any negative externalities on the general public – for example, from the increased incidence of boat trailer parking on residential streets.

A number of targets are therefore proposed as a means of achieving a common agreement and understanding among stakeholders and the community of the likely growth required in each category of boat storage to deliver the best outcome by 2021. The targets are also informed by recent trends in the growth of different types and sizes of vessels, remembering that not all vessels are suitable for all storage methods.

The purpose of the targets is not to limit the growth in any particular category of boat storage. To a large extent, the actual growth in particular categories will be driven by market outcomes, which are in turn influenced by external factors such as economic growth. However, as owner of the seabed of Sydney Harbour and administrator/regulator of all development and activities conducted on the Harbour, there are a number of ways which the Government can help shape how growth is met. Setting targets not only helps inform future policy, but also helps stakeholders and industry to understand the objectives behind Government decision and initiatives.

Storage for vessels over 6 metres

The 2010 Report pointed to an increase in the average size of recreational vessels across the State, particularly in Sydney Harbour. The 2010 Report estimated that the proportion of vessels on the Harbour over 6 metres compared to those under 6 metres would increase from 41.5% and to 45.1% by 2020.

Based on this estimate it is likely that of the 5000 additional vessels forecast in Sydney Harbour by 2021, around 2200-2300 will be vessels over 6 metres, which due to their size cannot be stored on trailers. These boats must therefore be accommodated through a combination of increased on-water and dry stack storage.

Dry stack storage systems typically cater for motor boats between 6 and 12 metres. RMS registration figures suggest that these types of boats have grown by around 11% in Sydney between 2003 and 2009 to around 7500 vessels. Analysis of RMS moorings data reveals that around 80% of vessels on private moorings in Sydney Harbour are between 6-12 metres and of these around 1,500 or almost 35% are now motor-boats. Establishing dry-stack storage facilities on Sydney Harbour will therefore not only help accommodate growth, but also has the potential to free up a number of moorings. This would help reduce waiting lists and provide a large proportion of the spaces required to meet demand for the 6-12 metre range. As there are no dry-stack facilities currently on the Harbour, a target of 1000-1200 new spaces is proposed as an achievable target by 2021. Given the size of land required for such facilities, there are limited potential sites on the Harbour. Incorporating dry stack facilities into development of major maritime precincts will therefore be a priority.

The remaining growth of 1000-1200 vessels will need to be accommodated in wet berths. Based on past trends around 150-250 of these vessels are likely to be accommodated by new berths at private domestic facilities and private marinas. The rest of growth will need to be accommodated through increased berths at commercial marinas and moorings.

It is estimated that commercial marinas and clubs could provide between 600-800 additional spaces. This would also require an expansion in total moorings of approximately 300, noting the actual number of new private moorings may need to be higher if some commercial moorings are converted to marina berths.

In addition to expanding the number of moorings, there is also need to better organise moorings to maximise the areas of the Harbour that are accessible for all boaters. Swing moorings and in particular private moorings are often scattered across entire bays preventing access to the bay for general boating. While commercial sites have converted a number of moorings to berths, the rate of conversions has been relatively low and so most bays surrounding commercial sites remain cluttered.

The image at Figure 27 below shows well-organised berths adjacent to fore and aft moorings where boats are ‘lined up’ and which also provide enhanced storage. Most obvious in the figure is the large area taken up by the remainder of moorings, causing a cluttering effect in the bays.

De-cluttering of bays can be achieved in a number of ways that may include, converting moorings to berths at commercial sites, or changes in mooring styles and systems to create greater efficiency and capacity, for example through using pontoon systems, or fore and aft moorings at selected sites.

Fig. 27 - *Fore and aft moorings, berths and scattered moorings*

Fig. 28 - *Well-organised storage in the foreground with scattered moorings in the background*

Fig. 29 & 30 - *A pontoon mooring system showing vessels attached (29) and the system (30)*

Storage for vessels under 6 metres

For the remaining 2,800 new vessels expected in Sydney Harbour by 2021, trailers are likely to remain the dominant form of storage. While the majority of trailerable vessels will continue to be stored on private property in garages and driveways, there will also likely be an increase in the number of trailers parked on suburban streets. This will particularly be the case in areas where housing density is already high, or is expected to increase by 2021.

The introduction of dry-stack storage facilities may assist by providing an affordable form of secure boat storage for owners of smaller boats, who do not have sufficient space on their own property.

The establishment of dedicated off-street boat trailer parking will also be targeted. In late 2012 the Government approached a number of local Councils in the metropolitan area with a view to conducting a trial whereby the Government provided assistance to help Councils establish off-road parking sites. Initial discussions revealed Council concerns about a lack of available land, especially in high density areas.

However, there may be suitable locations in less established areas including former industrial sites, and Government owned land particularly on the western side of the Harbour, including the Bays Precinct.

The Government will explore available Government locations and also review opportunities for providing on-water commercial access for remote storage sites at strategic sites, usually at current boat ramps to facilitate the concept of ‘valet’ service at the land-water interface.

Storage for Commercial Vessels

In absolute terms the number of additional berths that will be required for commercial vessels on Sydney Harbour by 2021 is comparatively less of a challenge. However, continued growth in the industry will require improvements and modernisation of commercial vessel facilities around the Harbour, particularly in key precincts such as Rozelle Bay and Blackwattle Bay.

Conclusion

The Sydney Harbour Boat Storage Strategy highlights the nature of the boat storage challenge facing Sydney Harbour to 2021. In order to keep pace with growth and ensure a mix of facilities best suited to the characteristics of vessels in the region the following growth targets have been identified:

- 1000-1200 new spaces in dry-stack storage facilities.
- 600-800 new commercial marina berths.
- 300 new mooring spaces.
- 150-250 new berths at private marinas and domestic facilities.

The Strategy has also identified the need to investigate the establishment of dedicated boat trailer parking facilities to help accommodate the expected growth in trailerable vessels, which are already causing parking concerns in many Harbour-side suburbs.

A range of actions in the Maritime Policy Agenda will assist in achieving the targets including:

- Reviewing RMS' commercial marina rental procedure to provide certainty to commercial marina operators and encourage the development of public access facilities across the Harbour.
- Working with the Department of Planning and Infrastructure to review existing planning controls for maritime property to reduce unnecessary red tape.
- Undertaking a comprehensive review of the policy and regulatory framework governing moorings, including consideration of alternate mooring styles, compliance methods, commercial incentives and pricing arrangements.
- Review all existing RMS policies and procedures to improve consistency and transparency and align with a set of strategic policy principles that are widely understood and accepted by stakeholders and the community.

There are several major strategic sites around the Harbour including in the Bays Precinct (Rozelle Bay, Blackwattle Bay, White Bay and Glebe Island), Berry's Bay and Wentworth Point, which have significant potential to deliver the facilities and infrastructure required to meet Sydney Harbour's boat storage challenge. Working with RMS, Transport for NSW will ensure that development at these sites is shaped by the boat storage targets identified in this Strategy.

Appendix B

Planning Application Meeting Minutes

SYDNEY PORTS
FIRST PORT, FUTURE PORT

Meeting minutes

Meeting name: Planning Application Meeting

Address of the Land: White Bay 6 (Lot 1 DP 875201)	Sydney Ports Precinct: White Bay
Proponent: Baileys Marine Fuels	Proposal Description: Modification to MP Approval 06_0037 – dry boat storage and additional pontoons
Date: 15 April 2013	Estimated Capital Investment Value: $400,000
Development Assessment Process: Section 75W Modification	Determining Authority: Department of Planning & Infrastructure

Attendees:

Guy Bailey (Baileys)	Roy Garth (SPC)
Tim Crosland (Baileys)	Nick Garside (SPC)
Tod Brookes (Aecom)	Roland Marshall (SPC)
Richard Lorraine (SPC)	Ryan Bennett (SPC)
Fooi Chin (SPC)	

Planning Facilitator & Meeting Chair: Ryan Bennett

Apologies: John McKenna, Saskia Starr, Peter Reed

MINUTES

Items Discussed	Discussion
Proposed Modification Summary	• Alter the approved Building 1 (not yet constructed) footprint to 10m wide x 65m long from the approved 16m wide x 50m long. The footprint of this building is also to allow for a caretakers' accommodation, offices, workshops and/or a boat showroom on the eastern end of the footprint. ○ Alter the use of Building 1 from bulk storage and office leases to a dry boat storage rack facility. • Alter the approved Building 2 (not yet constructed) footprint to 10m wide x 56m long with a height of 11m from the approved 20m wide x 50m long and

SYDNEY PORTS
FIRST PORT, FUTURE PORT

Meeting minutes

	10 m high. This building is to be a shed-type structure with no southern wall. o Alter the use of Building 2 from bulk indoor storage of vessels and marine equipment and a maintenance shed to a permanent dry boat storage facility with provision for a small office, workshop and/or showroom at its eastern end. • Construct two new buildings between the footprints of Buildings 1 and 2: o Building 3A – 7m wide x 27m long x 11m high for dry boat storage o Building 3B – 10m wide x 35m long x 11m high for dry boat storage plus space for offices, workshops and a showroom at the eastern end. • All buildings are proposed to be shed-style with three sides and a roof with one open side (southern sides for Buildings 1 and 2 and the northern sides for Buildings 3A and 3B. • The proposed modification would allow for a maximum of 150 vessels to be stored on-site. • Alter and add to the approved on-site car parking to allow for 30 spaces adjacent to the northern boundary (already approved) plus an additional 38 spaces + 10 motorcycle spots along the southern boundary next to the refuelling bowsers. • Construct new floating pontoons adjacent to the north of the travel lift which would involve construction activities similar to those for the existing on-site pontoons, including on water piling works (approximately 10 piles). • Construction of a 'meet and greet' area in the NE corner of the site, providing a waiting area, facilities and offices. This would involve 3 demountable buildings with dimensions of approximately 2.4m x 15m. • Provision of associated utilities.
Property and site layout	• Documentation incorrectly notes that the approved parking spots (30) are adjacent to the northern boundary of the site. Reference should be made to the approved site layout, showing that the approved parking area is outside of the non-exclusive licence area located along the northern side of the site. The documentation needs to be modified accordingly. • An alternative parking arrangement needs to be proposed as part of the proposal (and shown on the Plan), which does not include the proposed parking along the northern site boundary within the non-exclusive licence area and similarly not within the non-exclusive licence area along the southern side of the site. This is needed as SPC has the right to take back the non-exclusive licence area. • An alternative Meet & Greet area needs to be proposed as part of the proposal (and shown on the Plan), this need to be outside of any non-exclusive licence area. This is needed as SPC has the right to take back the non-exclusive licence area. • The lease boundary is incorrectly marked. This needs to be updated to reflect the actual lease boundary. • Should approval be obtained from the consent authority, the lease and licences would need to be varied to allow for the approved use. Reasonable legal costs is obtaining the variations are to be paid by Baileys.

SYDNEY PORTS
FIRST PORT, FUTURE PORT

Meeting minutes

	• More detail, including floor plan and square meters, regarding the proposed caretakers accommodation needs to be provided as part of the documentation. • A dilapidation report will be required prior to construction (to be done in conjunction with Sydney Ports). • A Construction Environmental Management Plan (CEMP) and site Operational Environmental Management Plan (OEMP) will be required (or revision of existing ones) at the relevant stages of the proposal (if development consent is obtained). • Sydney Ports does not accept the proposed placement of three concrete blocks (related to the proposed pontoons) above the mean high water mark (MHWM). Any proposed installations in this area must be clearly shown as being below the MHWM (i.e. within Baileys licence area with RMS).
Development Assessment Process	• Based on the information provided, the development assessment process is likely to be a S75W Modification to Major Project Approval 06_0037, with Sydney Ports required to provide a permission to lodge. • Clarification reportedly verbally provided to Aecom (in 2011 prior to first proposing this modification with Sydney Ports) from DP&I that the Director-General does not have any specific requirements prior to completing the environmental assessment documentation for the proposed S75W Modification.
Construction	• The documentation is to include an assessment of all works that will be undertaken under the modification proposal. • The documentation is to detail a construction programme for physical works including key milestones, construction methods and equipment and how the works will impact on internal site operations and external stakeholders / operators. • A staging report will likely be required to be submitted to Sydney Ports prior to construction commencing if this modification obtains development consent. • In relation to piling activities, a bank survey will need to be undertaken prior to the commencement of piling activities and after the completion of piling activities. • Confirmed that the proposed construction works will not impact upon any of the utilities/services to White Bay 5 site • Work as executed drawings in CAD format and certification documents to be issued to Sydney Ports upon completion of construction works
Environmental (noise, air, water quality, contamination, flora & fauna,	• Assessment of construction and operational impacts is required and how the additional / modified works will be managed, in the context of the existing approval, to mitigate any impacts on the environment. • It is considered that the original assessment and approval appropriately covered potential environmental impacts from the construction of Buildings 1

SYDNEY PORTS
FIRST PORT, FUTURE PORT

Meeting minutes

etc)	and 2: noise impacts from construction and operation; stormwater; water quality and waste water; waste management and disposal (including volume); and air quality and dust, potential acid sulphate soils. The alterations to the size of the buildings should not significantly change these impacts however the visual assessment would need to be readdressed. Additionally, Buildings 3A and 3B were not part of the original approval so would need to be considered. • The inclusion of the internal dry boat storage should consider the following potential impacts: noise from construction and operation of the storage facilities on neighbouring properties and uses; hours of operation; waste management and disposal (including volumes); stormwater; water quality and waste water; traffic; visual impacts; energy and water consumption and management. – Noted that hours of operation for the dry boat storage will be as already approved on-site. • The Glebe Island / White Bay Community Liaison Group will be advised of the proposal. • Guidelines – as for previous PAM (for Mod 3), but also consider in particular, the OEH Industrial Noise Policy and Interim Construction Noise Guideline. • A completed Green Port Guidelines Checklist is to be submitted to SPC with the modification.
Cruise Terminal Operations and Access / Egress	• Access to Baileys site (other than for staff and fuel deliveries) will need to be as follows: – Non-cruise days: via the Robert Street gate but an acceptable solution will need to be proposed so that the Gatehouse will let those people in (e.g. a daily visitor list). – Cruise days: via James Craig Road / Sommerville Road as per Cruise Terminal traffic. There will be no access/egress allowed via Robert Street on Cruise Days except for Bailey's staff and fuel deliveries. – Baileys to provide access/egress proposal in a report format, including proposed induction process, to Sydney Ports for approval.
Marine Operations / Harbour Master	• Habour Master Approval will be required as the proposal involves the disturbance of the sea bed. • No one will be permitted to stay on boats moored overnight at WB6. • The approved Marine Traffic Management Plan may need to be revised and approved. This will be communicated in the Harbour Master's approval for the proposal.
Traffic and Security	• The traffic assumptions appear to be based on the travel lift acting as the limiting factor (numbers of boats that can be lifted in/out of the water in a given time period). If the forklift can also do this activity independently from the travel lift, then these numbers should be re-considered.

SYDNEY PORTS
FIRST PORT, FUTURE PORT

Meeting minutes

	• A construction traffic management plan will be required prior to the commencement of construction. This plan will have to take into consideration ship and non-ship days
Safety & Risk	• Consideration is required of the current location of the fire hydrants and the reach of these hydrants and hoses taking into consideration the proposed construction of the buildings, the additional moorings and the proposed parking (including the alternative parking arrangement required as noted above). • Prior to construction, the approved Fire Safety Study will need to be revised to fully consider the proposed modified development, including the proposed location of hydrants, hose reels, extinguishers, etc. Re-approval of the FSS by the NSW Fire Brigade may be required. • With respect to external boat storage racks, provide the credentials of the supplier and the load specifications of the racks (i.e. maximum safe working load, installation specifications and a process to ensure that the racks are not inadvertently overloaded).
Other (e.g. heritage, visual amenity, cumulative impacts, etc)	• A complete description of the proposed works is required, including construction works and what is additional to, or a modification of, the existing development approval. • The Plan showing the site with the proposed modifications needs to be amended as per the discussion at the PAM and the contents of these minutes, including the proper gate location, the proper lease area boundary and showing the 'take-back' areas currently under non-exclusive licence to Baileys. • The total footprint areas for the buildings as approved and as modified (ref Section 2.1) need to be checked. • It is recommended that the documentation state that the modified moorings already approved under Mod 3 to MP 06_0037 have not yet been constructed for the sake of clarity (ref Section 1.2).
Applicable legislation & other guideline requirements	• Environmental Planning & Assessment Act, 1979 • Protection of the Environment Operations Act 1997 • Sydney Regional Environmental Plan No. 26 – City West • Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 • Glebe Island / White Bay Master Plan 2000
Documentation to be provided to Sydney Ports	• Permission to Lodge Application Form http://www.sydneyports.com.au/__data/assets/pdf_file/0008/10997/SPC10222_Form_Y_-_Permission_to_Lodge_Editable.pdf • Revised environmental assessment documentation and associated plans incorporating the requirements as detailed in these Minutes

SYDNEY PORTS
FIRST PORT, FUTURE PORT

Meeting minutes

	• Green Port Guidelines checklist (available on Sydney Ports' website) • Harbour Master Approval Form http://www.sydneyports.com.au/__data/assets/pdf_file/0007/10996/Form_Z__Harbour_Master_approval_final.pdf

Information not discussed at the meeting but required to be considered:

- It is noted that the proposed buildings for the Meet & Greet area are not consistent with the maximum building heights noted in the Glebe Island and White Bay Master Plan (Nov 2000) (a deemed DCP). This should be addressed as part of the assessment and consideration of the Master Plan.
- An operational traffic management plan (or a revision of the existing one) will be required prior to operations associated with the proposed modification commencing.

Minutes prepared by: Ryan Bennett
Issued To: All attendees & apologies
Issue Date: 19 April 2013
Issued By: email

NOTE: The above information and requirements may not be an exhaustive list of assessment or legislative requirements and is based on the preliminary information provided at the Planning Application Meeting. You are still required to consider and assess all environmental impacts, legislation and Sydney Ports' policies / guidelines applicable to your proposal.

Appendix C

Photomontages

KEY MAP

CERTIFIED PHOTOMONTAGE
No : PMC099201 - Refer to attached Certificate.

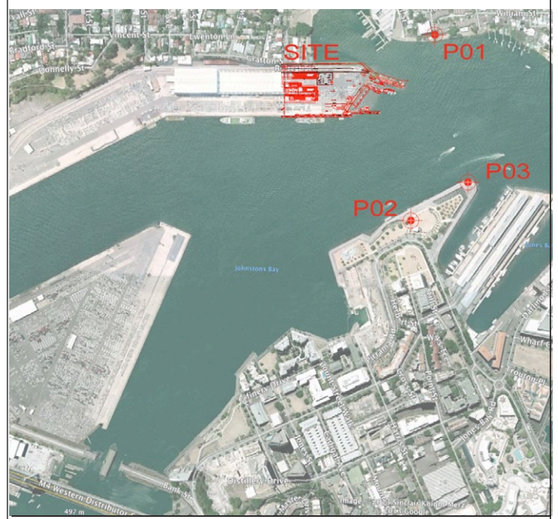
Certifier: Cameron McFadzean B Arch BA (Arch) IES ABSA AAAI

NOTE:
Photomontage perspective based on camera data, Laser Survey position and survey photomatch.
SURVEY: Hard & Forester Ref 115500503, 9.07.12

Camera Data: Daylight: 18.04.13 3pm (35mm efl)

P 01	PUBLIC WALKWAY (East Balmain)	
	P01.1	120 mm lens
	P01.2	24 mm lens
P 02	Pirrama Road Park	
	P02.1	32 mm lens
P 03	Pirrawma Park - NE Point (Sculptures)	
	P03.1	32mm lens

CAMERA LOCATION MAP



TITLE
PROPOSED PHOTOMONTAGE
as viewed from PUBLIC SPACE

PROJECT
White Bay 6 Marine Park
ROZELLE

CLIENT
CLIENT: Mr B McMullen

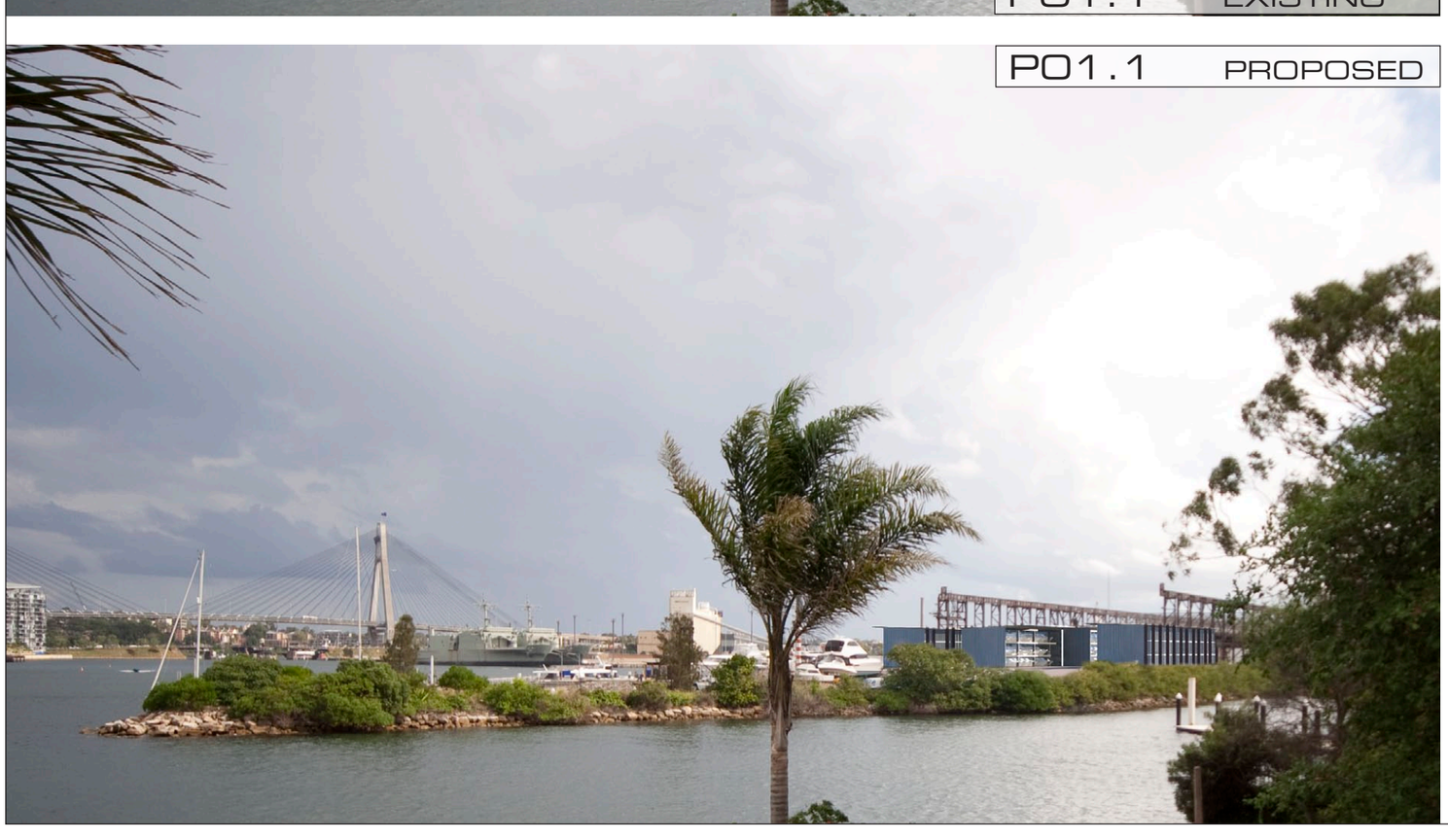
ARCHITECT / DESIGNER:
N/A
WHITE BAY 6 MARINE PARK
(Brianna 3DS)

Job Ref : 18.04.13

PAGE No : P01
DATE : 19.04.13
VERSION : 01
REF : 0992

VISUALISATION / 3D
DENEB DESIGN
PO BOX 539 MONA VALE 1660
Ph 02 9997 7480 Fx 9940 0772
info@denebdesign.com.au
www.denebdesign.com.au

P01.1 EXISTING



P01.1 PROPOSED

CERTIFIED PHOTOMONTAGE
No : PMC099201 - Refer to attached Certificate.

