ADDENBROOKE PTY LTD

TRAFFIC AND PARKING IMPACT REVIEW OF PROPOSED EXTENSION TO NORTH HARBOUR MARINA, GOURLAY AVENUE, BALGOWLAH NSW

AUGUST 2024

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CONTENTS

1.0 INTRODUCTION

North Harbour Marina is located in North Harbour, Balgowlah, at the end of Gourlay Avenue. It provides marina berths for 34 boats, including four soft-stand berths, plus support services for boat repairs and maintenance. It also provides 51 swing moorings.

The area is well served by public transport, with frequent bus services.

Car parking is generally accommodated on street in Gourlay Avenue, with an area of angle parking just above the marina, with 22 parking spaces, plus about 5 spaces at the end of Gourlay Avenue, adjacent to the marina. These parking areas are under the control of Manly Council. There is a footpath/steps from the 22 space parking area down to North Harbour Marina. This parking also serves the adjacent North Harbour Sailing Club, a private club that serves its members with moorings and club facilities.

North Harbour Marina is located adjacent to the well-used walking track between Manly and The Spit.

There is an un-met demand for wet marina berths on Sydney Harbour. To assist in meeting this demand, North Harbour Marina propose to extend their existing marina, to accommodate an additional 9 boats. At the same time, 10 xisting commercial swing moorings would be removed. The total number of boats accommodated will increase by two.

While the key extension proposed is the extension of the marina berths, the option is also proposed to extend the deck area of the marina building and to convert part of the office area into a café kitchen. The intention is to lease the café space to a local café operator, to provide a service to boat users and to walkers on the Manly-The Spit track.

Figure 1 shows the proposed marina extension plan.

Figure 2 shows the location of current and removed swing moorings.

Figure 3 shows the layout of the marina building and the proposed alterations.

2.0 TRAFFIC AND PARKING CHARACTERISTICS OF MARINAS

The traffic and parking characteristics of many land use developments have been surveyed by the Roads & Traffic Authority of NSW (RTA), with research reports prepared in the series *Land Use Traffic Generation – Data and Analysis.* The results of this research have been compiled in the RTA document *Guide to Traffic Generating Developments.* This document recommends traffic generation and parking demand rates for a wide range of developments, including land use types that were not surveyed by the RTA (and its predecessor, Traffic Authority of NSW). In an attempt to cover a wide range of land uses, some rates were recommended without the benefit of detailed research, in order to provide some guidance to Local Government and traffic engineering practitioners. One such land use that did not have the benefit of detailed background research is marinas.

Manly Development Control Plan Part 4 Schedule 3 does not list a parking requirement for marinas, but comments:

> "*For other development types not identified in this Schedule, parking shall be provided in accordance with the Roads and Maritime Services (RMS) Design Reference Documents…"*

Manly DCP does have a parking rate for cafes of: *1 parking space for every 40 sqm of gross floor area of serviced area.*

The current (Version 2.2 dated October 2002) RTA *Guide to Traffic Generating Developments* recommends that surveys be undertaken of similar marina developments, to establish the parking demand. In the absence of such surveys, the default rates are *0.6 spaces per wet berth* and *0.2 spaces per swing mooring.* These default rates are unchanged from the original edition of this Guide that was published in December 1993.

The consulting engineering company Christopher Hallam & Associates Pty Ltd (CHA) have been undertaking traffic and parking assessments of marinas for over 20 years. Because of the complexity of the surveys and analysis, and with many Local Government Authorities not having specific parking rates, CHA prepared a research report titled "*The Traffic and Parking Implications of Marina Developments",* with the most recent version being dated September 2012. This report is Annexure A to this Assessment.

As discussed in Section 2.1 of the appended document, the RTA parking rates were premised on the assumption that boats that were in more accessible locations, that is, on wet marina berths compared with boats on swing moorings, were more highly utilized, because of this easier accessibility. There is no RTA research to prove this assumption.