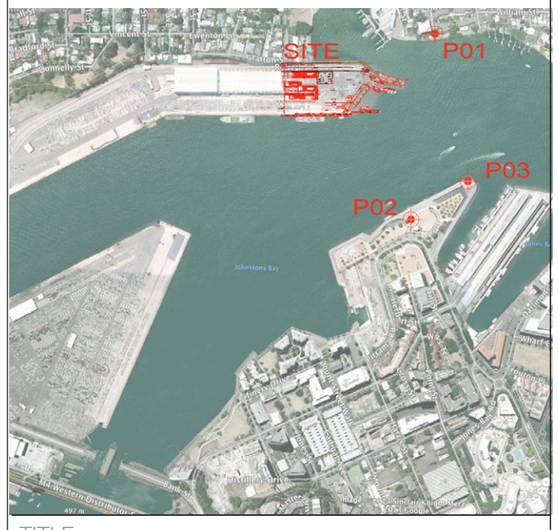
Certifier: Cameron McFadzean B Arch BA (Arch) IES ABSA AAAI

NOTE:
Photomontage perspective based on camera data, Laser Survey position and survey photomatch.
SURVEY: Hard & Forester Ref 115500503, 9.07.12

Camera Data: Daylight: 18.04.13 3pm (35mm efl)

P 01	PUBLIC WALKWAY (East Balmain)	
	P01.1	120 mm lens
	P01.2	24 mm lens
P 02	Pirrama Road Park	
	P02.1	32 mm lens
P 03	Pirrawma Park - NE Point (Sculptures)	
	P03.1	32mm lens

CAMERA LOCATION MAP



TITLE
PROPOSED PHOTOMONTAGE
as viewed from PUBLIC SPACE

PROJECT
White Bay 6 Marine Park
ROZELLE

CLIENT
CLIENT: Mr B McMullen

ARCHITECT / DESIGNER:
N/A
WHITE BAY 6 MARINE PARK
(Brianna 3DS)

Job Ref : 18.04.13

PAGE No : P02
DATE : 19.04.13
VERSION : 01
REF : 0992

VISUALISATION / 3D
DENEB DESIGN
PO BOX 539 MONA VALE 1660
Ph 02 9997 7480 Fx 9940 0772
info@denebdesign.com.au
www.denebdesign.com.au

P02.1 EXISTING

P02.1 PROPOSED

LOCATION

CERTIFIED PHOTOMONTAGE
No : PMC099201 - Refer to attached Certificate.

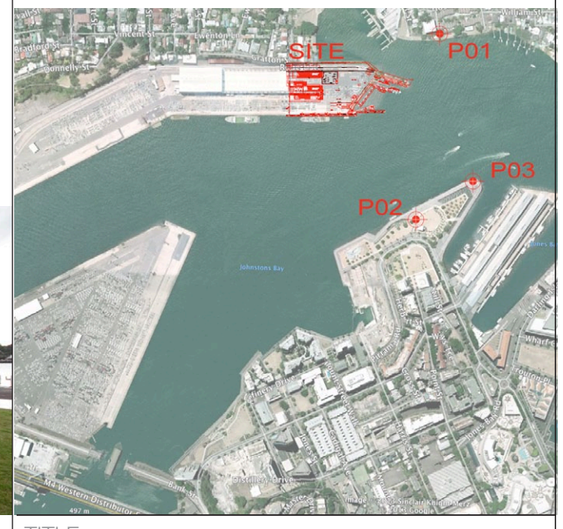
Certifier: Cameron McFadzean B Arch BA (Arch) IES ABSA AAAI

NOTE:
Photomontage perspective based on camera data, Laser Survey position and survey photomatch.
SURVEY: Hard & Forester Ref 115500503, 9.07.12

Camera Data: Daylight: 18.04.13 3pm (35mm efl)

P 01	PUBLIC WALKWAY (East Balmain)	
	P01.1	120 mm lens
	P01.2	24 mm lens
P 02	Pirrama Road Park	
	P02.1	32 mm lens
P 03	Pirrawma Park - NE Point (Sculptures)	
	P03.1	32mm lens

CAMERA LOCATION MAP



TITLE
PROPOSED PHOTOMONTAGE
as viewed from PUBLIC SPACE

PROJECT
White Bay 6 Marine Park
ROZELLE

CLIENT
CLIENT: Mr B McMullen

ARCHITECT / DESIGNER:
N/A
WHITE BAY 6 MARINE PARK
(Brianna 3DS)

Job Ref : 18.04.13

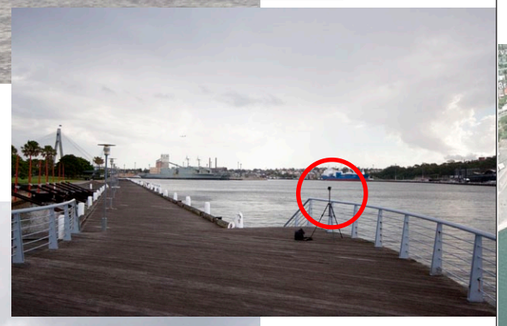
PAGE No : P03
DATE : 19.04.13
VERSION : 01
REF : 0992

VISUALISATION / 3D
DENEB DESIGN
PO BOX 539 MONA VALE 1660
Ph 02 9997 7480 Fx 9940 0772
info@denebdesign.com.au
www.denebdesign.com.au

P03.1 EXISTING

P03.1 PROPOSED

LOCATION



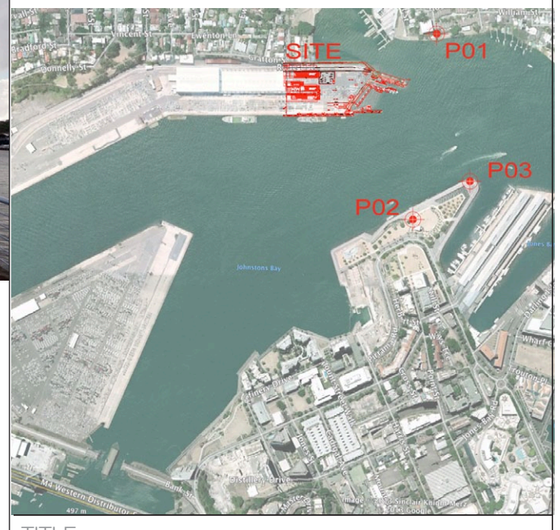
CERTIFIED PHOTOMONTAGE
No : PMC099201 - Refer to attached Certificate.

Certifier: Cameron McFadzean B Arch BA (Arch) IES ABSA AAAI

NOTE:
Photomontage perspective based on camera data, Laser Survey position and survey photomatch.
SURVEY: Hard & Forester Ref 115500503, 9.07.12

Camera Data: Daylight: 18.04.13 3pm (35mm efl)
P 01 PUBLIC WALKWAY (East Balmain)
P01.1 120 mm lens
P01.2 24 mm lens
P 02 Pirrama Road Park
P02.1 32 mm lens
P 03 Pirrawma Park - NE Point (Sculptures)
P03.1 32mm lens

CAMERA LOCATION MAP



TITLE
PROPOSED PHOTOMONTAGE
as viewed from PUBLIC SPACE

PROJECT
White Bay 6 Marine Park
ROZELLE

CLIENT
CLIENT: Mr B McMullen

ARCHITECT / DESIGNER:
N/A

Job Ref : 18.04.13

WHITE BAY 6 MARINE PARK
(Brianna 3DS)

PAGE No : P04
DATE : 19.04.13
VERSION : 01
REF : 0992

VISUALISATION / 3D
DENEB DESIGN
PO BOX 539 MONA VALE 1660
Ph 02 9997 7480 Fx 9940 0772
info@denebdesign.com.au
www.denebdesign.com.au

Appendix D

Green Ports Checklist

Sydney Ports Corporation

Checklist

The completed Checklist is to accompany all applications for new developments/activities submitted to Sydney Ports, or when requested by Sydney Ports.

The Checklist has the following features:

– The Headings (shaded in blue), Item numbers and Purpose/Criteria descriptions directly correspond to those in the Green Port Guidelines. This allows easy reference between this Checklist and the Guidelines.

– Applicants are to state whether each item has been addressed, not addressed or whether it is not applicable to the specific development. The Stages of Development indicators in the Green Port Guidelines may assist in this assessment.

– Applicants are then to explain how each item has been addressed, why it hasn't been addressed or why it is not applicable. Applicants are directed to the Suggested Measures provided in the Green Port Guidelines for guidance on how to address each item although alternative and innovative measures that may be more specific or relevant to the individual facility or operation are also encouraged.

– Supporting documentation (such as a Waste Management Plan, Environmental Management Plan or Design Specifications) may be referenced or attached to the Checklist.

– The Checklist can be filled out either electronically or by hand and sent back to Sydney Ports for review.

Applicant details

Name		**Company**	Baileys Marine Fuels Pty Ltd				
Address	Roberts Road						
City/Town	Balmain			**State**	NSW	**Postcode**	2041
Telephone		**Mobile**		**Email**			

Project details

Location of proposed development
White Bay Berth 6, Roberts Road, Balmain, 2041
Description of proposed development
Modification of the existing approval (MP 06_0037) granted 12 June 2009, to introduce dry boat storage facilities, additional floating pontoons, a ‘meet and greet’ areas, and increase car parking facilities.
The details on this form are the provisions and intentions for maximising the environmental sustainability of this development.

Name			
Signature		**Date**	

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Materials selection	R1	Reduce the quantity of new materials being used by reusing materials or by utilising recycled materials.	N/A	Opportunities to use recycled materials would be considered during detailed design.	-
	R2	Encourage environmentally friendly production of materials.	N/A	Not applicable as the proposed modification would not include the manufacturing of any materials.	-
	R3	Specify materials that have minimal embodied energy and environmental impact.	N/A	The selection of materials would be undertaken at the detailed design stage. As part of the initial application, Baileys Marine Fuels made a commitment to consider materials with minimal embodied energy.	Material selection is outside the scope of the modification.
	R4	Consider the end of life of materials and the whole building, design for deconstruction.	N/A	Consideration of the end of life of materials would be undertaken at the detailed design stage. Baileys Marine Fuels has made a commitment to consider the end of life of materials.	Consideration of the end of life of materials is outside the scope of the modification.

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Waste management	W1	Minimise the generation of wastes.	Yes	Construction waste management procedures would be outlined in the Construction Environment Management Plan (CEMP), including measures to minimise, reuse and reduce waste. The modification will not result in the introduction of an additional waste stream, but will encompass general construction waste. These will be disposed of in accordance with the waste procedures identified in the environmental assessment of the project.	Refer Section 5.5 of the modification document and Section 7.6 of the approved project's environmental assessment.
	W2	Facilitate recycling to reduce the amount of waste going to landfill.	Yes	The CEMP would include measures to minimise, reuse and reduce waste.	Refer to Section 5.5 of the modification documentation and Section 7.6 of the approved project's environmental assessment.
	W3	Ensure the safe storage and handling of hazardous wastes.	N/A	Hazardous waste would not be introduced on site as part of the modification. On site, waste will be stored in sealed containers and removed from site by licensed contractors who are advised of the type of waste, and records will be kept of all such disposed wastes.	N/A

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Water consumption	H1	Reduce consumption of potable water internally.	N/A	The reduction of potable water use is recommended through the use of rainwater tanks to collect water from the building roofs and other water efficient measures; to be determined at the detailed design phase.	See Section 5.6 of Modification B.
	H2	Manage and monitor water usage and any leaks.	N/A	No change from the approved development. Baileys Marine Fuels will monitor water usage and leaks through Sydney Water bills.	N/A
	H3	Reduce the quantity of potable water used for landscape irrigation.	N/A	The reduction of potable water use is recommended through the use of rainwater tanks to collect water from the building roofs and other water efficient measures; to be determined at the detailed design phase.	See Section 5.6 of Modification B.
	H4	Treat water on-site and reuse the treated water to reduce demand on the local potable water supply and the demand on the local infrastructure.	N/A	No additional wastewater impacts would be introduced by the modified elements of the project. The modified proposal allows for additional building roof area and greater opportunity to capture rainwater for re-use in site activities such as boat cleaning.	See Section 5.1 of Modification A, Section 5.4 and 5.6 of Modification B.

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Energy use	E1	Reduce energy consumption and hence greenhouse gas emissions.	N/A	The reduction of energy consumption and greenhouse gases will be determined during the detailed design phase. White Bay 6 has made a commitment to reduce energy consumption.	A reduction in energy consumption and greenhouse gases is outside the scope of the modification.
	E2	Manage the use of energy to minimise consumption.	N/A	The management of energy to minimise consumption would be determined during the construction and operational phases of the modification works.	The management of energy is outside the scope of the modification.
	E3	Source energy from renewable sources.	N/A	The sourcing of energy from renewable sources would be determined during the detailed design phase. White Bay 6 has made a commitment to source energy from renewable sources.	The sourcing of energy is outside the scope of the modification.
	E4	Source energy from alternate energy sources and use less greenhouse intensive fuels (in particular limit diesel use).	N/A	The sourcing of energy from alternate energy sources would be determined at the detailed design phase. White Bay 6 has made a commitment to source energy from alternate sources.	The sourcing of energy is outside the scope of the modification.

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Transportation	T1	Encourage the use of alternative modes of transport by employees, in order to reduce the amount of inefficient/individual car travel and therefore greenhouse gas emissions.	N/A	Employee modes of transport would not be affected by the proposed modification. Bicycle parking would be provided on site.	Encouraging employees to use alternative modes of transport is outside the scope of the modification.
	T2	Reduce greenhouse gas emissions from operational vehicles and equipment.	Yes	The proposed modification would result in one additional forklift on site. Though this addition would not emit significant amounts of additional greenhouse gases, the forklift would be operated in a way to ensure emissions are minimised where possible. Forklift would be operated in accordance with OEMP and plant would be turned off when not in use.	Refer to modification document.

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Indoor environment	IE1	Improve the quality of indoor air to protect the health of employees and enhance productivity.	N/A	No change from the approved development as a result of the modification.	The improvement of indoor air is outside the scope of the modification.
	IE2	Optimise daylighting and make best use of artificial lighting to assist eye health and productivity.	N/A	No change from the approved development as a result of the modification.	Optimising daylight is outside the scope of the modification.
	IE3	Provide optimum acoustical environment for productivity and to prevent ear damage.	N/A	No change from the approved development as a result of the modification.	Providing an optimum acoustic environment is outside the scope of the modification.

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Emissions	EM1	Protect the ozone layer and reduce the potential for global warming.	Yes	The proposed modification would not produce or use any substances that are harmful to the ozone layer.	-
	EM2	Limit the generation of air pollutants and ensure that they are emitted away from sensitive receptors.	Yes	During construction air pollutant generation would be limited by implementing management measures outlined in the CEMP. Operational activities are not expected to generate additional air pollutants.	No additional documentation required. Air quality not assessed under modification document due to the fact no impacts additional to those assessed in original environmental assessment are expected.
	EM3	Minimise odours.	N/A	The proposed modification is not expected to produce any odours during construction or operation.	-
	EM4	Minimise noise nuisance.	N/A	Construction noise and operational sound power levels will not generate any noise at a level above what was predicted in the original environmental assessment.	Refer Section 5.2 of the modification document.
	EM5	Avoid light spill into night sky or neighbouring properties/areas.	Yes	Any minor change in lighting would not significantly alter light spill. Lighting at the site is kept to a minimum.	Refer Section 8.5 of original environmental assessment.
	EM6	Avoid accidental contact with hazardous or poisonous goods.	Yes	The White Bay 6 ISO 14001 Environmental Management Plan would address this issue.	-

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Water quality	HQ1	Manage stormwater to reduce peak stormwater flows and protect water quality.	N/A	The modification would not require any adjustments to stormwater drainage on site and will follow stormwater management measures outlined in the environmental assessment of the approved project.	Refer Section 7.2 of the original environmental assessment.
	HQ2	Manage water quality to protect the harbour and other water bodies.	N/A	General construction mitigation measures would be implemented to avoid potential impacts on water during construction.	Refer Section 7.3 of the original environmental assessment.
	HQ3	Prevent damage from potential flood events and water table changes.	Yes	The land-based activities which form part of the modification would be incorporated into the pollution control measures that were approved for the site, in accordance with the OEH requirements.	Refer Section 7.2 of the original environmental assessment.

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Land use	L1	Encourage the redevelopment of sites that have previously been developed and remediate contaminated land.	N/A	The modification would be an extension of the existing land use at White Bay Berth 6, which is currently used as an integrated marine fuel, service and supply base.	Site redevelopment is outside of the scope of the modification.
	L2	Use landscaping to enhance biodiversity and conserve and create habitat for flora and fauna.	Yes	The modification includes proposed landscape planting adjacent to the water's edge in the north-western corner of the site.	Refer Figure 1 in modification document.
	L3	Enhance visual amenity.	Yes	The proposed modification would not significantly alter the visual impact of the project or visual landscape of the area in which the project is situated.	Refer Section 5.3 of modification document.
	L4	Avoid impact on identified heritage items.	N/A	No items of heritage significance are located in close proximity to White Bay Berth 6.	Impacts on items of heritage significance are outside of the scope of the modification.

	Item No	Purpose/criteria	Has this been addressed? (Yes, No, N/A)	How has it been addressed? Or, why has it not been addressed?	Provide details of supporting documentation/ reference material
Environmental management	M1	Maintain good relationships with stakeholders and respond to any complaints.	Yes	AECOM has undertaken stakeholder consultation with Sydney Ports Corporation. White Bay 6 will respond to any complaints.	Refer Section 4 of the modification document.
	M2	Provide a framework for identifying, managing and minimising environmental impacts, and maximising environmental benefits.	N/A	The White Bay 6 ISO 14001 Environmental Management Plan would address this issue. The modification has undertaken an assessment of the environmental impacts associated with the proposed development.	Refer Section 5 of the modification document.
	M3	Educate developers, tenants and employees about ESD and how to improve sustainability.	N/A	The White Bay 6 ISO 14001 Environmental Management Plan would address this issue.	Education of developers, tenants and employees regarding ESD and sustainability is outside the scope of the modification. Refer to Section 5.6 of modification document for information on energy and water consumption on site.

Appendix E

Noise Assessment

AECOM Australia Pty Ltd
Level 21, 420 George Street
Sydney NSW 2000
PO Box Q410
QVB Post Office NSW 1230
Australia
www.aecom.com

+61 2 8934 0000 tel
+61 2 8934 0001 fax
ABN 20 093 846 925

3 July 2013

Guy Bailey
Baileys Marine Group
28 Mews Road
Fremantle WA 6160

Dear Guy

White Bay Berth 6 - Dry Dock Boat Storage Facilities
Section 75W Modification Request
Acoustic Assessment

1.0 Introduction

This document has been prepared by AECOM Australia Pty Ltd (AECOM), on behalf of the Proponent (White Bay 6 Pty Ltd), as a supplementary acoustic assessment in support of the of proposed modifications to the previously approved plans at White Bay Berth 6 in Balmain, NSW.

On 12 June 2009, the then Minister for Planning granted approval for a marine fuelling and supply facility at Berth 6, White Bay (MP 06_0037). The Proponent has reviewed the original project components to assess their viability and appropriateness and is seeking to modify its approval. The proposed changes require a modification to the existing approval under section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The proposed modifications to the previously approved plans at White Bay Berth 6, are detailed in AECOM's Section 75W Modification Request document, reference, '*White Bay Berth 6 – Dry Boat Storage Facilities – Section 75W Modification Request'*, dated 05 May 2013. Section 2 of this document presents a description of the proposed modifications with the potential to have an acoustic impact on nearby residential receivers.

AECOM has carried out this supplementary noise impact assessment in support of the section 75W modification request for White Bay Berth 6 – Dry Boat Storage Facility.

This document provides the following:

- Identifies the noise limits as presented in the Minister's Conditions of Approval as modified (PM 06_0037) dated 14 September 2009.
- Assesses noise emissions at residences as a result of the proposed section 75W modification considering the previously approved '*Addendum to Preferred Project Report*' completed by Kellogg Brown and Root Pty Ltd (Ref: SEN547-G-REP-001 Rev 1) dated 20 November 2007.
- Assesses noise emission impacts at residences as a result of the section 75W modification considering the recently conducted annual noise audit completed by AECOM (ref: 60153589.RPT03.00) dated 3 April 2013.
- Determine compliance or exceedance with the project noise limits stipulated in the Minister's Conditions of Approval as modified (PM 06_0037) dated 14 September 2009.

1.1 Compliance noise audits

According to the Minister's Conditions of Approval (MCoA), the site must comply with the noise limits presented in Condition F1. A noise compliance assessment must be undertaken within the first three months of the commencement of operations at the site and submitted to the Director-General of the Department of Planning and Infrastructure, as required by Condition F3 of the approval.

AECOM has conducted a noise compliance assessment (ref: 60153589.RPT02.01) dated 24 August 2011 and an annual noise audit (ref: 60153589.RPT03.00) dated 3 April 2013. The assessments demonstrated compliance with the MCoA project noise limits.

2.0 Description of the Modification

The proposed modification, in terms of additional noise significant sources, includes the operation of one additional forklift on site, for the purposes of what is referred to in the original assessment as 'boat pre-commissioning and launching activities'. This involves the transport of boats to and from the boat storage facilities to the travel lift for launching and docking.

The additional forklift has been assessed to determine the impact on expected operational noise levels for the site. The sound power level of the additional forklift has been based on near field noise measurements undertaken by AECOM of the current forklift on 28 March 2013 during a noise audit. The additional forklift would be operating with a sound power level of 94 dB(A), for approximately 7.5 minutes in every 15 minute period. This takes into account the identification of the vessel, retrieval of the vessel and handover procedures with customers. The operations would take place during the daytime period only as per the original approval.

The sound power level measured is likely to be representative of the forklift used. It is considered more accurate than the assumptions made in the '*Addendum to Preferred Project Report*' and in the initial '*White Bay Berth 6 – Dry Boat Storage Facilities – Section 75W Modification Request*'.

The modification includes the change in the dimensions and number of buildings on the site, increasing from two buildings to four buildings on the existing site for dry boat storage. The buildings would provide additional acoustic shielding for the closest residential receivers on Grafton Street from site activities. However, shielding has not been considered in the assessment making it conservative.

3.0 Acoustic Criteria

The MCoA for the construction and operation of the marine refuelling facility at Berth 6, White Bay, issued 14 September 2009 stipulates the noise contribution limits applicable to the operation of the facility and the requirements for compliance noise monitoring, Conditions F1 and F2 of the MCoA are reproduced below:

F1 Noise Limits

The use of any part of the premises including vessel refuelling and other activities, and the operation of the plant, machinery or other equipment on the site must not exceed the sound level pressure (noise) limits presented in the table below. Note the limits represent the sound pressure level (noise) contribution, at the nominated receiver locations in the Table

(a) Noise limits – During operation of the facility

Residential location	***Day***	***Evening***	***Night***		
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(9\ hours)}$	$L_{Aeq(1\ minute)}$
1 Grafton St, Balmain	*54*	*48*	*48*	*45*	*59**
Datchett St, Balmain	*49*	*44*	*44*	*41*	*54**
33 Adolphus St, Balmain	*36*	*35*	*35*	*35*	*60*
2 Point St, Pyrmont	*40*	*35*	*35*	*35*	*61*

**The sleep disturbance limits do not apply to trucks whilst engages in movements on the access road to enter or leave the site.*

(b) For the purpose of clause (a) of this condition:

(i) Day is defined as the period from 7.00 am to 6.00 pm Monday to Saturday and 8.00 am to 6.00 pm Sundays and Public Holidays;

(ii) Evening is defined as the period from 6.00 pm to 10.00 pm; and

(iii) Night is defined as the period from 10.00 pm to 7.00 am Monday to Saturday, and 10.00 pm to 8.00 am Sundays and Public Holidays.

F2 Noise Measurements

(1) Noise from the premises is to be measured at the most affected point within the residential boundary, or at the most affected point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Condition F1 unless otherwise stated.

(2) Noise from the premises is to be measured at 1 metre from the dwelling facade to determine compliance with the $L_{Aeq(1\ minute)}$ noise level in Condition F1.

(3) *Where it can be demonstrated that direct measurement of noise from the premises is impractical, the DECC may accept alternative means of determining compliance (See Chapter 11 of the Industrial Noise Policy).*

(4) *The modification factors presented in section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where practicable.*

(5) *The noise emission limits identified in F1 apply under meteorological conditions of wind speed up to 3 metres per second at 10 metres above ground level, and temperature inversion conditions.*

3.1 Operational timeframe

Hours of operation would remain as per the original approval, with the dry boat storage accessible between:

- 7:00 am and 6:00 pm on Mondays to Saturdays.
- 8:00 am and 6:00 pm on Sundays.

In the event that boats return to the facility after 6:00 pm, they would be required to tie up to the wharf to be lifted out of the water and transferred to dry storage the following day during normal operational hours.

4.0 Acoustic Assessment

4.1 Assessment considering previously predicted noise levels

The previous noise assessment presented in the '*Preferred Project Report*' by Kellogg Brown and Root identifies the typical activities taking place in the site, according to the hours of operation. These were applied to a noise model to complete an assessment in accordance with the MCoA. The activities assumed in this model are summarised below:

- Refuelling:
  - Commercial
  - Recreational
- Commercial boat arrivals and departures / commercial boat mooring
- Recreational boat arrivals and departures
- Truck movements to and from site
- Refuelling of fuel tank farm
- Grey water and sullage facilities
- Office facilities – mechanical services
- Commercial supply deliveries
- Provision of bulk storage
- Provision of supplies – retail
- Hardstand / Laydown area – boat engine start up / shut down.
- Operations of a roll-on roll-off boat ramp.

This involved a number of machinery, tools or plant, with assumptions concerning the average duration of use over a 15 minute period. This included:

- Heavy vehicles and light vehicles moving within the site
- Forklift
- Travel lift
- High pressure water cleaner
- Electric power tools and fit out activities
- Voices (raised)

- Boats and barges
- Material handling activities
- Air conditioning plants and pumps

The White Bay 6 operations currently do not include the roll-on roll-off ramp as identified in the approvals. It is not anticipated that the roll-on roll-off ramp would become part of the operations in the immediate future. However, a conservative assessment approach has been adopted and the operations of the roll-on roll-off ramp have been included in the assessment.

This assessment stated that trucks, boats and the occasional water blasting would be the main sources of noise associated with the project. A detailed description of current site operations, previously assessed is reproduced in Attachment A. This assessment considers all previously modelled operations and the operation of the additional forklift.

The noise emissions from the typical daytime activities, including the additional forklift have been predicted at the nearest residential receiver, 1 Grafton Street, Balmain, and are presented in Table 1. The calculation is conservative and does not include air absorption, ground absorption or any form of undulating terrain or shielding. Measured noise levels at the receiver could be expected to be lower than those calculated below.

The proposed modified activities would be limited to the daytime period. As such, the evening and night time period has not been considered, as well as sleep disturbance.

Table 1 Total predicted noise levels

Receiver location	Noise level, $L_{Aeq(15minute)}$, dB(A)				Exceedance, dB(A)
	Daytime criteria	Previous predicted noise level	Predicted noise emissions from additional forklift	Total predicted noise level	
1 Grafton Street, Balmain	54	54	41	54	-

The results presented in Table 1 show that compliance at the worst affected receiver is achieved during daytime Berth 6 operations with the inclusion of the additional forklift. Compliance at the worst affected receiver ensures compliance at all other sensitive residential receivers. The contribution from the additional forklift is 13 dB below the total industrial noise contribution from the site. This means that the total noise level would increase by a negligible amount.

4.2 Assessment considering previously compliance noise audits

An assessment has also been undertaken based on AECOM's recent annual compliance noise audits of the facility (ref: 60153589.RPT02.01) dated 24 August 2011 and an annual noise audit (ref: 60153589.RPT03.00) dated 3 April 2013. During the attended noise measurements the main sources of plant and equipment identified onsite were:

- Two pumps located on a plinth located inside a fully enclosed shed
- A compressor in its own enclosure inside the shed
- Marine Bull
- Boat Lift
- Boats refuelling
- General site activities undertaken on the hardstand e.g. boat cleaning, boat repairs and car movements.

A summary of the compliance measurements are provided in Table 2.

Table 2 Measured noise levels

Measurement location	Time	Comments	Measured noise levels, dB(A)	
			$L_{Aeq\ (15\ min)}$	$L_{A90\ (15\ min)}$
1 Grafton St, Balmain (property boundary, site level)	10:42 am	Noise consisted of • birds; • boats in the harbor; • road traffic from the Anzac Bridge; • dog barking; • marine bull audible; • boat lift audible; • general site activities audible; and • fuel pumping activities inaudible[2].	50 (47[1])	47
1 Grafton St, Balmain (Street level)	11:21 am	Noise consisted of • birds; • cicadas; • air plane noise; • boats in the harbor; • road traffic from the Anzac Bridge; • marine bull audible; • boat lift audible; • general site activities audible; and • fuel pumping activities inaudible[2].	50 (47[1])	46

Notes:

1 Estimated contribution from Bailey's marine refuelling facility.

2 Contribution from the fuel pumping operations has been estimated to contribute 40 dB(A).

Based on these measurements, the total noise level, including the additional forklift is summarised in Table 3

Table 3 Total predicted noise levels

Receiver location	Noise level, $L_{Aeq(15minute)}$, dB(A)				Exceedance, dB(A)
	Daytime criteria	Measured contribution	Predicted noise emissions from additional forklift	Total predicted noise level	
1 Grafton Street, Balmain	54	47	41	48	-

The results presented in Table 3 show that compliance at the worst affected receiver is achieved during daytime operations, including the use of the additional forklift, in the context of existing operations. Compliance at the worst affected receiver ensures compliance at all other sensitive receivers.

5.0 Conclusion

AECOM has conducted this supplementary noise impact assessment of the proposed section 75W modification request for White Bay Berth 6 – Dry Boat Storage Facility. The assessment has been undertaken in accordance with the requirements of the Minister's Conditions of Approval.

The assessment has considered all existing predicted and measured noise levels from the operation of the site during the daytime period, as originally approved as well as in the context of current operations at the site Noise emissions during the evening and night-time remain unchanged as a result of the proposed modifications.

The results of this noise impact assessment, show that the proposed modifications to the White Bay Berth 6 – Dry Boat Storage Facility (operation of one additional forklift) complies with MCoA noise limits at all residences identified in the MCoA during the daytime period. As such, no additional mitigation measures are recommended.

Should you have any questions regarding the content of this letter please do not hesitate to contact the undersigned.

Yours sincerely

Sean Holmes
Graduate Engineer
sean.holmes@aecom.com

Direct Dial: +61 2 8934 0355
Direct Fax: +61 2 8934 0001

cc: Caitlin Bennet (AECOM)
Patrick Martinez (AECOM)

Attachment A – Excerpt from the Addendum to Preferred Project Report (Kellogg Brown and Root, 2008).

Table 3.1 List of machinery / tools / plant and breakdown of operational hours

Machinery / Tools / Plant	Activity Type involving machinery / tools / plant	Operations involved in Activity	Operational hours Summary	Breakdown of operational hours to periods			
				Day period (7am - 6pm Mon - Sat 8am - 6pm Sunday and Public Holidays)	Evening Period (6pm - 10pm)	Night Period (10pm - 5am)	Night Shoulder Period (5am - 7am Mon - Sat 5am - 8am Sunday & Public Holidays)
Trucks	Truck movements to & from site for fuel & goods delivery & collection	Trucks arriving and leaving site	7 days a week: 24 hours a day	Yes	Yes	Yes	Yes
Forklift	• Commercial supply deliveries • Provision of bulk storage • Provision of retail supplies • Use of hardstand/laydown area • Boat pre-commissioning and launching activities	Transfer of materials around the site including from trucks to storage sheds and hardstand areas	Mon - Sat 7am - 8pm Sun 8am - 6pm	Yes	Yes	No	No
Pallet Jacks	• Commercial supply deliveries • Provision of bulk storage • Provision of retail supplies • Use of hardstand / laydown area	Transfer of materials around the site including from trucks to storage shed and hardstand area	Mon - Sat 7am - 8pm Sun 8am - 6pm	Yes	Yes	No	No
Cranes	Only occasional use associated with transfer of materials for: • Commercial supply deliveries • Provision of bulk storage	Transfer of materials around the site including from trucks to storage sheds and hardstand area	Mon - Sat 7am - 8pm Sun 8am - 6pm	Yes	Yes	No	No

Machinery / Tools / Plant	Activity Type involving machinery / tools / plant	Operations involved in Activity	Operational hours Summary	Breakdown of operational hours to periods			
				Day period (7am - 6pm Mon - Sat 8am - 6pm Sunday and Public Holidays)	Evening Period (6pm - 10pm)	Night Period (10pm - 5am)	Night Shoulder Period (5am - 7am Mon - Sat 5am - 8am Sunday & Public Holidays)
Travel Lift	• Provision of bulk storage • Boat pre-commissioning and launching activities • Use of hardstand / laydown area	• Boat launching • Retrieval of boats from river • Transfer and lifting of boats into slips on hardstand	Mon - Sat 7am - 6pm Sun 8am - 6pm	Yes	No	No	No
Roll-on Roll-off Ramp (Ro-Ro Ramp)	Transfer of materials from the hardstand/laydown area to water based vessels via the Ro-Ro ramp	Operation of the ro-ro ramp	Mon - Sat 7am - 8pm Sun 8am - 6pm	Yes	No	No	No
High Pressure Water Cleaner	Boat pre-commissioning activities	Pre-delivery, warranty and service work activities on boat	Mon - Sat 7am - 8pm Sun 8am - 6pm	Yes	No	No	No
Electric Power Tools, i.e. electric power polishing equipment	Boat pre-commissioning activities	Pre-delivery, warranty and service work activities on boat	Mon - Sat 7am - 8pm Sun 8am - 6pm	Yes	No	No	No
Boat engines and navigation signal testing (in sheds and on hardstand area associated with pre-commissioning activities)	Boat pre-commissioning activities	Pre-delivery, warranty and service work activities on boat	Mon - Sat 7am - 8pm Sun 8am - 6pm	Yes	No	No	No
Air conditioning plant	Associated with offices accommodation for marine businesses	Operation of air conditioning plant for office accommodation temperature regulation	7 days a week: 5am - 10pm	Yes	Yes	No	No
Compressor units for internal chiller room	Provision of supplies retail (Storage of chilled goods)	Operation of compressor units for chilled goods storage	7 days a week: 24 hours a day	Yes	Yes	Yes	Yes

Table 3.2 Activity classes and breakdown of operational hours

Activity Class	Operations involved in Activity	List of Machinery / Tools / Plant involved	Operational hours summary	Day period (7am - 6pm Mon - Sat 8am - 6pm Sunday and Public Holidays)	Evening Period (6pm - 10pm)	Night Period (10pm - 5am)	Night Shoulder Period (5am - 7am Mon - Sat 5am - 8am Sunday & Public Holidays)
Refuelling - COMMERCIAL	• Refuelling	• Fuel Bowser • Submersible pumps at tank farm • Dual storage Solenoid valve at pump	7 days a week: 24 hrs a day	Yes	Yes	Yes	Yes
Boat arrivals and departure / boat moorings COMMERCIAL	• Boats docking - turn engine off • Engines restarted - boat departs	• Boat engines	7 days a week: 24 hrs a day	Yes	Yes	Yes	Yes
Great water and sullage facilities COMMERCIAL	• Attach hose to remove grey water and sullage from vessel	• Sanivax pump-out system (single action diaphragm pump) • Vacuum pump	7 days a week: 24 hrs a day	Yes	Yes	Yes	Yes
Refuelling - RECREATIONAL	• Refuelling	• Fuel Bowser • Submersible pumps at tank farm • Dual storage Solenoid valve at pump	7 days a week: 24 hrs a day	Yes	Yes	No	Yes
Boat arrivals and departures RECREATIONAL	• Boats docking - turn engine off • Engines restarted - boat departs	• Boat engines	7 days a week: 5am to 10pm	Yes	Yes	No	No
Grey water and sullage facilities RECREATIONAL	• Attach hose to remove grey water and sullage from vessel	• Sanivax pump-out system (single action diaphragm pump) • Vacuum pump	7 days a week: 5am to 10pm	Yes	Yes	No	Yes

Activity Class	Operations involved in Activity	List of Machinery / Tools / Plant involved	Operational hours summary	Day period (7am - 6pm Mon - Sat 8am - 6pm Sunday and Public Holidays)	Evening Period (6pm - 10pm)	Night Period (10pm - 5am)	Night Shoulder Period (5am - 7am Mon - Sat 5am - 8am Sunday & Public Holidays)
Landscaping	• Maintenance, watering and weeding	• Hoses attached to pumps connected to rainwater tank • Whipper snipper and other standard gardening equipment	Mon - Sat 7am to 6pm Sun 8am - 6pm	Yes	No	No	No

Appendix F

Site Plans

MARINE PARK

WHITE BAY 6

DRAWING SCHEDULE

00	DRAWING SCHEDULE + NOTES	
01	SITE PLAN APPROVED STRUCTURES + PROPOSED AMENDMENTS	
02	STORMWATER CONTROL PLAN + EROSION & SEDIMENT CONTROL PLAN	
03	DRAINAGE SCHEMATIC	
10	BUILDING A	FLOOR PLAN
11	BUILDING A	ELEVATION + SECTION
12	BUILDING A	ELEVATIONS
20	BUILDING B	FLOOR PLAN
21	BUILDING B	ELEVATION + SECTION
22	BUILDING B	ELEVATIONS
30	BUILDING C1 + C2	FLOOR PLAN
31	BUILDING C1 + C2	ELEVATION + SECTION
32	BUILDING C1 + C2	ELEVATIONS
50	PRIMARY MEET & GREET BUILDINGS	FLOOR PLAN
51	PRIMARY MEET & GREET BUILDINGS	ELEVATIONS
55	SECONDARY MEET & GREET BUILDINGS	FLOOR PLAN
56	SECONDARY MEET & GREET BUILDINGS	ELEVATIONS

N O T E S

SPECIFICATION TYPICAL TO ALL STRUCTURES

STRUCTURAL DETAILS
STRUCTURAL DETAILS TO ENGINEERS DESIGN.

CONCRETE
TO AS.3600 - CONCRETE CODE.

TIMBER
TO AS.1684 - TIMBER CODE.

INSULATION
ROOF FOIL + R1.0 BATTS
EXTERNAL WALLS FOIL + R1.0 BATTS

DRAINAGE
TO AS.3500 - DRAINAGE CODE
TO TANKS WITH OVERFLOW TO HARBOUR

ELECTRICAL
TO AS.3000 - WIRING RULES.

GENERAL
VERIFY ALL SCHEDULES & DIMENSIONS ON SITE BEFORE COMMENCEMENT OF WORKS OR ORDERING OF MATERIALS.

ALL WORKS IN A TRADESMAN LIKE MANNER.

ALL WORKS TO BE DESIGNED AND BUILT IN ACCORDANCE WITH THE PROVISIONS OF THE

- BUILDING CODE OF AUSTRALIA
- DISABILITY DISCRIMINATION ACT
- ANY AUSTRALIAN STANDARD
- & COUNCIL REQUIREMENTS.

ALL WORKS TO BE CERTIFIED BY A PCA PRIOR TO FINAL SIGN.

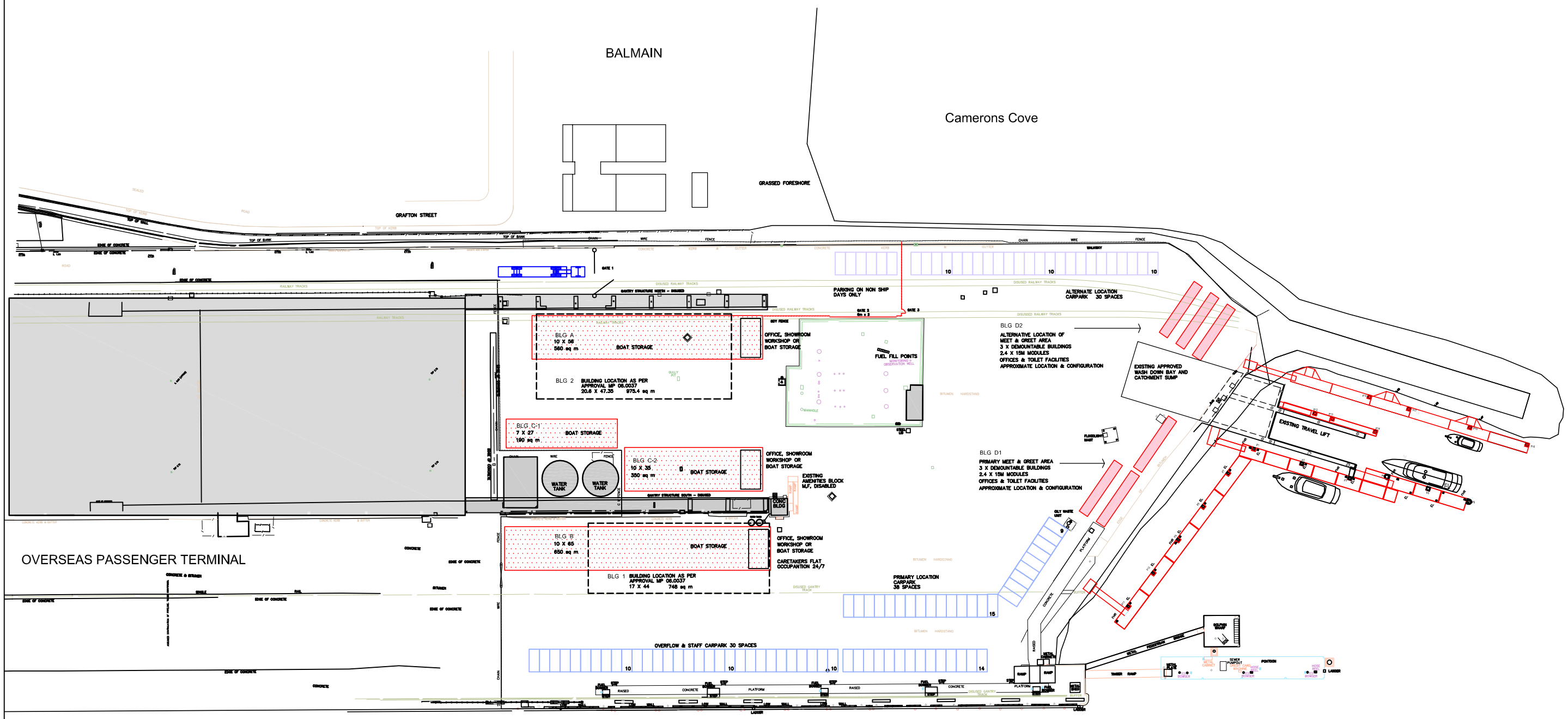
DRAWING SCHEDULE
+ NOTES

PAUL CARRICK & ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:100	JUNE 2013	A	839

project
WHITE BAY 6 MARINE PARK

sheet
00



0 10 50 100

LEGEND

- EXISTING STRUCTURES
- ORIGINAL BUILDINGS 1 & 2 – LOCATION & PROFILE AS APPROVED MP 06.0037
- REVISED BUILDINGS A, B , C1, C2 VESSEL STORAGE, OFFICE, STORAGE PROPOSED LOCATION & DESIGN
- REVISED BUILDINGS D1 – PRIMARY LOCATION & D2 – ALTERNATIVE LOCATION MEET & GREET DEMOUNTABLES APPROX LOCATION & CONFIGURATION
- PROPOSED VEHICLE PARKING – PRIMARY LOCATIONS
- PROPOSED VEHICLE PARKING – ALTERNATIVE LOCATIONS
- PROPOSED WATER BASED STRUCTURES

SITE COVERAGE PROPOSED

BLG A	560 sq m
BLG C-1	350 sq m
BLG C-2	190 sq m
BLG B	650 sq m
TOTAL	1750 sq m
ORIGINAL	1682.85 sq m