Following research by Christopher Hallam & Associates for the Boating Industry Association, a submission was made to Standards Australia, with a request to review the parking requirements in AS3962-1991. This Standard was revised in 2001, with

AS3962-2001 recommending the same parking rates for wet berths and swing moorings, being the range 0.3-0.6 spaces per berth. The key change in this Standard was that swing moorings and wet marina berths now have the same parking requirements, which is a change to the previous AS3962-1991, where wet berths had a higher parking rate. Further changes were made in AS 3962:2020, where the default parking rates are *0.25 spaces per wet berth, per dry berth, per swing mooring, and per employee.* Again, the rates for wet berths and swing moorings are the same, and with the same direction to use these rates *in the absence of traffic and parking studies.*

As set out in Annexure A, CHA have undertaken very extensive surveys of marinas in Sydney over the last 20 years, paying particular attention to the relative boat usage patterns of boats on swing moorings compared with boats in wet marina berths. The relevant factors were:

- Boat usage rate
- Persons per boat used
- Transport mode and hence car parking demand

The boat usage rate was the principal variable. There was generally less variation in the persons per boat used and the transport modes. Marinas located in the Eastern Suburbs could in theory have lower car usage, although recreational users would typically have provisions to deliver to the boat, which generally makes public transport usage less attractive. There is a small trend for larger boats to have more people, but the research did not suggest that a 60 foot boat had twice the passengers as a 30 foot boat. The research had most survey data for boats of up to 20 metres in length. There was less survey data for boats larger than 20 metres, for the simple reason that there are fewer boats of this length in Sydney. Surveys have been undertaken at Rozelle Bay Marina, covering boats larger than 20 metres. These boats typically have full time crew. On balance they have a higher parking demand than smaller boats, but with the increase not as great as might be assumed.

Recent surveys of boats 25 metres or more in length at Rose Bay and Point Piper Marinas in November and December 2021 found a mean peak parking rate of 0.311 cars/berth and an 85%ile rate of 0.411 cars/berth.

Seasonal factors clearly have an impact on the absolute levels of boat usage and hence parking demand and traffic generation. Summer weekends generally see the highest levels of boat usage. The relativity of boats on swing moorings used versus boats in marina berths used remains relatively constant.

All of the marina survey results and analysis have been through an exhaustive review in the Land & Environment Court.

The Conclusions in the research, for the recommended car parking rates for marinas, based on Summer weekend boat usage and parking demand were:

*	Boats on swing moorings	0.224 cars/mooring
*	Boats in wet marina berths, <20m in length	0.166 cars/berth
*	Boats in wet marina berths, 20-24m in length	0.223 cars/berth
*	Boats in wet marina berths, 25m or longer	0.411 cars/berth

The key conclusion is thus that if swing moorings are replaced with wet marina berths, the car parking demand WILL NOT INCREASE. In all probability, it will reduce.

This at first appears counter-intuitive, where the theory goes – as suggested in the RTA Guide – that boats that are more accessible, in berths instead of on swing moorings, will be used more. However, in considering this issue, some distinction needs to be made between commercial swing moorings managed by a marina, and private swing moorings leased by individuals. The marina research has only addressed commercial swing moorings that are part of commercial marina operations. Commercial marinas usually provide a tender service to their clients on swing moorings, whereby a marina employee drives the clients out to their moored boat. At the end of the day, the incoming boat owner usually phones the marina and requests a tender pick-up. Such procedures reduce the accessibility disadvantages of boats on swing moorings. There can of course be situations where the boat returns late, after the tender service has ceased. The typical operation in these circumstances is for the boat owner to pull into the marina, drop off most passengers and materials, return to the mooring and then come ashore in a dinghy.

The point about the surveys and analysis is that they have been undertaken to prove or disprove assumptions about boat usage and parking demand. This method is no different to that employed in the RTA surveys of other land uses.

One pattern CHA observed in these surveys is that swing moorings are used by a greater proportion of yachts compared with power boats. There is a generalized trend that yacht owners typically used their boats more than power boat owners, and would prefer to pay the lesser mooring fees compared with marina berth fees, and put up with the marginally reduced accessibility. Many power boat owners demand immediate access to their boats, often being cash-rich but time-poor, with the latter reducing their overall usage of their boat. While these appear simplistic observations, they are borne out in the surveys undertaken. The research report does not attempt to address any social implications of replacing cheaper swing moorings with wet marina berths, in line with market demand, but sticks to an engineering assessment of the parking – and hence traffic generation – consequences of such changes.