SITE PLAN
APPROVED STRUCTURES & PROPOSED AMENDMENTS

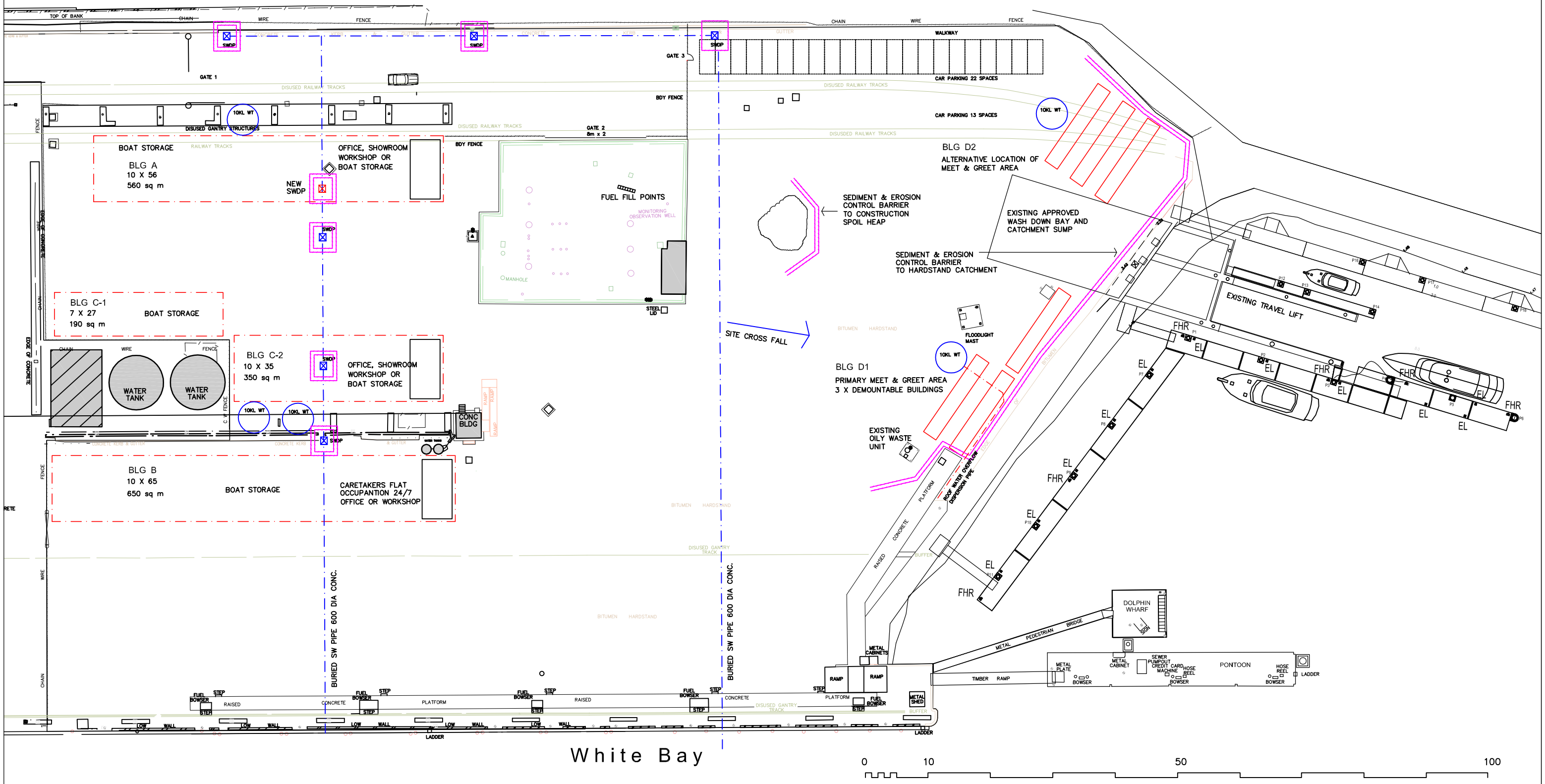
NORTH

PAUL CARRICK ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1: 200	JUNE 2013	A	839

project: WHITE BAY 6 MARINE PARK

sheet: 01



White Bay

0 10 50 100

LEGEND

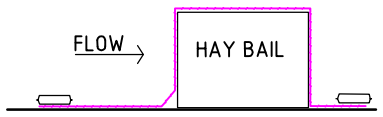
SWDP — EXISTING STORMWATER DRAIN PIT

10KL WT — PROPOSED WATER TANKS
10 KL HDPE 2.5 DIA
FIRST FLUSH BYPASS SYSTEM
OVERFLOW TO HARDSTAND

SEDIMENT & EROSION CONTROL

TYPICAL SWDP ISOLATION

EACH PIT TO BE ISOLATED WITH STRAW BAILS AS SHOWN AND / OR GEOTEXTILE BARRIER
MAINTENANCE PROGRAM TO BE CARREID OUT TO ENSURE EFFECTIVE CONTROL OF CONSTRUCTION SEDIMENT



TYPICAL HARDSTAND RUNOFF ISOLATION

GEOTEXTILE BARRIER LAID AT OVERLAND FLOW PATH AS SHOWN ABOVE
SECURED BY SAND BAGS AND HAY BAILS

LOCATED AT HARBOURSIDE RUNOFF EXIT AND ANY TEMPORARY SPOIL HEAP
LOCATE ON LOW SIDES

STORMWATER DRAINAGE PLAN
EROSION & SEDIMENT CONTROL PLAN

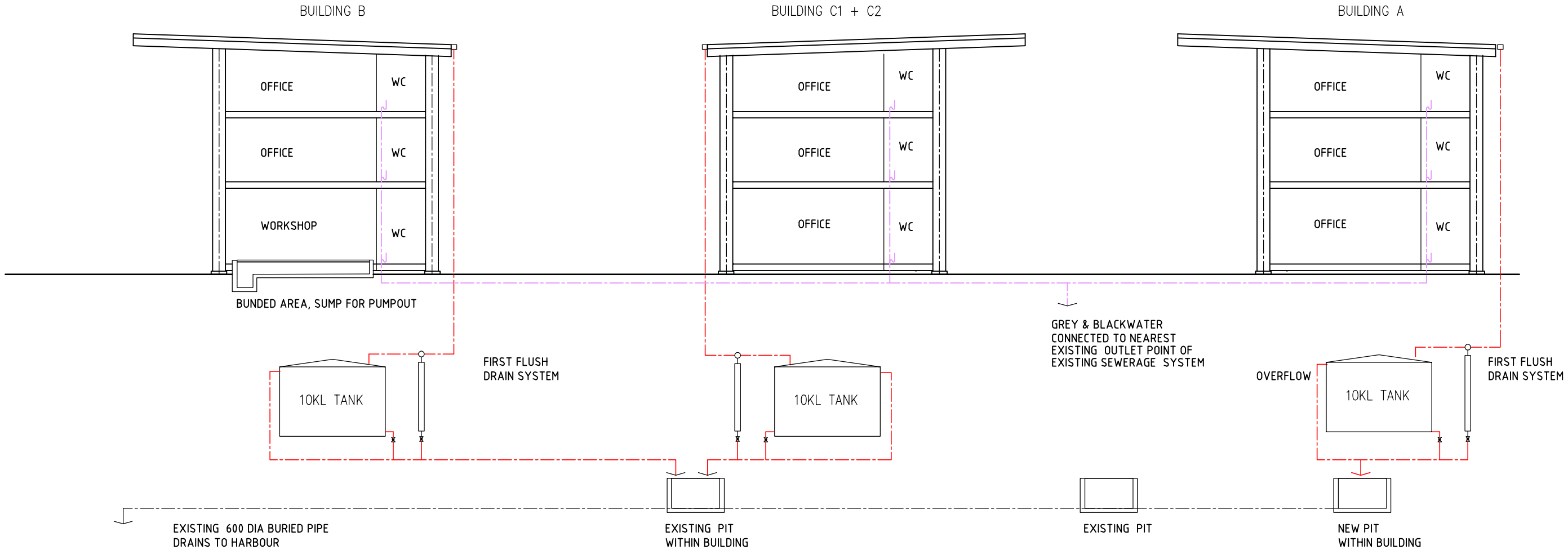
NORTH

PAUL CARRICK
ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

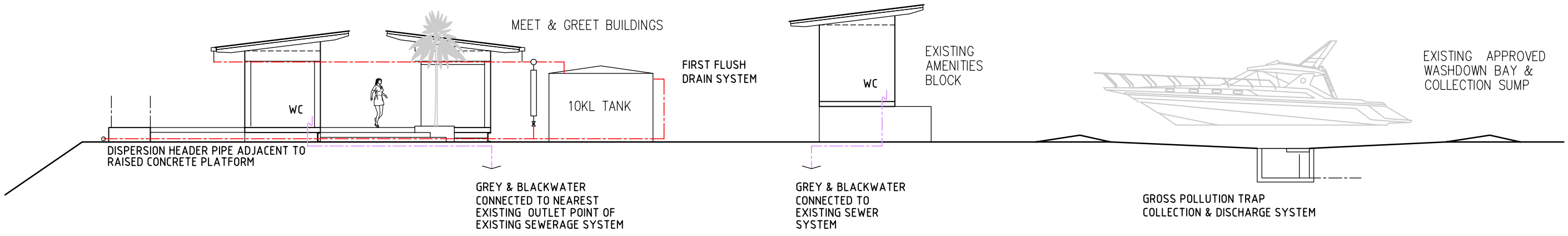
scale	date	revision	project no.
1:600	JUNE 2013	A	839

project: WHITE BAY 6 MARINE PARK

sheet: 02



ROOF WATER COLLECTION & DRAINAGE SYSTEM



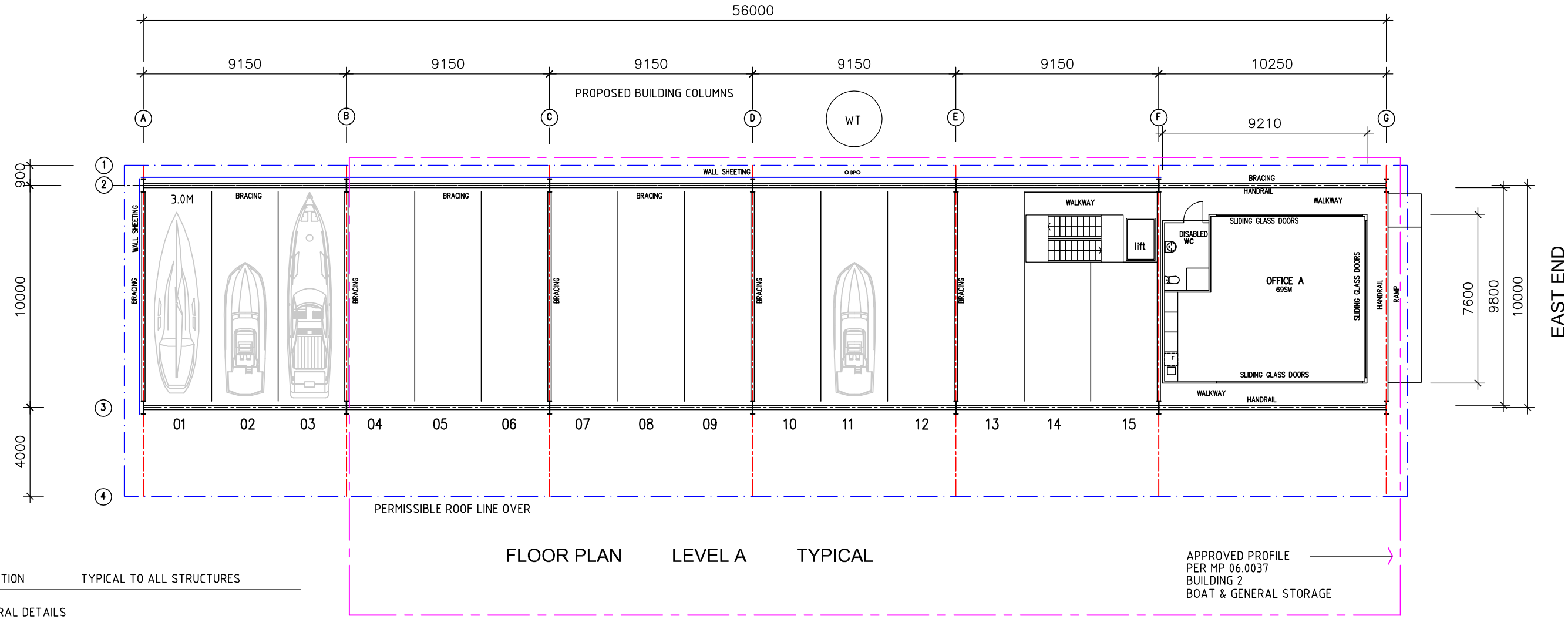
DRAINAGE SCHEMATIC

PAUL CARRICK
& ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:200	JUNE 2013	A	839

project: WHITE BAY 6 MARINE PARK

sheet: 03



FLOOR PLAN LEVEL A TYPICAL

APPROVED PROFILE
PER MP 06.0037
BUILDING 2
BOAT & GENERAL STORAGE

SPECIFICATION TYPICAL TO ALL STRUCTURES

STRUCTURAL DETAILS
STRUCTURAL DETAILS TO ENGINEERS DESIGN.

CONCRETE
TO AS.3600 - CONCRETE CODE.

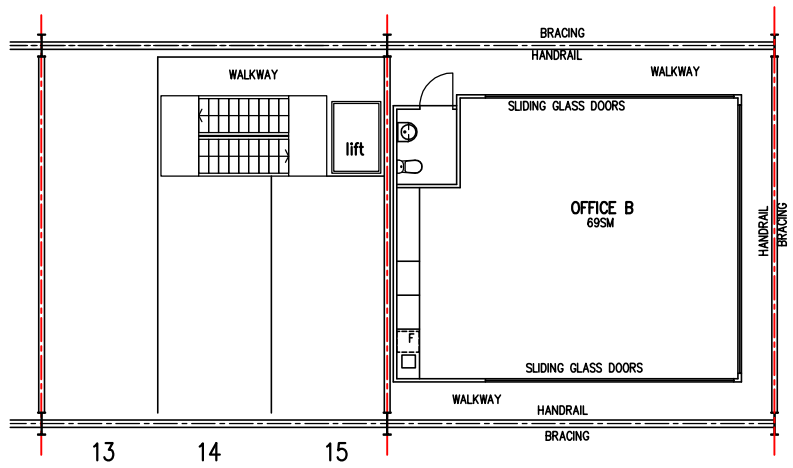
TIMBER
TO AS.1684 - TIMBER CODE.

INSULATION
ROOF FOIL + R1.0 BATTS
EXTERNAL WALLS

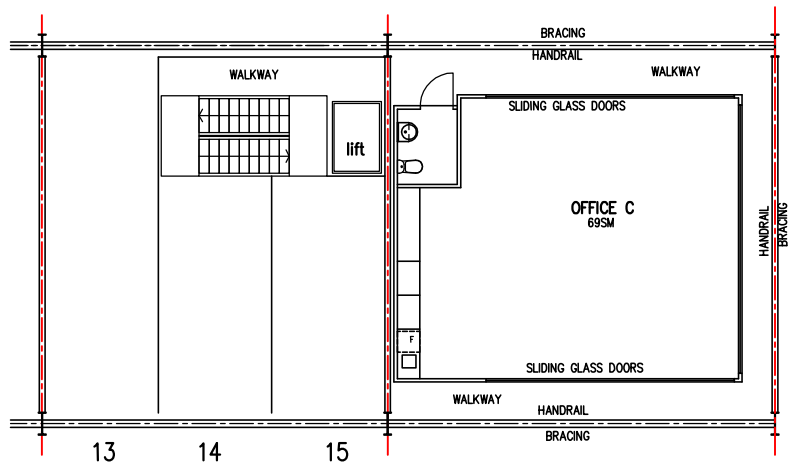
DRAINAGE
TO AS.3500 - DRAINAGE CODE
TO TANKS WITH OVERFLOW TO HARBOUR

ELECTRICAL
TO AS.3000 - WIRING RULES.

GENERAL
VERIFY ALL SCHEDULES & DIMENSIONS ON SITE BEFORE COMMENCEMENT OF WORKS OR ORDERING OF MATERIALS.
ALL WORKS IN ACCORDANCE WITH PROVISIONS OF
BUILDING CODE OF AUSTRALIA, DISABILITY DISCRIMINATION ACT
ANY AUSTRALIAN STANDARD & COUNCIL REQUIREMENTS.
ALL WORKS IN A TRADESMAN LIKE MANNER.



FLOOR PLAN LEVEL B TYPICAL



FLOOR PLAN LEVEL C TYPICAL

L E G E N D

GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	COLORBOND WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	COLORBOND SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

SURFACE FINISHES

VESSEL STORAGE

LEVEL C	14 BAYS
LEVEL B	14 BAYS
LEVEL A	14 BAYS
TOTAL	42 VESSELS
SITE TOTAL	150 VESSELS

NOTES

PLANS, ELEVATIONS & SECTIONS ARE TYPICAL ONLY AND MAY BE REVISED SUBJECT TO ENGINEERS DESIGN & DETAIL

OFFICE SPACE NOMINATED TO BE USED FOR SHOWROOM, WORKSHOP OR VESSEL STORAGE PURPOSES

NORTH

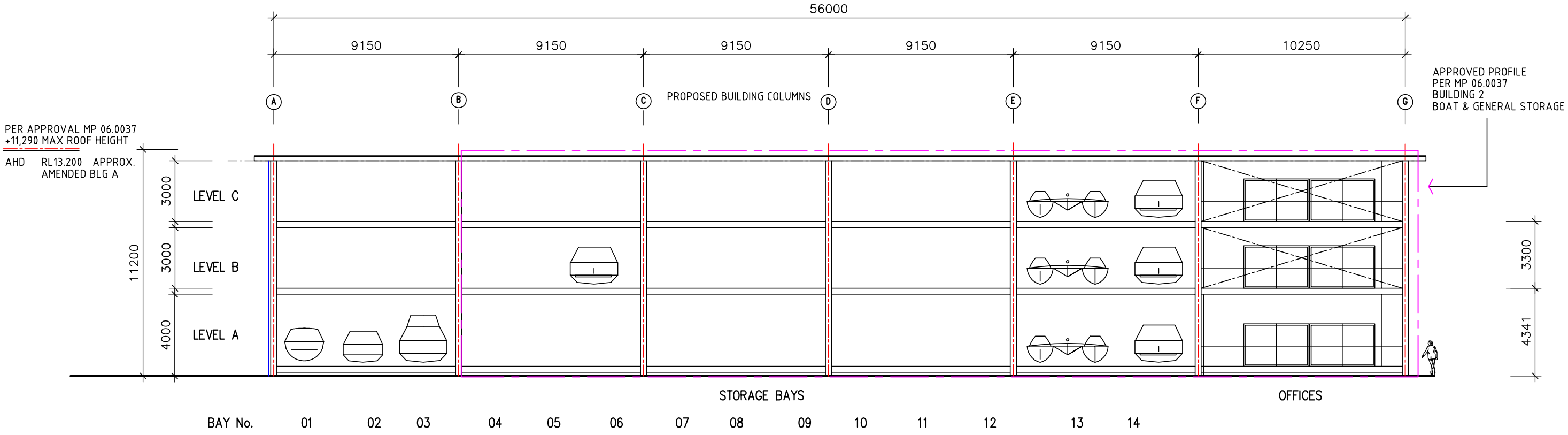
PAUL CARRICK & ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:200	JUNE 2013	A	839

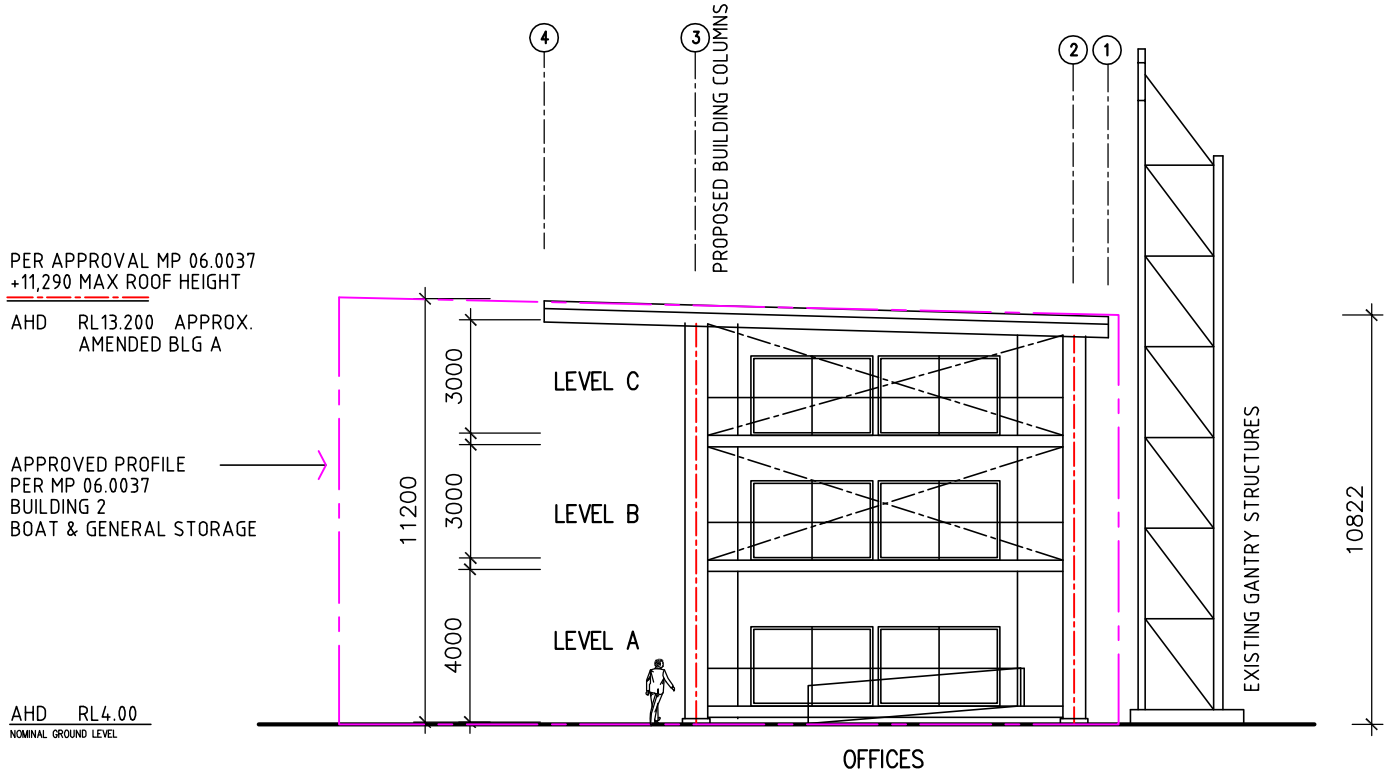
project: WHITE BAY 6 MARINE PARK

sheet: 10

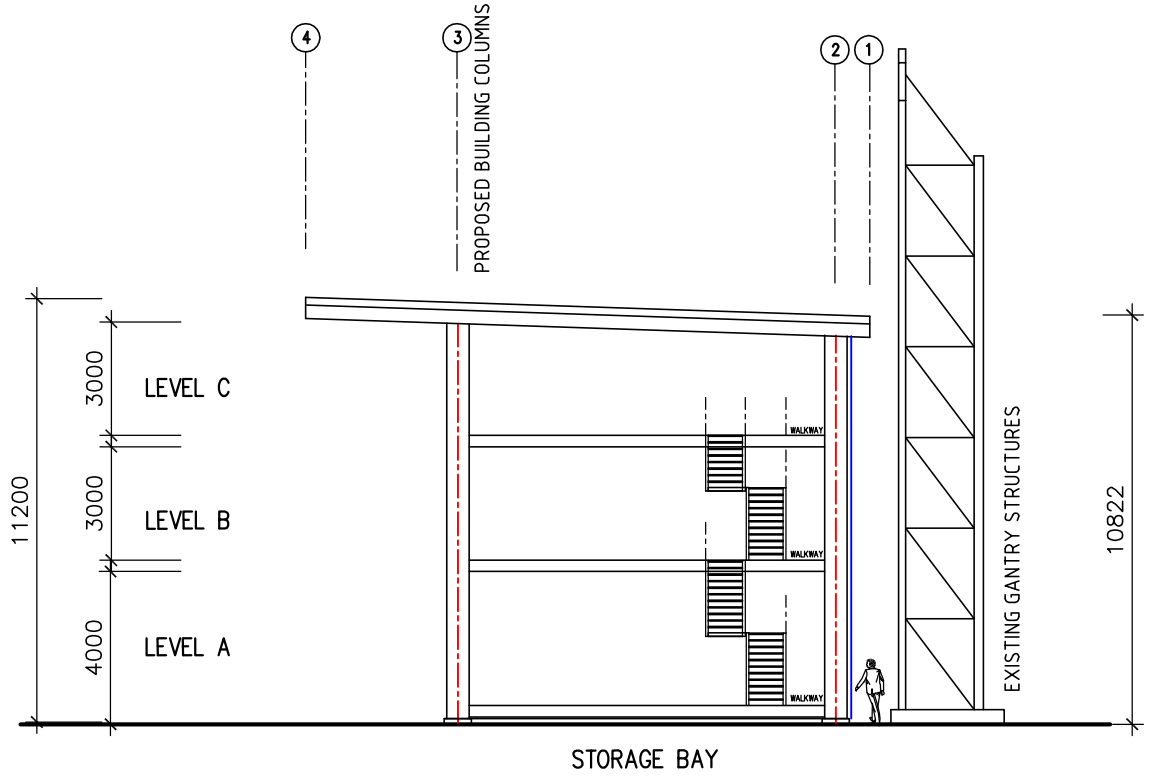
BUILDING A 56 X 10
FLOOR PLAN



FRONT ELEVATION



EAST ELEVATION



SECTION

LEGEND		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	COLORBOND WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	COLORBOND SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