This marina research was most recently put to the test in 2022 in Land & Environment Court Proceedings No.2021/192265, with the marina in question being Gladesville Bridge Marina, located near the southern end of Gladesville Bridge. The Applicant's traffic engineer was Christopher Hallam while the traffic engineer for the City of Canada Bay Council was Craig McLaren. The research report set out in Annexure A was discussed in depth. For these Proceedings, the new surveys of boats 25 metres or more in

length was undertaken. Annexure B reproduces pages 1-5 plus the final page 12 of the *Joint Expert Report*. The parking rates set out in Annexure A and as further discussed above were recommended by Christopher Hallam. Craig McLaren (CM), for the Council accepted these rates, as set out in paragraph 4:

a. *CM accepts the rate of 0.166 cars/boat for boats less than 20m;*
b. *CM accepts the rate of 0.223 cars/boat for boats between 20m and up to 25m;*
c. *CM accepts the rate of 0.411 cars/boat for boats 25m or longer;*
d. *CM accepts the rate of 0.224 spaces/mooring per swing mooring;*
e. *CM supports the AS3962 rate of 0.25 spaces per staff in lieu of supplementary surveys or site-specific analysis.*

These rates have been used in this analysis of the parking implications of the proposed changes at North Harbour Marina.

3.0 TRAFFIC AND PARKING IMPLICATIONS OF MARINA EXTENSION

3.1 Current Marina Operation

Figure 1 shows both current and proposed marina berths, with the new pontoons shaded grey. Figure 2 shows the swing moorings controlled by the marina, with the moorings proposed to be removed shaded in green. There are totals of 34 berths and 51 moorings at present.

Boat users either walk to the marina or park on Gourlay Avenue, in the 22 space angle parking area above the marina or in the 5 spaces immediately adjacent to the marina. These parking spaces are also able to be used by members of the adjacent North Harbour Sailing Club.

There are 3 staff members based at the marina. Boat maintenance workers are relatively flexible, with sometimes more than one on site, purely depending on the jobs in hand. Work might be done away from the site. Table 3.1 sets out the current peak parking demand likely on a Summer weekend (assuming maintenance work is undertaken on the weekend, which is less likely).

TABLE 3.1 CURRENT PEAK PARKING DEMAND

Berth Size	Arm A	Arm B	Total	Parking Rate	Cars
Soft stand 10m berths	4	0	4	0.166	0.664
10m	2	0	2	0.166	0.332
12m	15	9	24	0.166	3.984
14m	0	4	4	0.166	0.664
Moorings	0	0	51	0.224	11.424
Staff			3	0.25	0.75
Total					17.818

As indicated, the Parking Rates used are based on Summer weekend surveys. By way of comment, on Wednesday 25th October 2023, a fine sunny day, at 11.00am the total parking demand in the two areas on Gourlay Avenue was 12, from a supply of about 27 spaces. This parking usage would have included members of the North Harbour Sailing Club.

3.2 Proposed Marina Extension

Figure 1 shows the Proposed Marina Expansion plan, with new pontoons at the base of Arm A and new pontoons on the western side of Arm B. The total number of wet marina berths would increase from 34 to 43.

An integral part of the proposal is for 10 existing commercial swing moorings in the area to be relinquished, as shown in Figure 2. The overall total boats accommodated will decrease by 1.

The proposed café will see the marina office area reduced from 39 m^2 to 26 m^2, with the difference of 13 m^2 allocated to the small café kitchen. The deck area will increase to provide for café seating, with 20 seats at 5 tables occupying an area of 26 m^2. The café seating is limited by the current unchanged provision of toilets. The deck will also maintain existing seating for marina users.

Office staff are expected to reduce by one, but with the addition of two café staff.

3.3 Parking Review

Based on the same peak parking rates used in Section 3.1, the peak parking demand of the marina will be as set out in Table 3.2.

TABLE 3.2 FUTURE PEAK PARKING DEMAND

Berth Size	Arm A	Arm B	Total	Parking Rate	Cars
8m	0	1	1	0.166	0.166
9m	3	0	3	0.166	0.498
10m	2	2	4	0.166	0.664
11m	1	1	2	0.166	0.332
12m	16	10	26	0.166	4.316
13m	0	1	1	0.166	0.166
14m	0	4	4	0.166	0.664
15m	0	2	2	0.166	0.332
Moorings	0	0	41	0.224	9.184
Staff			4	0.25	1.00
					17.322

Should there be the demand for large boats, 25m or longer, there is the option to utilize the T-heads of each arm to accommodate a 25m boat on Arm A and a 32m boat on Arm B. Instead of a parking demand at the heads of 4 x 0.166 = 0.664, the revised parking

demand would be 2 x 0.411 = 0.822, an increase that would marginally increase total parking demand to 17.48 cars.

In conclusion, based on extensive research undertaken by CHA and accepted in the Land & Environment Court of NSW, the deletion of ten swing moorings and the addition of 9 wet marina berths will not increase the demand for parking in the area, and hence the parking implications of the proposal will be satisfactory. The analysis is sufficiently robust to allow the two T-head mooring spaces on each Arm to be converted to single berths for boats 25m or longer.

3.4 The Cafe

The analysis set out in Tables 3.1 and 3.2 takes staffing of a café into account but not patrons. The Manly DCP rate for Cafes of *one space per 40 m^2 of gross floor area of serviced area* does not have any additional requirement for staff parking. After allowing for a walkway between the marina arms and the office and side walkway and the maintenance of the existing seating for marina patrons, the area of deck classified as *service area* is 26 m^2, so at the rate of one space per 40 m^2, the theoretical parking demand is 0.65 spaces. While this serviced area typically includes toilets, the two toilets available are already there, for use by the marina staff and customer and hence their area should not be added. They also define the upper limit for café seating.

The question is, who are the likely café customers? The obvious customers will be marina users who might stop for a coffee and/or food going to or from their boat. There would also be an opportunity for the café to supply packaged meals for boat users, to be consumed on the boats. The second group of obvious customers will be walkers on the Manly to The Spit track – the definition of walk-in customer. Again, a brief coffee or an extended meal are options. The only group of customers who would add to the parking demand would be those who might think: *Let's go down to that great Marina café for lunch!*. With the size of the kitchen – 13 m^2 – and the limited seating, the café is not likely to feature in the *Good Food Guide.*

As a sensitivity analysis, if one third of customers are boat owners from the marina, one third are walkers and one third are drive-in customers, and if the analysis of serviced area found a demand for 0.65 spaces total, one-third would be 0.217 spaces. Taking off 0.25 spaces for the inclusion of staff numbers in the analysis set out in Table 3.2, the remaining increased peak parking demand would zero spaces.