VESSEL STORAGE	
LEVEL C	14 BAYS
LEVEL B	14 BAYS
LEVEL A	14 BAYS
TOTAL	42 VESSELS
SITE TOTAL	150 VESSELS

NOTES

PLANS, ELEVATIONS & SECTIONS ARE TYPICAL ONLY AND MAY BE REVISED SUBJECT TO ENGINEERS DESIGN & DETAIL

OFFICE SPACE NOMINATED TO BE USED FOR SHOWROOM, WORKSHOP OR VESSEL STORAGE PURPOSES

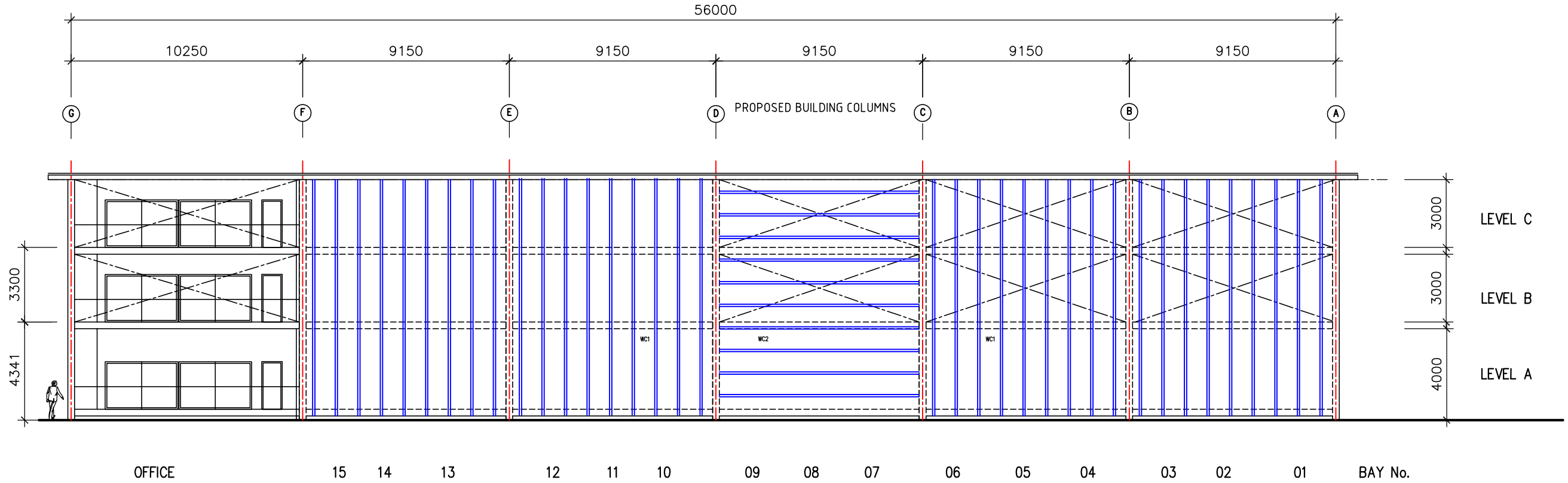
PAUL CARRICK
ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

BUILDING A 56 X 10
ELEVATION & SECTION

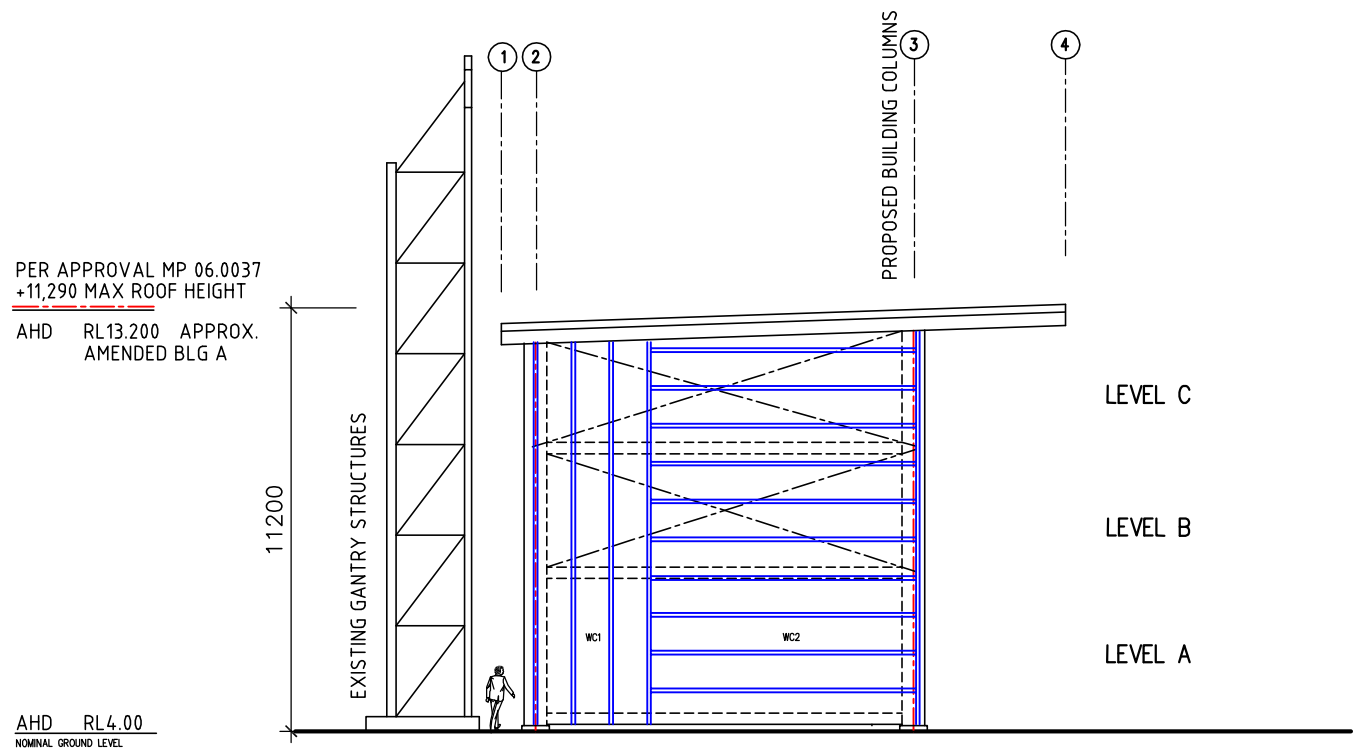
scale	date	revision	project no.
1:200	JUNE 2013	A	839

project: WHITE BAY 6 MARINE PARK

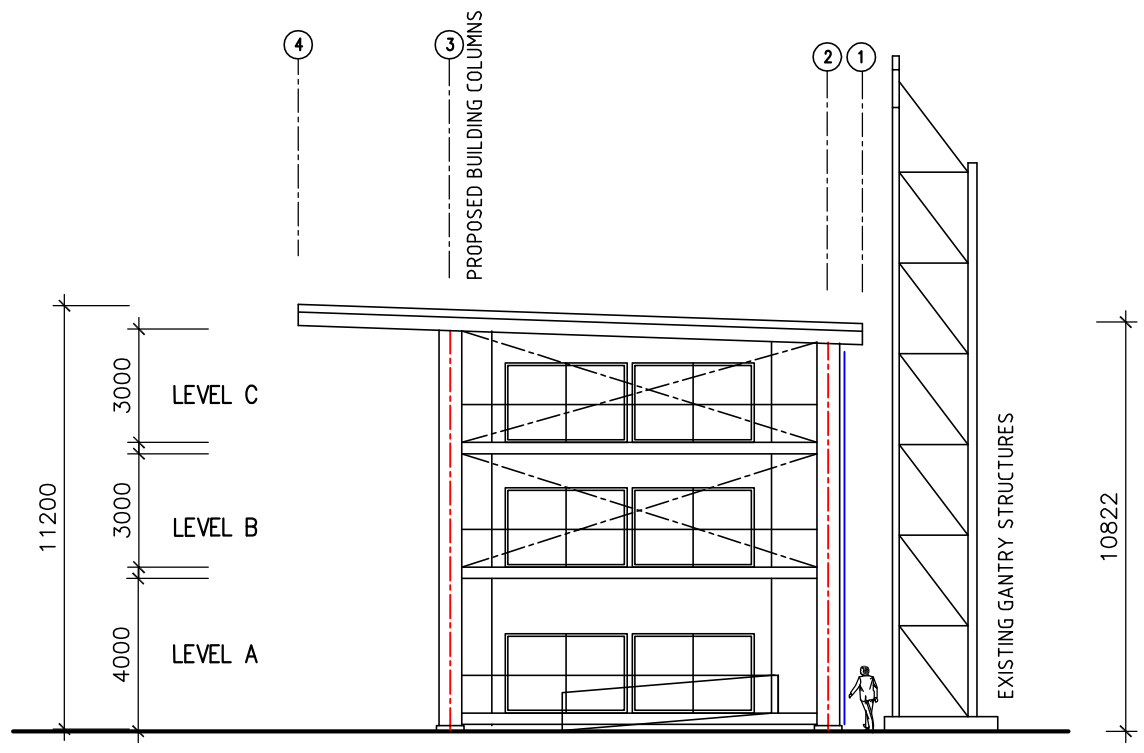
sheet: 11



NORTH REAR ELEVATION



WEST END ELEVATION



EAST END ELEVATION

BUILDING A 56 X 10
ELEVATIONS

AHD RL0.0
FDTG FDTG +925
FORT DENISON TIDE GAUGE

LEGEND		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	COLORBOND WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	COLORBOND SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

VESSEL STORAGE	
LEVEL C	14 BAYS
LEVEL B	14 BAYS
LEVEL A	14 BAYS
TOTAL	42 VESSELS
SITE TOTAL	150 VESSELS

NOTES

PLANS, ELEVATIONS & SECTIONS ARE TYPICAL ONLY AND MAY BE REVISED SUBJECT TO ENGINEERS DESIGN & DETAIL

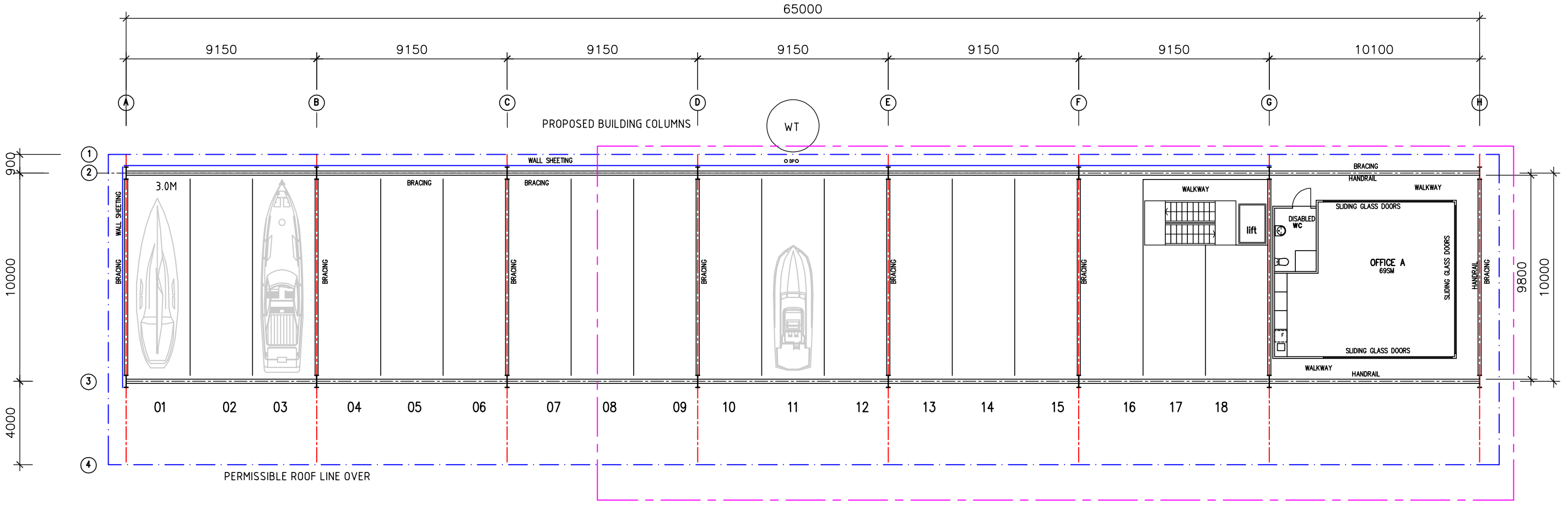
OFFICE SPACE NOMINATED TO BE USED FOR SHOWROOM, WORKSHOP OR VESSEL STORAGE PURPOSES

PAUL CARRICK
ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:200	JUNE 2013	A	839

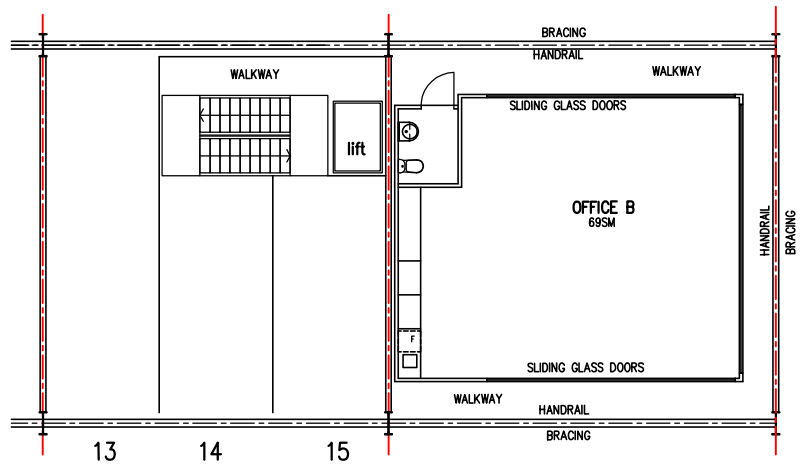
project
WHITE BAY 6 MARINE PARK

sheet
12

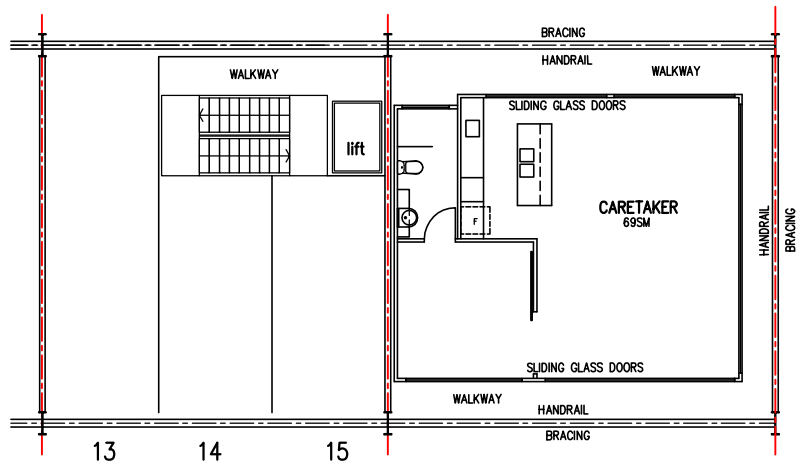


FLOOR PLAN LEVEL A TYPICAL

APPROVED PROFILE
PER MP 06.0037
BUILDING 1
OFFICE, RETAIL & WAREHOUSE



FLOOR PLAN LEVEL B TYPICAL



FLOOR PLAN LEVEL C TYPICAL

LEGEND		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	COLORBOND WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	COLORBOND SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

VESSEL STORAGE	
LEVEL C	18 BAYS
LEVEL B	18 BAYS
LEVEL A	18 BAYS
TOTAL	54 VESSELS
SITE TOTAL	150 VESSELS

NOTES

PLANS, ELEVATIONS & SECTIONS ARE TYPICAL ONLY AND MAY BE REVISED SUBJECT TO ENGINEERS DESIGN & DETAIL

OFFICE SPACE NOMINATED TO BE USED FOR SHOWROOM, WORKSHOP OR VESSEL STORAGE PURPOSES

NORTH

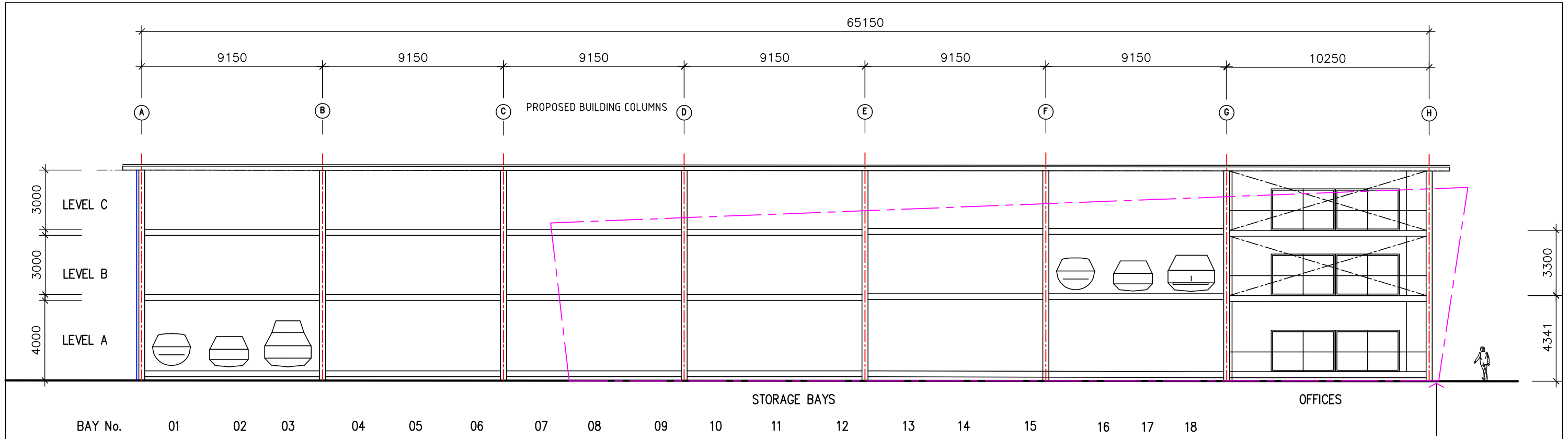
PAUL CARRICK
ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:200	JUNE 2013	A	839

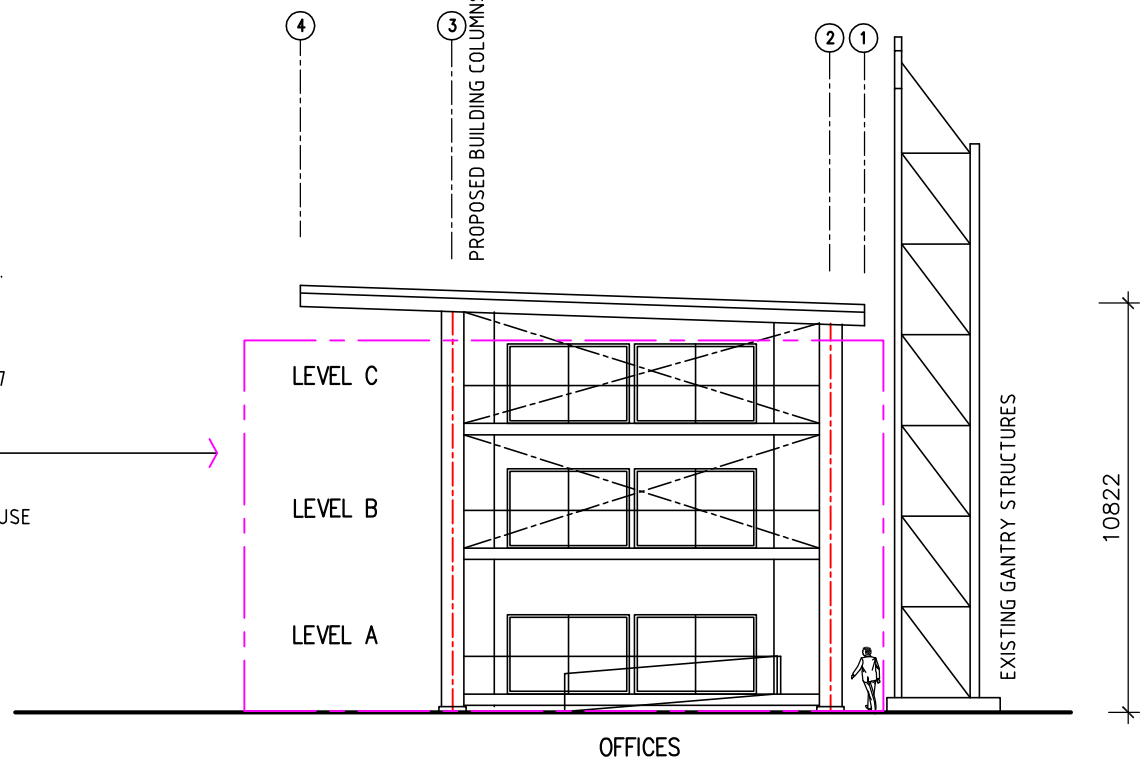
project
WHITE BAY 6 MARINE PARK

sheet
20

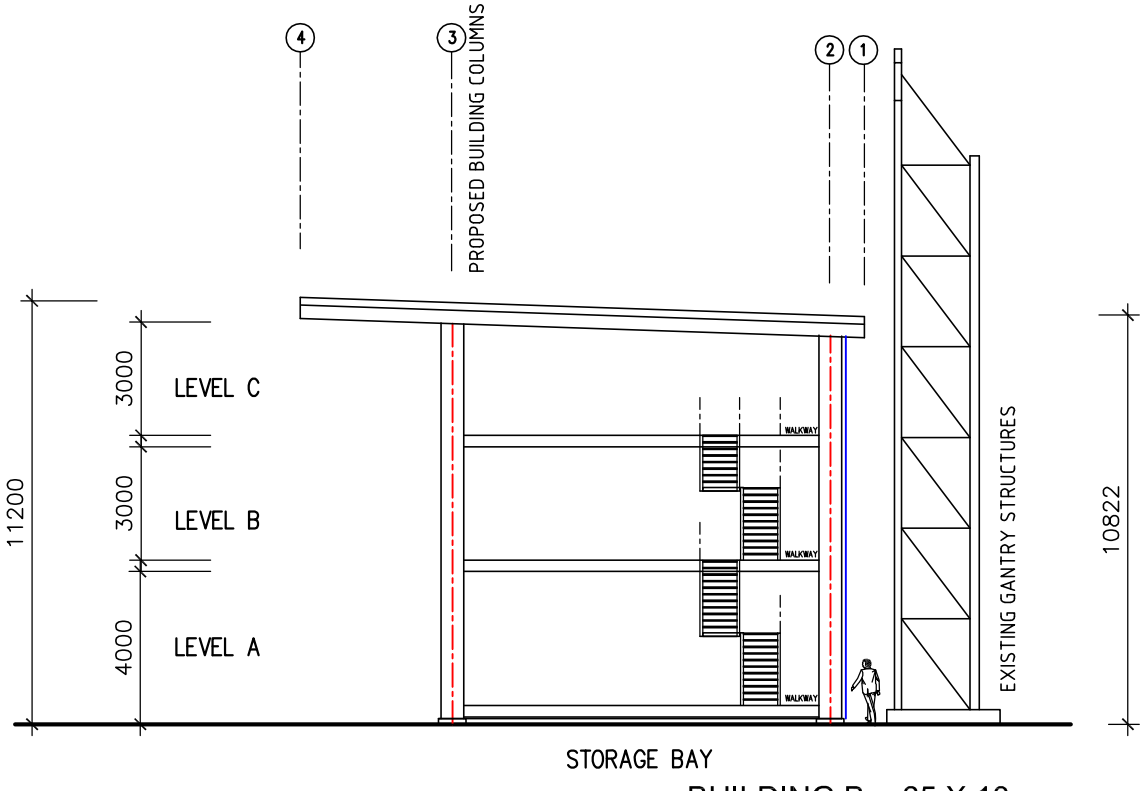
BUILDING B 65 X 10
FLOOR PLAN



FRONT ELEVATION



EAST ELEVATION



SECTION

AHD RL0.0
FDTG FDTG +925
FORT DENISON TIDE GAUGE

LEGEND		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	COLORBOND WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	COLORBOND SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

VESSEL STORAGE	
LEVEL C	18 BAYS
LEVEL B	18 BAYS
LEVEL A	18 BAYS
TOTAL	54 VESSELS
SITE TOTAL	150 VESSELS

NOTES

PLANS, ELEVATIONS & SECTIONS ARE TYPICAL ONLY AND MAY BE REVISED SUBJECT TO ENGINEERS DESIGN & DETAIL

OFFICE SPACE NOMINATED TO BE USED FOR SHOWROOM, WORKSHOP OR VESSEL STORAGE PURPOSES

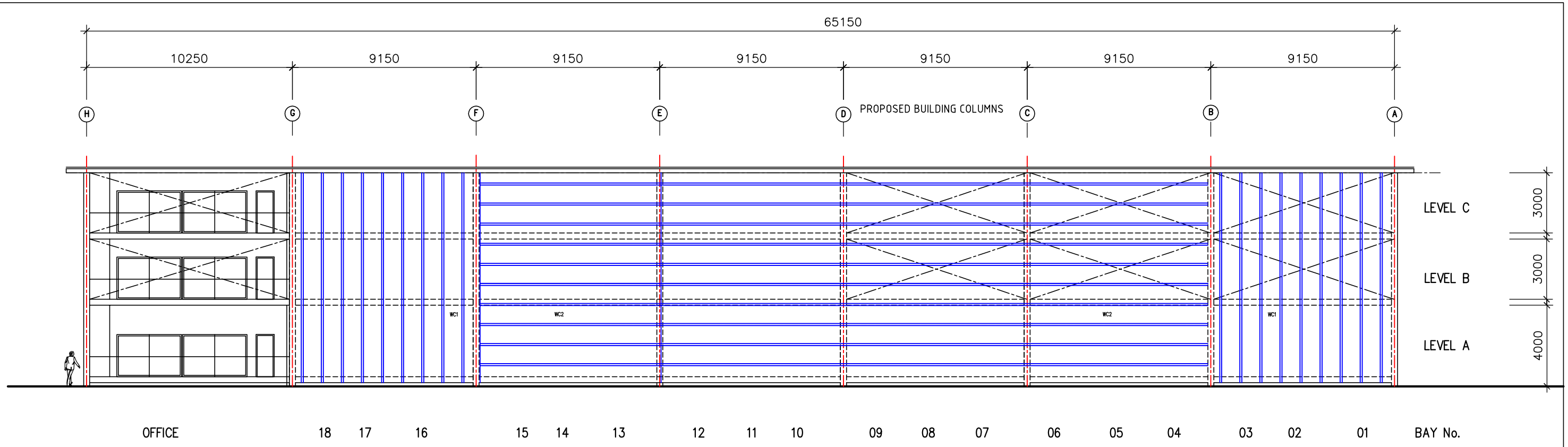
PAUL CARRICK
ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

BUILDING B 65 X 10
ELEVATION & SECTION

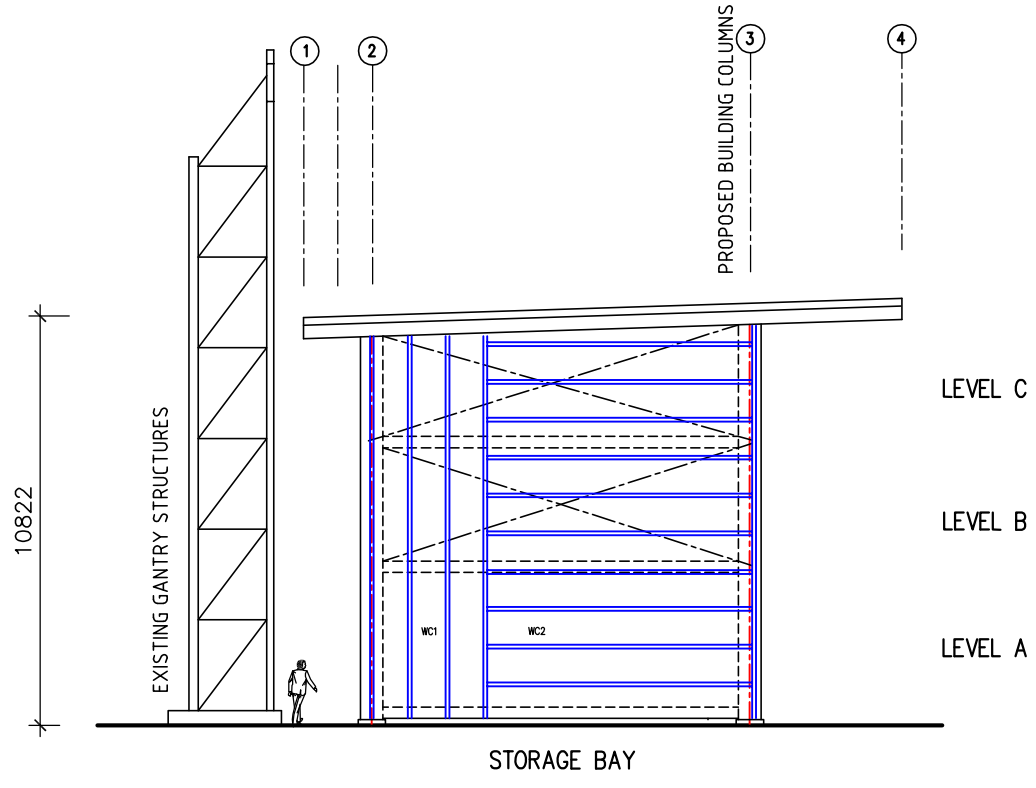
scale	date	revision	project no.
1:200	JUNE 2013	A	839

project: WHITE BAY 6 MARINE PARK

sheet: 21



NORTH REAR ELEVATION

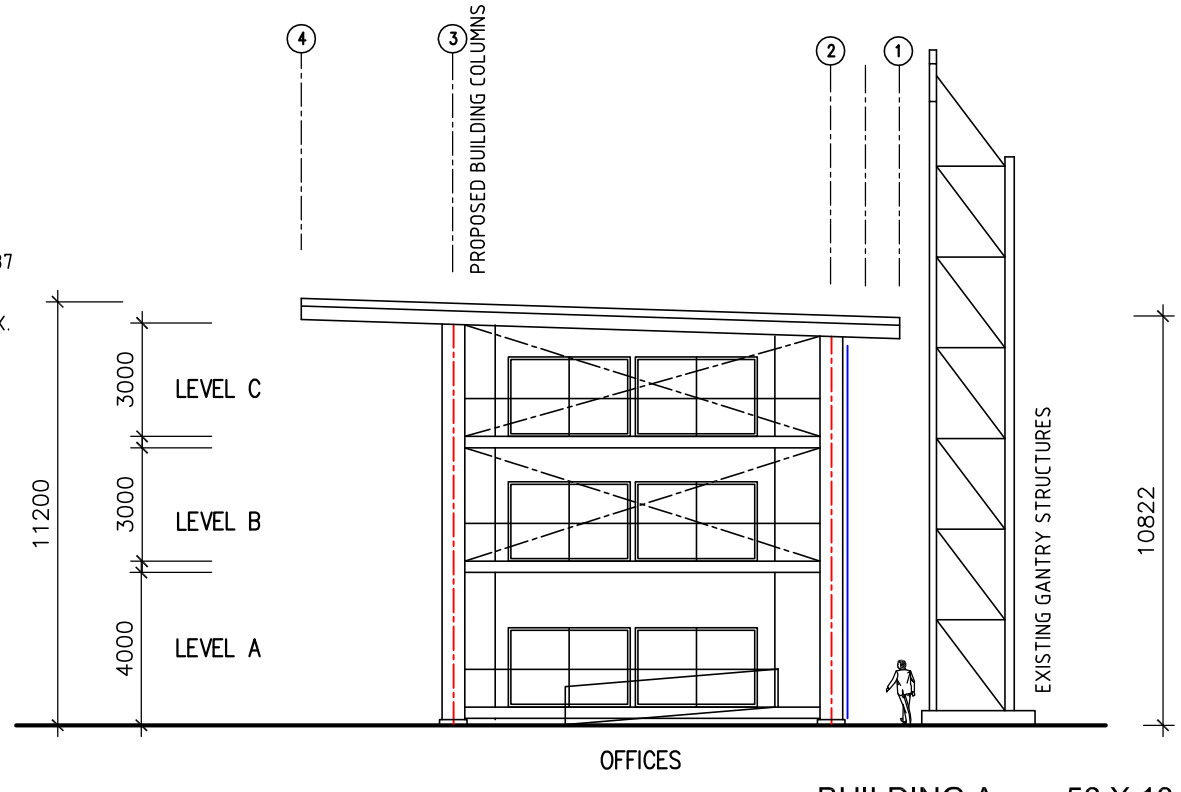


WEST END ELEVATION

PER APPROVAL MP 06.0037
+11,290 MAX ROOF HEIGHT

AHD RL13.200 APPROX.
AMENDED BLG A

AHD RL4.00
NOMINAL GROUND LEVEL



EAST END ELEVATION

BUILDING A 56 X 10
ELEVATIONS

VESSEL STORAGE	
LEVEL C	18 BAYS
LEVEL B	18 BAYS
LEVEL A	18 BAYS
TOTAL	54 VESSELS
SITE TOTAL	150 VESSELS

OFFICE SPACE

OFFICE SPACE NOMINATED TO BE USED FOR SHOWROOM, WORKSHOP OR VESSEL STORAGE PURPOSES

NOTE

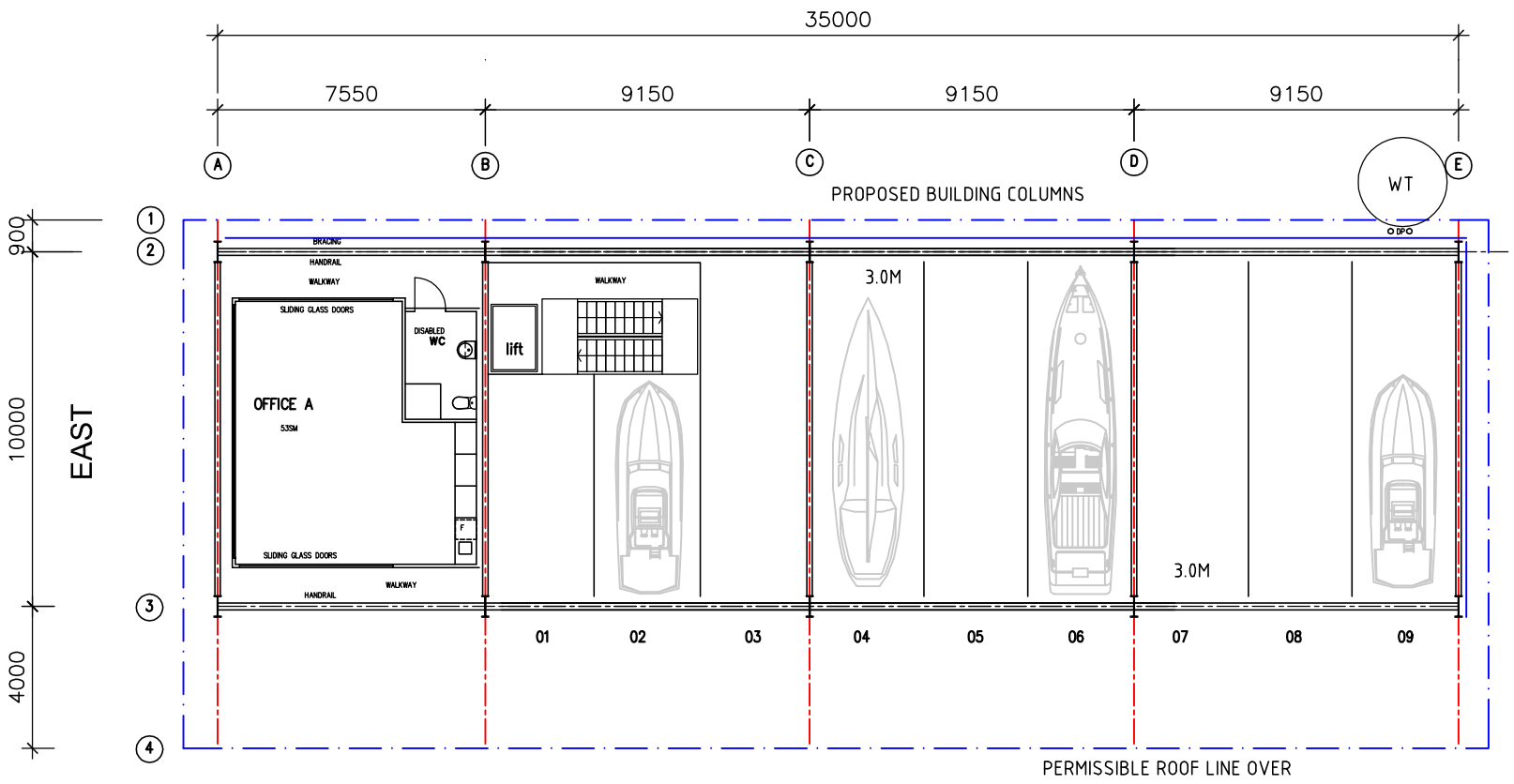
PLANS, ELEVATIONS & SECTIONS ARE TYPICAL ONLY AND MAY BE REVISED SUBJECT TO ENGINEERS DESIGN & DETAIL

PAUL CARRICK
ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:200	JUNE 2013	A	839

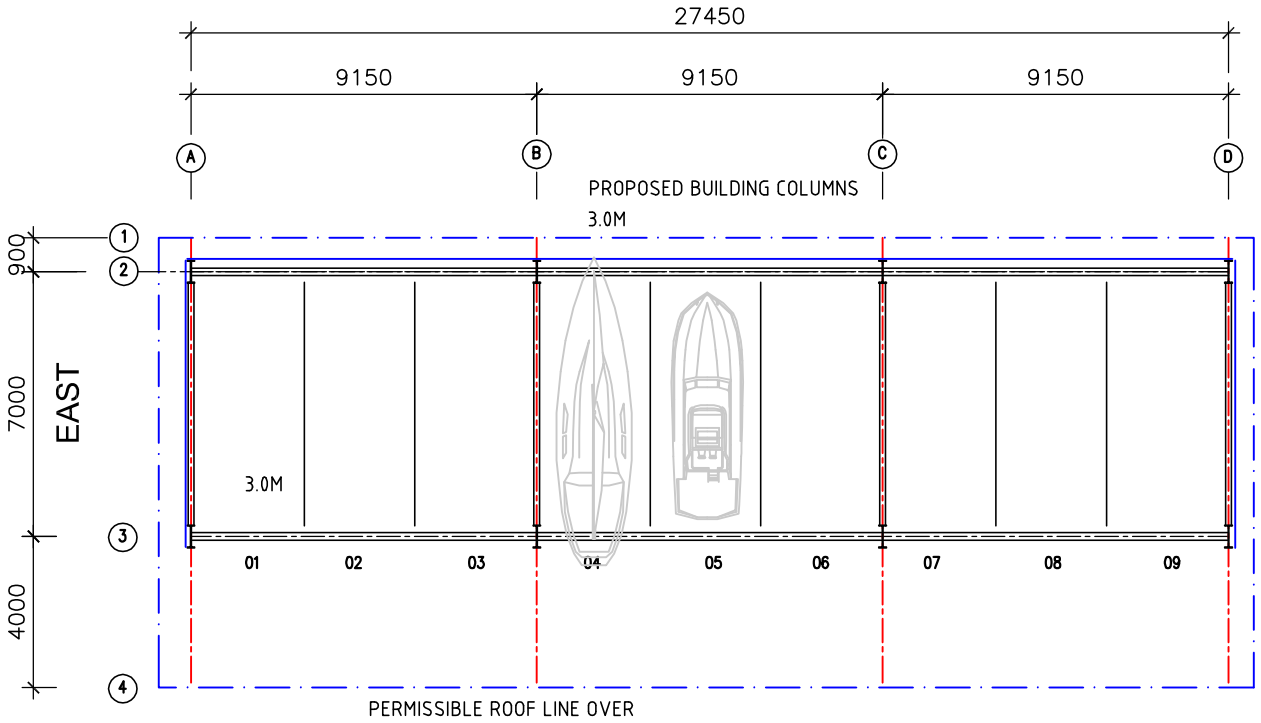
project
WHITE BAY 6 MARINE PARK

sheet
22



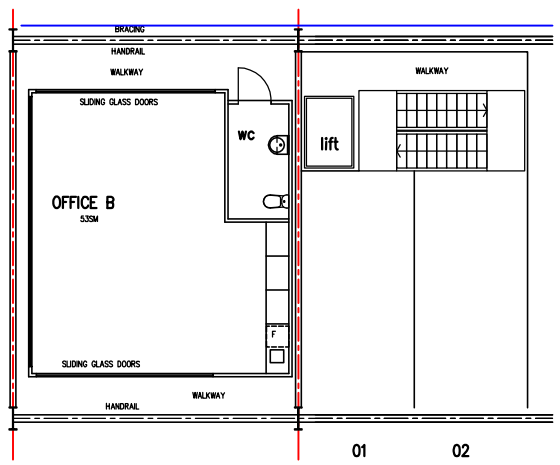
FLOOR PLAN LEVEL A TYPICAL

BUILDING C2 - EAST 35 X 10

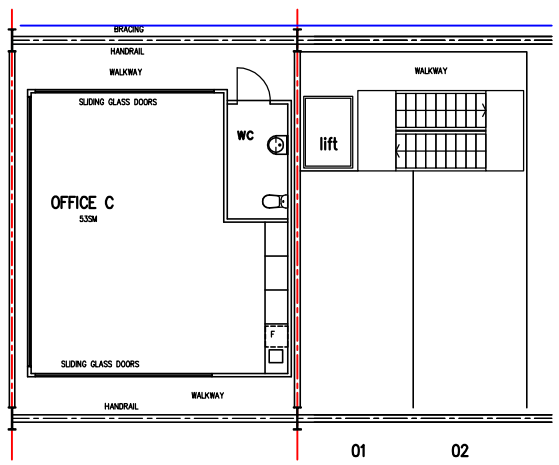


FLOOR PLAN LEVEL A TYPICAL

BUILDING C1 - WEST 27 X 7



FLOOR PLAN LEVEL B TYPICAL



FLOOR PLAN LEVEL C TYPICAL

LEGEND		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	COLORBOND WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	COLORBOND SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