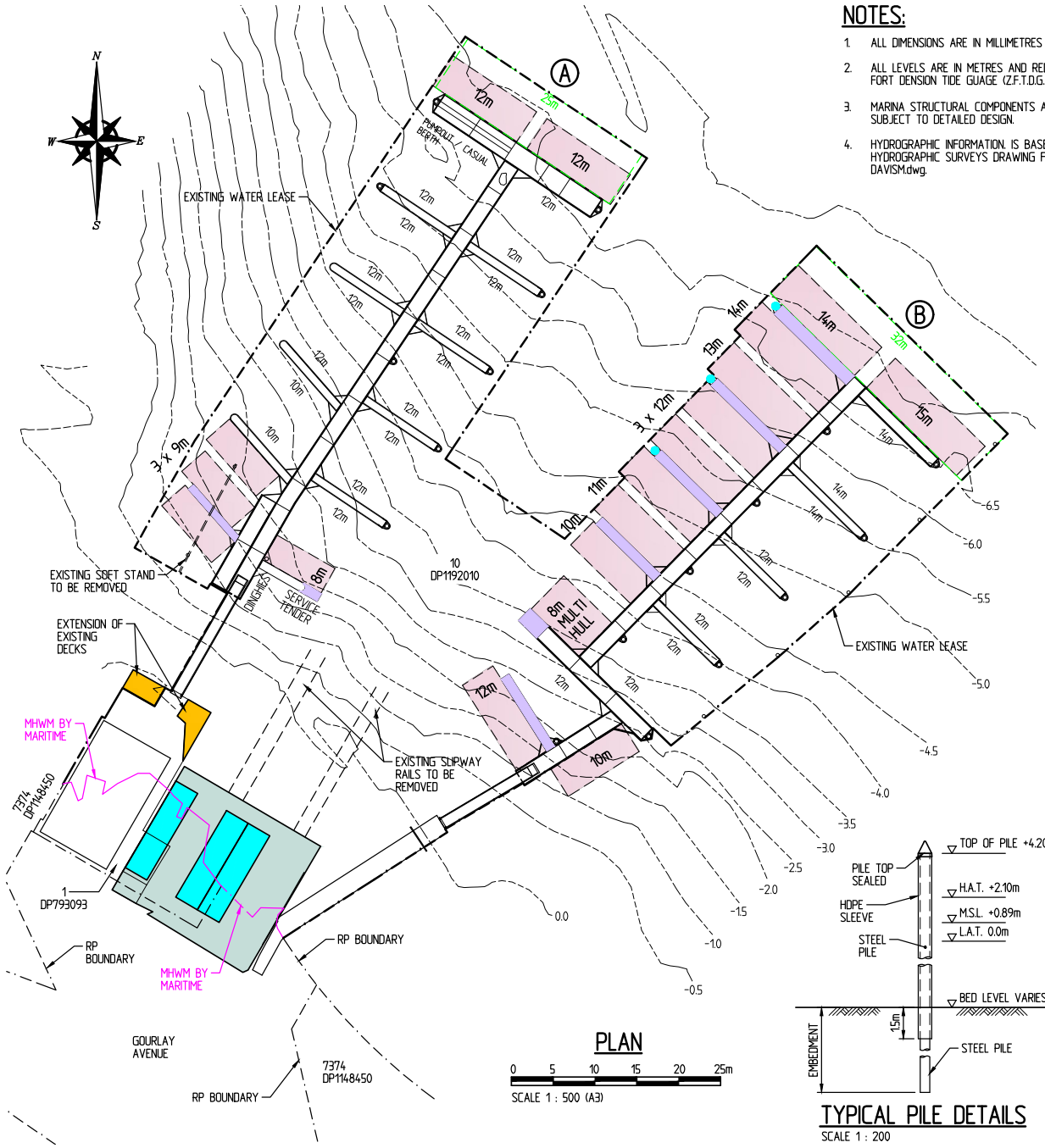
3.5 Traffic Review

As set out in the previous Section, the peak parking demand will not increase. With minimal change in parking demand, there will be minimal change in traffic generation. Hence the external traffic implications of the proposed extensions will be minimal.

4.0 CONCLUSIONS

1. The proposal is to delete a total of 10 swing moorings and the addition of 9 marina berths. A minor deck extension to the marina building is also proposed, with a café operation to be added.
2. *Manly Transport Development Control Plan* does not have specific parking rates for marinas, and refers to State Government guidelines, which in turn are out of date, based on a 1993 guide.
3. One traffic engineering consulting company, Christopher Hallam & Associates Pty Ltd have undertaken extensive research into the traffic and parking characteristics of marina developments. The attached research report (Annexure A) details this research, with Annexure B showing the agreement on parking rates in a 2022 Court Appeal. The research places special emphasis on the relative change in parking demands when swing moorings are replaced with wet marina berths. This form of marina updating has been popular because of the high demand for marina berths. The research found that swing moorings have a higher peak parking demand than wet berths of less than 20m.
4. It follows that the removal of ten swing moorings and the construction of 9 marina berths will not substantially change the demand for parking.
5. The addition of a small café to service marina users and walkers on the Manly to The Spit track is expected to have only a limited impact.
6. With peak parking demands not increasing, there will be no increase in the traffic generation of the site, and hence the proposal will have minimal impact on external traffic conditions.

FIGURE 1 NORTH HARBOUR MARINA - PRELIMINARY LAYOUT



PLAN

0 5 10 15 20 25m

SCALE 1 : 500 (A3)

TYPICAL PILE DETAILS

SCALE 1 : 200

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.
2. ALL LEVELS ARE IN METRES AND REDUCED TO ZERO FORT DENSION TIDE GUAGE (Z.F.T.D.G.).
3. MARINA STRUCTURAL COMPONENTS AND PILES ARE SUBJECT TO DETAILED DESIGN.
4. HYDROGRAPHIC INFORMATION. IS BASED ON HARVEY HYDROGRAPHIC SURVEYS DRAWING FILE : DAVISM.dwg.
5. ON SHORE LAYOUT, EXISTING STRUCTURE AND EXISTING WATER LEASE ARE BASED ON SURVEYOR DRAWING FILE : 3364-10.dwg.
6. GEO-REFERENCE TO GDA2020 MGA ZONE 56 COORDINATES IS BASED ON SURVEYOR DRAWING FILE : 3364-10.dwg.
7. FURTHER DETAILS OF MARINA BUILDING ARE CONTAINED IN FLOOR PLANS

LEGEND:

- NEW PONTOON
- NEW PILE
- 12m — BERTH LENGTH IN METRES
- 25m — OPTIONAL BERTH
- NEW BERTH
- EXTENSION OF EXISTING DECK
- 3 LEVEL DINGHY / KAYAK STORAGE
- NEW DECK

EXISTING BERTH SCHEDULE

BERTH SIZE	ARM A (WESTERN ARM)	ARM B (EASTERN ARM)	TOTAL
SOFT STAND (10m BERTHS)	4	0	4
10m	2	0	2
12m	15	9	24
14m	0	4	4
PUMPOUT / CASUAL	1	0	1
TOTAL	22	13	35

PROPOSED BERTH SCHEDULE

BERTH SIZE	ARM A (WESTERN ARM)	ARM B (EASTERN ARM)	TOTAL
8m	1	1	2
9m	3	0	3
10m	2	2	4
11m	0	1	1
12m	16	10	26
13m	0	1	1
14m	0	5	5
15m	0	1	1
PUMPOUT / CASUAL	1	0	1
TOTAL	23	21	44

NOTE : ARM A T-HEAD BERTHS WILL BE EITHER 2 BERTHS OR 1 BERTH WITH A MAXIMUM COMBINED VESSEL LENGTH OF 25m

ARM B T-HEAD BERTHS WILL BE EITHER 2 BERTHS OR 1 BERTH WITH A MAXIMUM COMBINED VESSEL LENGTH OF 32m

PRELIMINARY

L 22/05/24 NOTE No. 7 ADDED
K 6/03/24 PUMPOUT / CASUAL DESIGNATED
J 24/11/23 REVISED AS PER COUNCIL'S COMMENT
H 22/01/24 SLIPWAY NOTE REVISED
G 15/01/24 DINGHIES/KAYAK STORAGE ADDED
F 12/12/23 GEO-REFERENCE APPLIED
E 24/11/23 REVISED AS PER CLIENT'S COMMENT