VESSEL STORAGE	
LEVEL C	18 BAYS
LEVEL B	18 BAYS
LEVEL A	18 BAYS
TOTAL	54 VESSELS
SITE TOTAL	150 VESSELS

NOTES

PLANS, ELEVATIONS & SECTIONS ARE TYPICAL ONLY AND MAY BE REVISED SUBJECT TO ENGINEERS DESIGN & DETAIL

OFFICE SPACE NOMINATED TO BE USED FOR SHOWROOM, WORKSHOP OR VESSEL STORAGE PURPOSES

NORTH

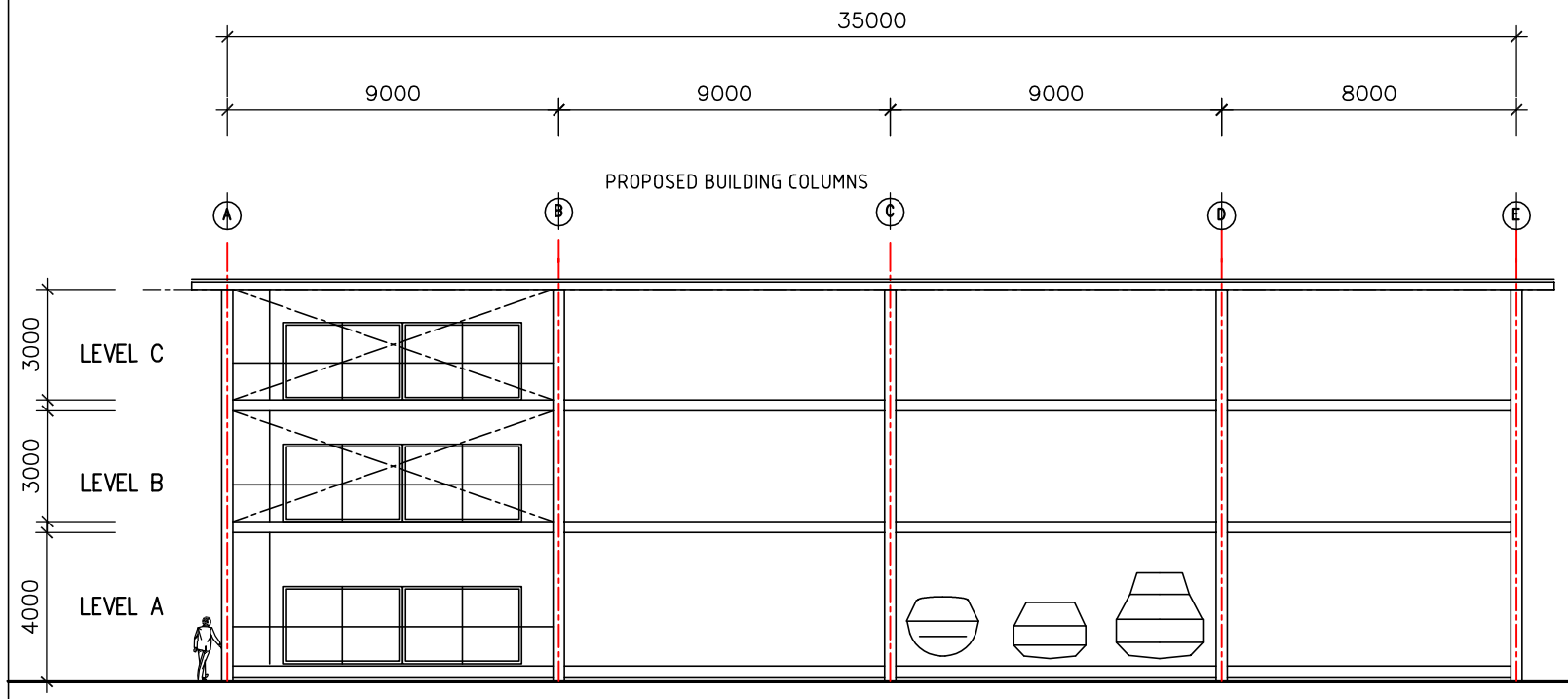
PAUL CARRICK & ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

BUILDINGS C1 & C2
FLOOR PLAN

scale	date	revision	project no.
1:200	JUNE 2013	A	839

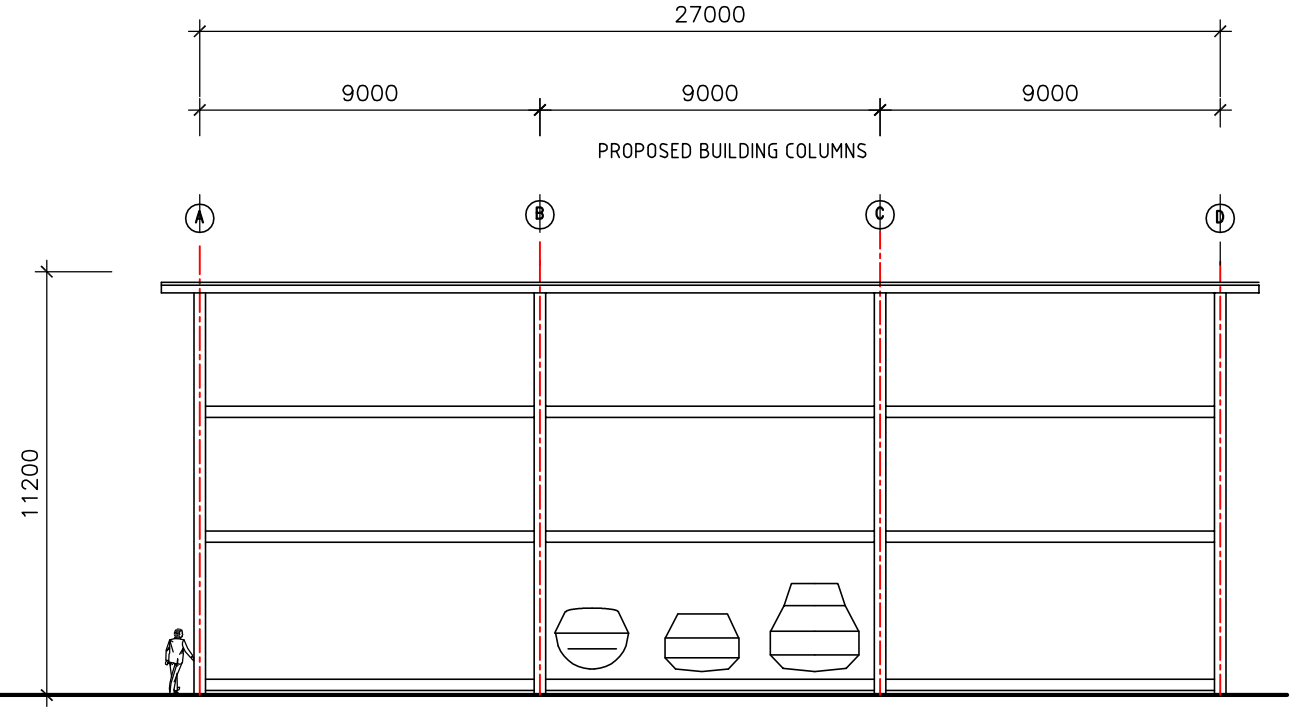
project: WHITE BAY 6 MARINE PARK

sheet: 30



BAY No. 01 02 03 04 05 06 07 08 09 10 11

BUILDING C2 - EAST
FRONT ELEVATION 35 X 10

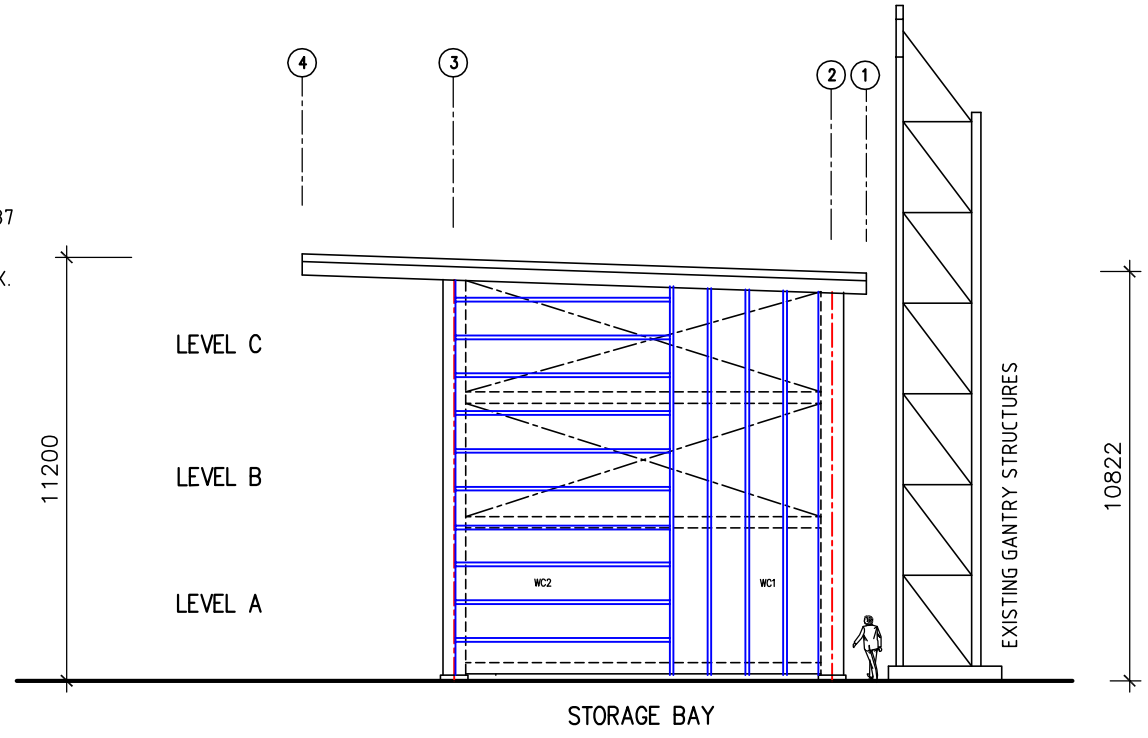


BAY No. 01 02 03 04 05 06 07 08 09

FRONT ELEVATION
BUILDING C1 - WEST 27 X 7

PER APPROVAL MP 06.0037
+11,290 MAX ROOF HEIGHT

AHD RL13.200 APPROX.
AMENDED BLG A

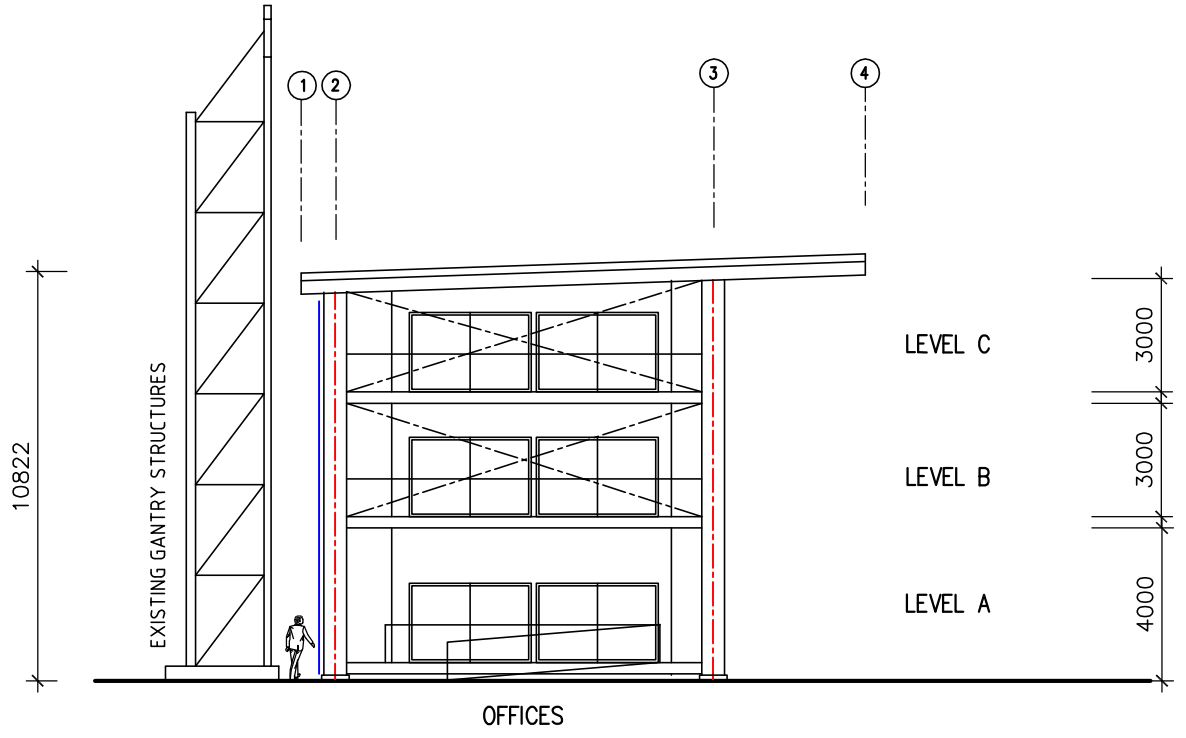


AHD RL4.00
NOMINAL GROUND LEVEL

STORAGE BAY

C2 - WEST END ELEVATION

AHD RL0.0
FDTG FDTG +925
FORT DENISON TIDE GAUGE



OFFICES

C2 - EAST END ELEVATION

LEGEND		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	COLORBOND WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	COLORBOND SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

VESSEL STORAGE	
LEVEL C	18 BAYS
LEVEL B	18 BAYS
LEVEL A	18 BAYS
TOTAL	54 VESSELS
SITE TOTAL	150 VESSELS

NOTES

PLANS, ELEVATIONS & SECTIONS ARE TYPICAL ONLY AND MAY BE REVISED SUBJECT TO ENGINEERS DESIGN & DETAIL

OFFICE SPACE NOMINATED TO BE USED FOR SHOWROOM, WORKSHOP OR VESSEL STORAGE PURPOSES

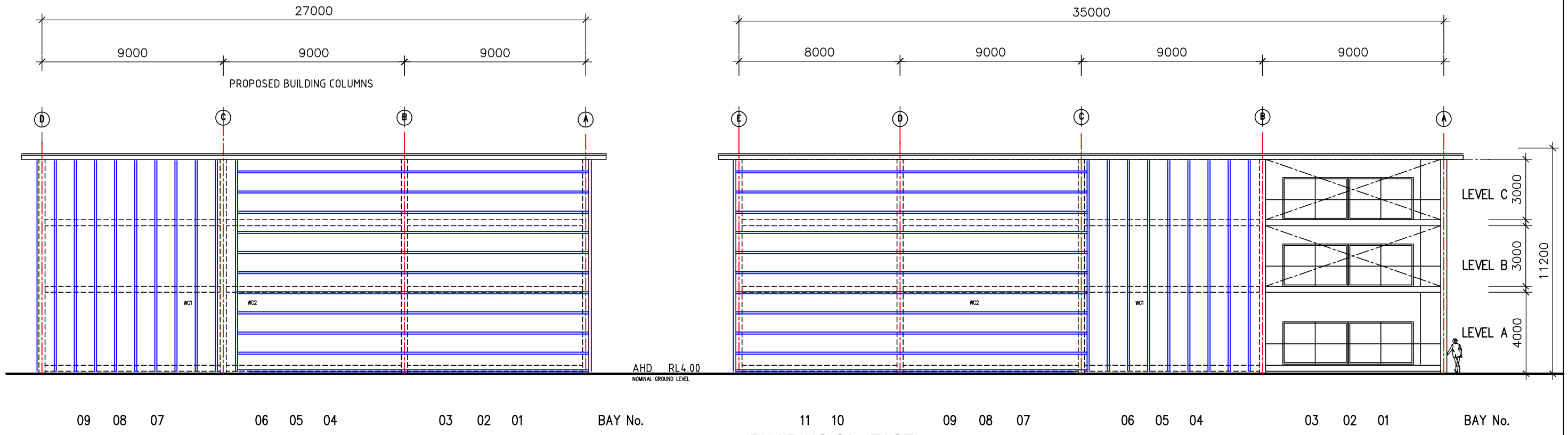
BUILDINGS C1 & C2
ELEVATION & SECTION

PAUL CARRICK
ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:200	JUNE 2013	A	839

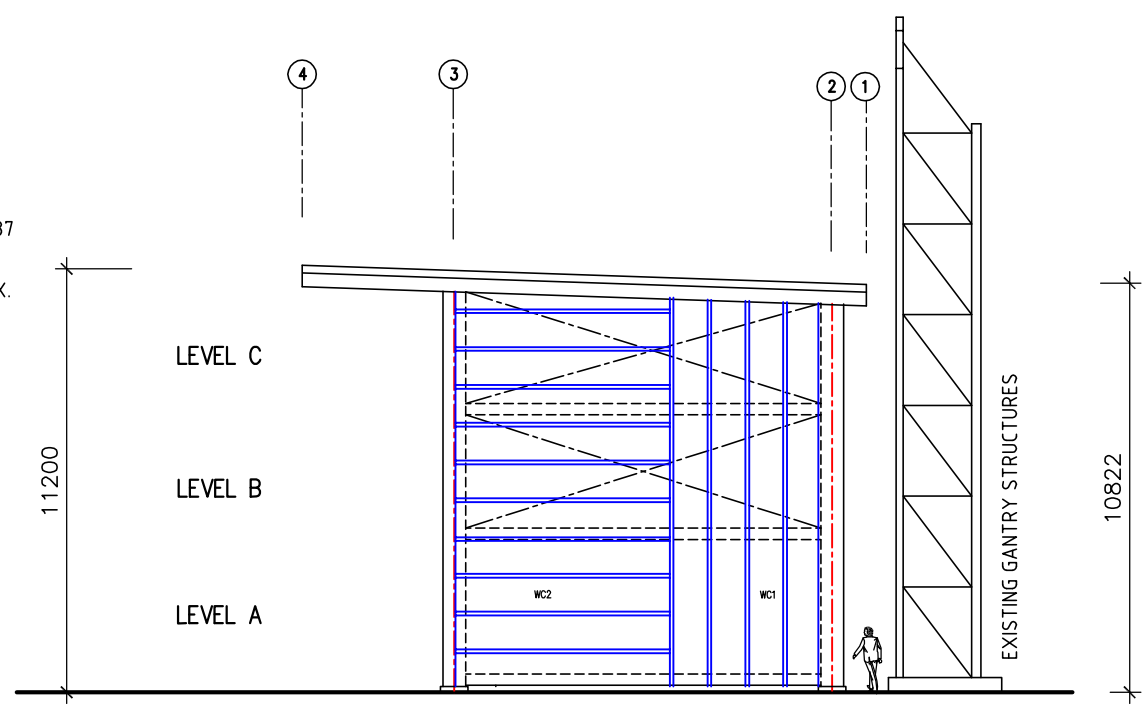
project: WHITE BAY 6 MARINE PARK

sheet: 31

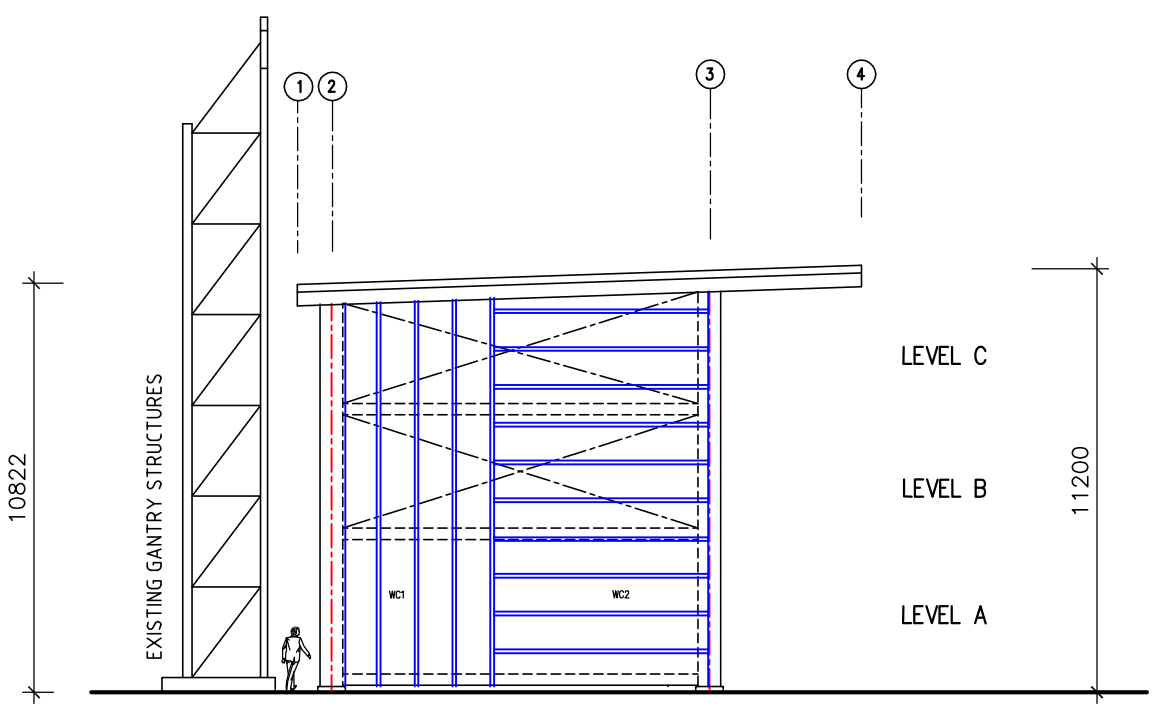


REAR ELEVATION
BUILDING C1 - WEST 27 X 7

BUILDING C2 - EAST
REAR ELEVATION 35 X 10



STORAGE BAY
C1 - WEST END ELEVATION



STORAGE BAY
C1 - EAST END ELEVATION

PER APPROVAL MP 06.0037
+11,290 MAX ROOF HEIGHT

AHD RL13.200 APPROX.
AMENDED BLG A

AHD RL4.00
NOMINAL GROUND LEVEL

AHD RL0.0
FDTG FDTG +925
FORT DENISON TIDE GAUGE

LEGEND		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	COLORBOND WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	COLORBOND SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

VESSEL STORAGE	
LEVEL C	18 BAYS
LEVEL B	18 BAYS
LEVEL A	18 BAYS
TOTAL	54 VESSELS
SITE TOTAL	150 VESSELS

NOTES

PLANS, ELEVATIONS & SECTIONS ARE TYPICAL ONLY AND MAY BE REVISED SUBJECT TO ENGINEERS DESIGN & DETAIL

OFFICE SPACE NOMINATED TO BE USED FOR SHOWROOM, WORKSHOP OR VESSEL STORAGE PURPOSES

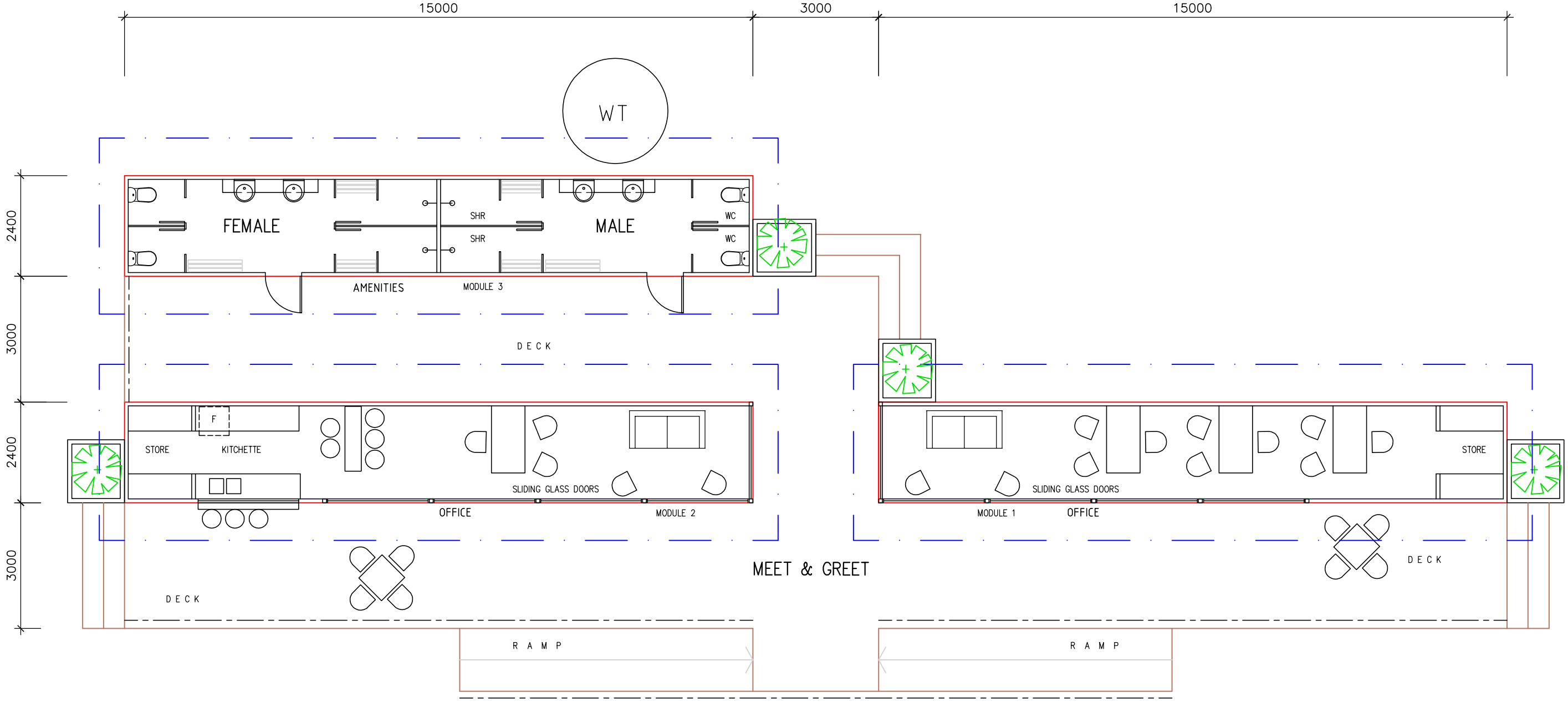
PAUL CARRICK & ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

BUILDINGS C1 & C2
ELEVATIONS

scale	date	revision	project no.
1:200	JUNE 2013	A	839

project
WHITE BAY 6 MARINE PARK

sheet
32



SPECIFICATION TYPICAL TO ALL STRUCTURES

STRUCTURAL DETAILS
STRUCTURAL DETAILS TO ENGINEERS DESIGN.

CONCRETE
TO AS.3600 - CONCRETE CODE.

TIMBER
TO AS.1684 - TIMBER CODE.

DRAINAGE
TO AS.3500 - DRAINAGE CODE
TO TANKS WITH OVERFLOW TO HARBOUR

ELECTRICAL
TO AS.3000 - WIRING RULES.

INSULATION
ROOF FOIL + R1.0 BATTS
EXTERNAL WALLS FOIL + R1.0 BATTS

GENERAL
VERIFY ALL SCHEDULES & DIMENSIONS ON SITE BEFORE COMMENCEMENT OF WORKS OR ORDERING OF MATERIALS.
ALL WORKS IN ACCORDANCE WITH PROVISIONS OF
BUILDING CODE OF AUSTRALIA, DISABILITY DISCRIMINATION ACT
ANY AUSTRALIAN STANDARD & COUNCIL REQUIREMENTS.
ALL WORKS IN A TRADESMAN LIKE MANNER.

LEGEND

		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	SCYON WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	SCYON SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

MEET & GREET BUILDINGS

DEMOUNTABLE TYPE UNITS
SKID 300 HD GALV PFC CHANNELS
150 PFC BEARERS
90 TP FLOOR JOISTS
HARDIE SCYON CLADDING
INSULATED WALL & ROOF
COLORBOND ROOFING 7 DEGREE PITCH
ALUM POWDER COATED WINDOWS AND DOORS
MODWOOD TYPE DECKING AND STAIRS

PRIMARY MEET & GREET BUILDINGS PLAN

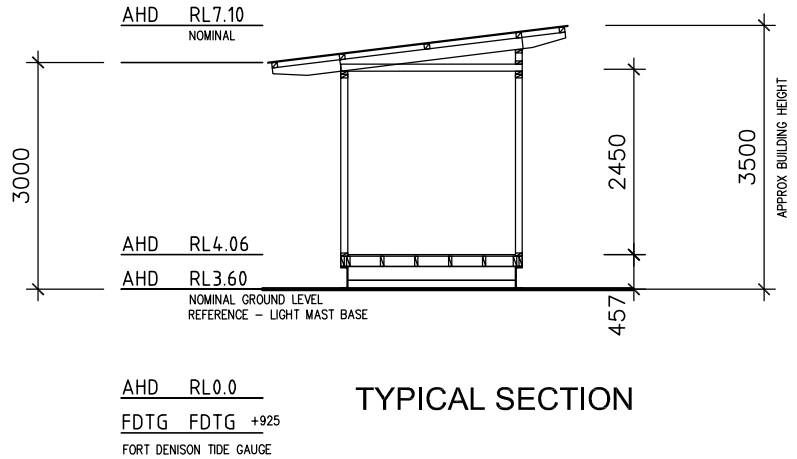
NORTH

PAUL CARRICK
ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

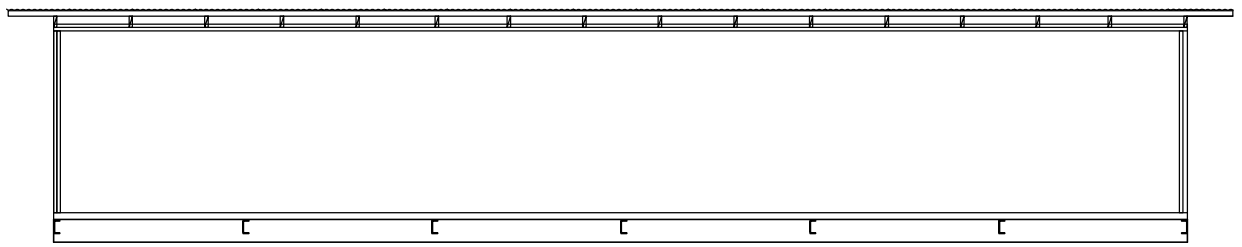
scale	date	revision	project no.
1:100	JUNE 2013	A	839

project: WHITE BAY 6 MARINE PARK

sheet: 50



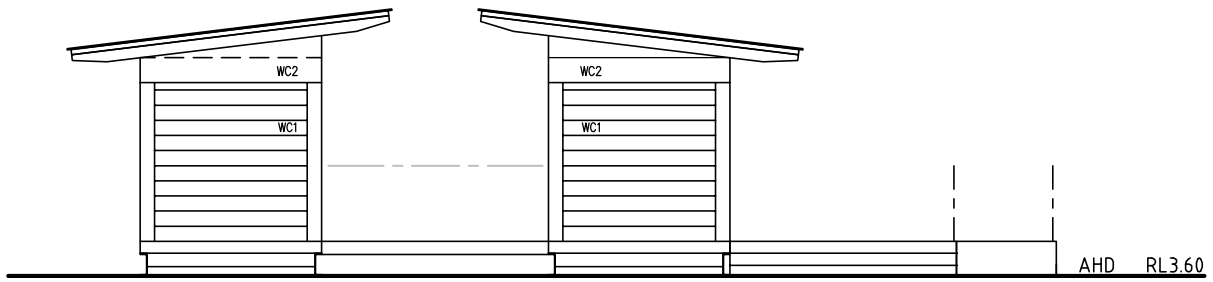
TYPICAL SECTION



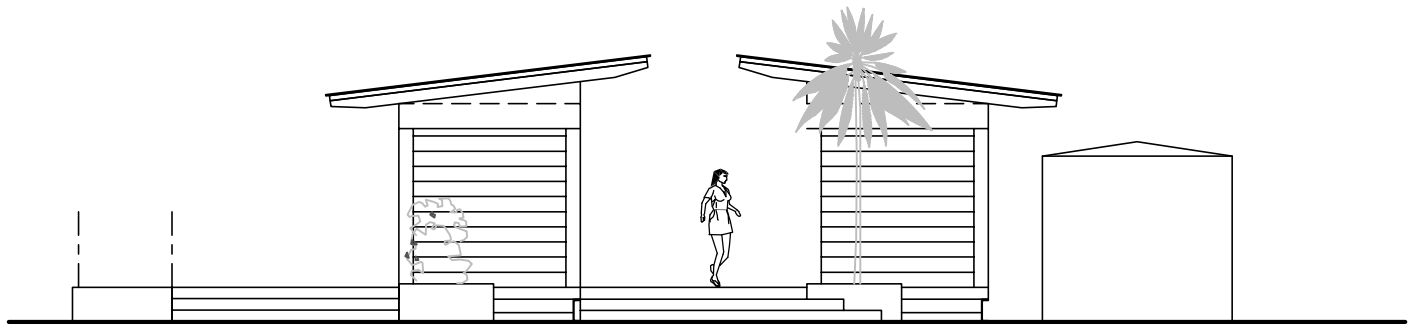
LONG SECTION

MEET & GREET MODULES

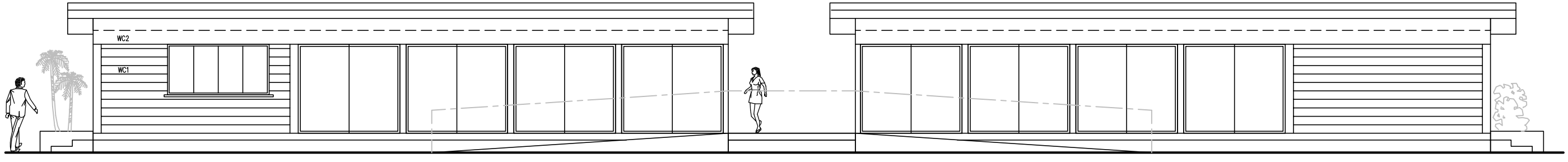
DEMOUNTABLE TYPE UNITS
SKID 300 HD GALV PFC CHANNELS
150 PFC BEARERS
90 TP FLOOR JOISTS
HARDIE SCYON CLADDING
INSULATED WALL & ROOF
COLORBOND ROOFING 7 DEGREE PITCH
ALUM POWDER COATED WINDOWS AND DOORS
MODWOOD TYPE DECKING AND STAIRS



SIDE SOUTH ELEVATION



SIDE NORTH ELEVATION



EAST FRONT ELEVATION

LEGEND		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	SCYON WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	SCYON SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

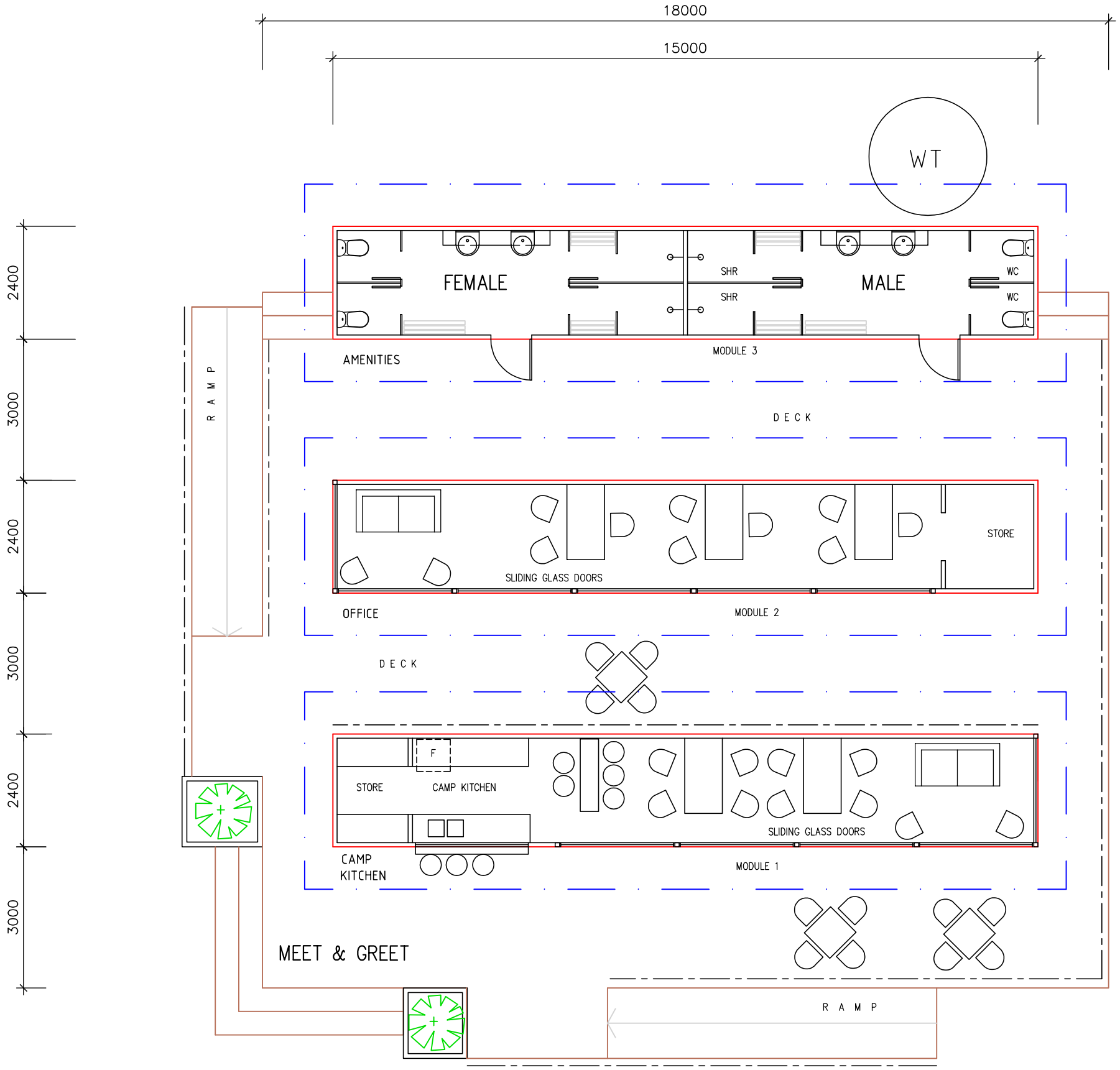
PRIMARY MEET & GREET BUILDINGS ELEVATIONS

PAUL CARRICK
ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:100	JUNE 2013	A	839

project: WHITE BAY 6 MARINE PARK

sheet: 51



LEGEND

GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	SCYON WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	SCYON SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY

SURFACE FINISHES

MEET & GREET MODULES

DEMOUNTABLE TYPE UNITS
SKID 300 HD GALV PFC CHANNELS
150 PFC BEARERS
90 TP FLOOR JOISTS
HARDIE SCYON CLADDING
INSULATED WALL & ROOF
COLORBOND ROOFING 7 DEGREE PITCH
ALUM POWDER COATED WINDOWS AND DOORS
MODWOOD TYPE DECKING AND STAIRS

SPECIFICATION TYPICAL TO ALL STRUCTURES

STRUCTURAL DETAILS
STRUCTURAL DETAILS TO ENGINEERS DESIGN.

CONCRETE
TO AS.3600 - CONCRETE CODE.

TIMBER
TO AS.1684 - TIMBER CODE.

INSULATION
ROOF FOIL + R1.0 BATTS
EXTERNAL WALLS FOIL + R1.0 BATTS

DRAINAGE
TO AS.3500 - DRAINAGE CODE
TO TANKS WITH OVERFLOW TO HARBOUR

ELECTRICAL
TO AS.3000 - WIRING RULES.

GENERAL
VERIFY ALL SCHEDULES & DIMENSIONS ON SITE BEFORE COMMENCEMENT OF WORKS OR ORDERING OF MATERIALS.
ALL WORKS IN ACCORDANCE WITH PROVISIONS OF
BUILDING CODE OF AUSTRALIA, DISABILITY DISCRIMINATION ACT
ANY AUSTRALIAN STANDARD & COUNCIL REQUIREMENTS.
ALL WORKS IN A TRADESMAN LIKE MANNER.

SECONDARY MEET & GREET BUILDINGS PLAN

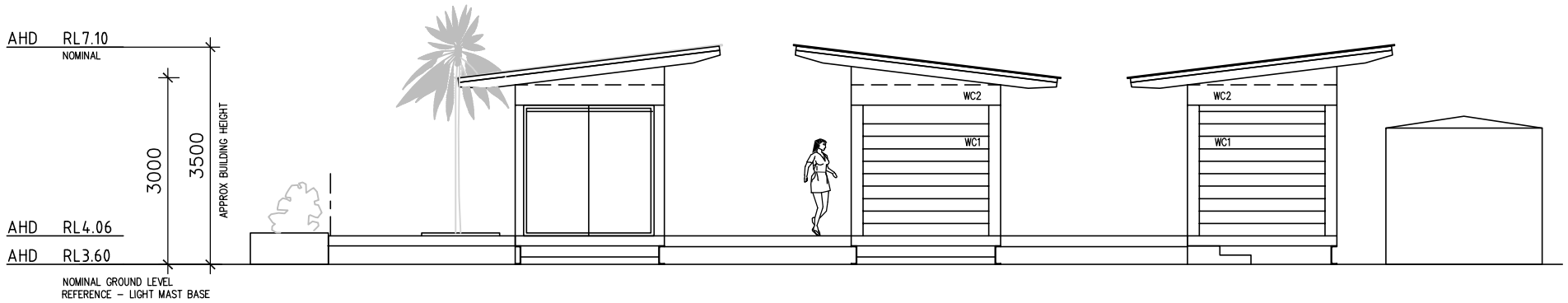
NORTH

PAUL CARRICK & ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:100	JUNE 2013	A	839

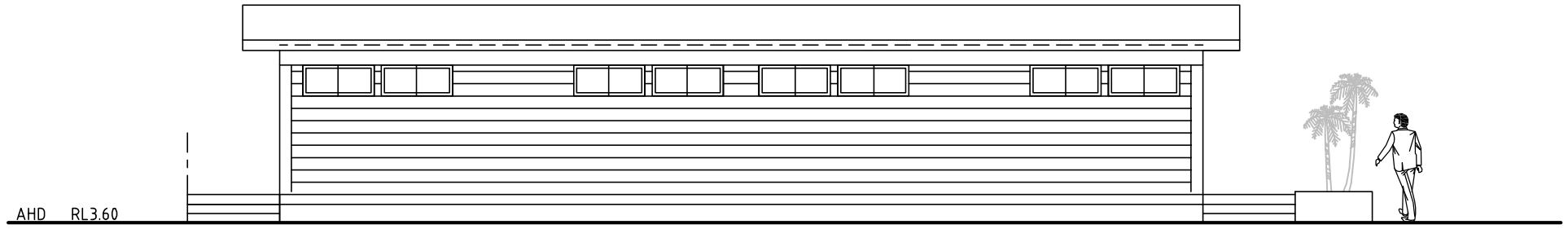
project
WHITE BAY 6 MARINE PARK

sheet
55

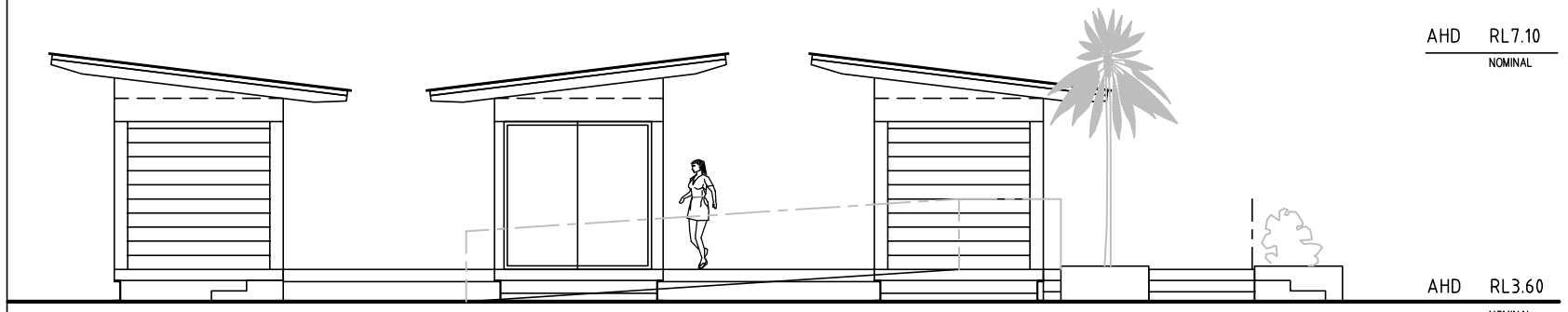


SIDE NORTH ELEVATION

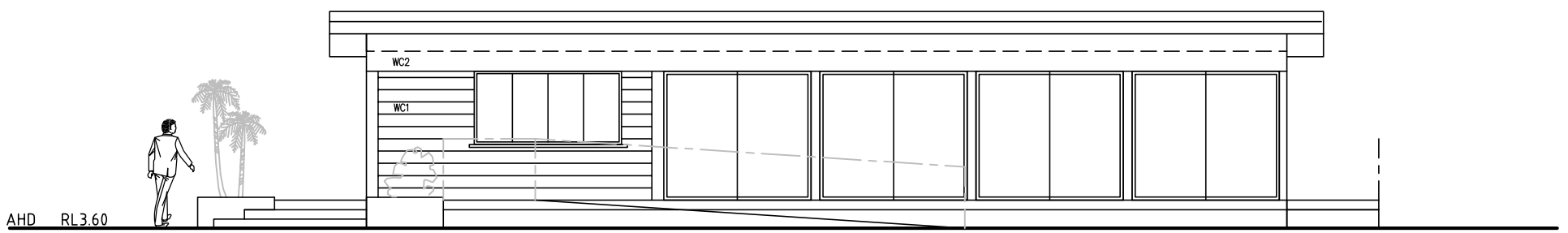
LEGEND		SURFACE FINISHES
GAF	GLAZING ALUM FRAMED	WHITE POWDER COAT
WC1	WALL CLADDING TYPE 1	SCYON WINDSPRAY - MID GREY
WC2	WALL CLADDING TYPE 2	SCYON SHALE GREY - LIGHT GREY
RS	ROOF SHEETING	COLORBOND WINDSPRAY - MID GREY
DP	DOWNPIPE	TO MATCH ADJACENT WALL SHEET
HR	HANDRAIL BALUSTRADING	HD GALVANISED
WT	10KL WATER TANK	HDPE 2.5 DIA X 2.3H GREY



WEST REAR ELEVATION



SIDE SOUTH ELEVATION



EAST FRONT ELEVATION

MEET & GREET MODULES

DEMOUNTABLE TYPE UNITS
SKID 300 HD GALV PFC CHANNELS
150 PFC BEARERS
90 TP FLOOR JOISTS
HARDIE SCYON CLADDING
INSULATED WALL & ROOF
COLORBOND ROOFING 7 DEGREE PITCH
ALUM POWDER COATED WINDOWS AND DOORS
MODWOOD TYPE DECKING AND STAIRS

SECONDARY MEET & GREET BUILDINGS ELEVATIONS

PAUL CARRICK & ASSOCIATES
building designers
04122 41514
pcadesign@ozemail.com.au

scale	date	revision	project no.
1:100	JUNE 2013	A	839

project: WHITE BAY 6 MARINE PARK

sheet: 56