Revisions

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Consultants to the Marina Industry.
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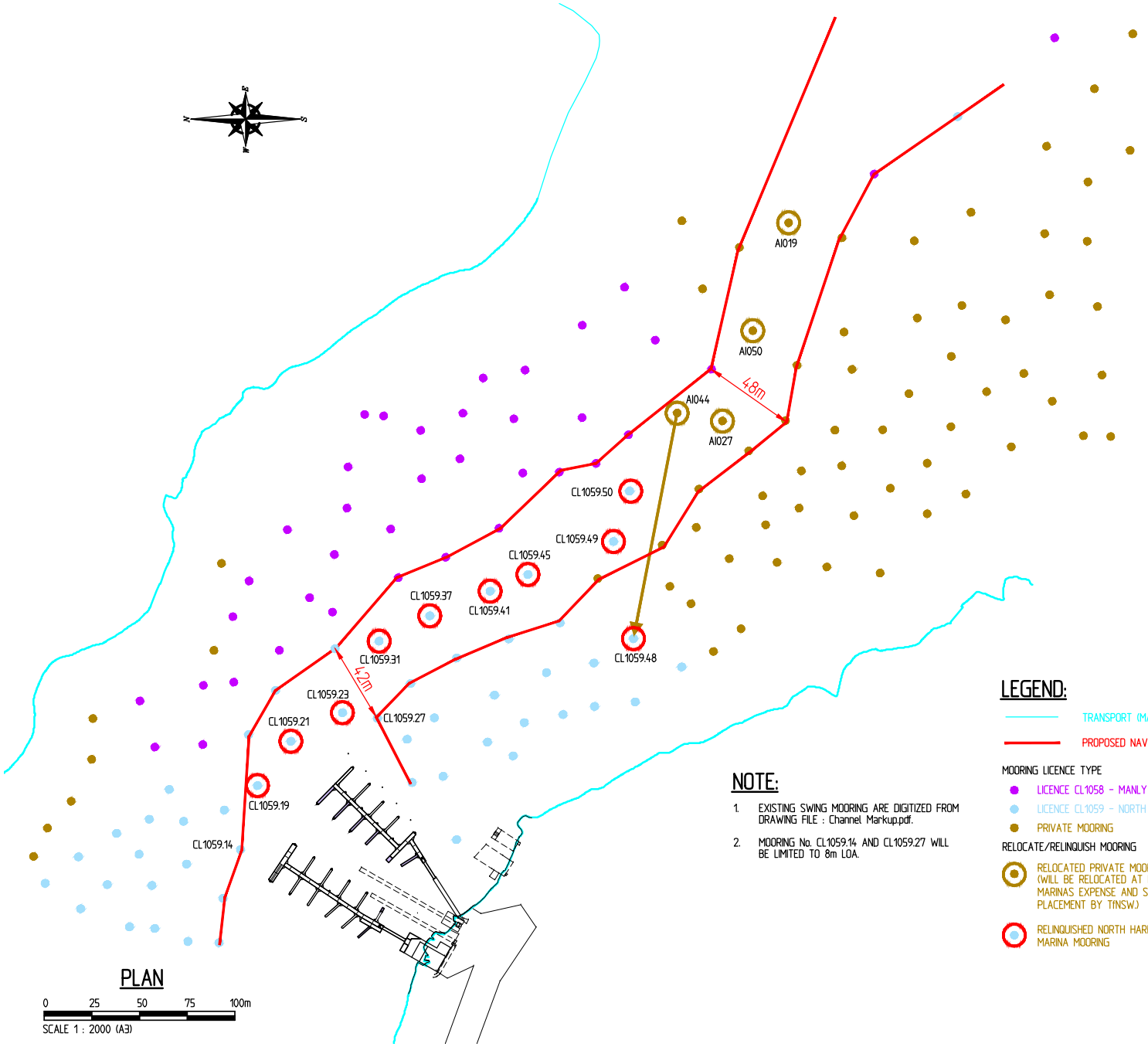
CLIENT:
ADDENBROOKE PTY. LTD.

PROJECT:
NORTH HARBOUR MARINA

TITLE:
PRELIMINARY LAYOUT

Date:	11/08/2023
Drawing No.:	6318-01/L
Scale:	AS SHOWN
Drawn By: J.C.	Checked By:
Approved By:	

FIGURE 2 NORTH HARBOUR MARINA - REMOVED SWING MOORINGS



PLAN

0 25 50 75 100m

SCALE 1 : 2000 (A3)

NOTE:

1. EXISTING SWING MOORING ARE DIGITIZED FROM DRAWING FILE : Channel Markup.pdf.
2. MOORING No. CL1059.14 AND CL1059.27 WILL BE LIMITED TO 8m LOA.

LEGEND:

- TRANSPORT (MARITIME) TITLE BOUNDARY
- PROPOSED NAVIGATION CHANNEL

MOORING LICENCE TYPE

- LICENCE CL1058 - MANLY BOATSHED
- LICENCE CL1059 - NORTH HARBOUR MARINA
- PRIVATE MOORING

RELOCATE/RELINQUISH MOORING

- RELOCATED PRIVATE MOORING (WILL BE RELOCATED AT NORTH HARBOUR MARINAS EXPENSE AND SUBJECT TO FINAL PLACEMENT BY TfNSW.)
- RELINQUISHED NORTH HARBOUR MARINA MOORING

PRELIMINARY

L 27/08/24 DIMENSION ADDED
K 27/08/24 DIMENSION ADDED
J 27/08/24 MOORING LAYOUT AND NAVIGATION CHANNEL CHANGED AS PER CLIENT'S MARK UP
H 28/06/24 REVISED AS PER CLIENT COMMENTS

Revisions

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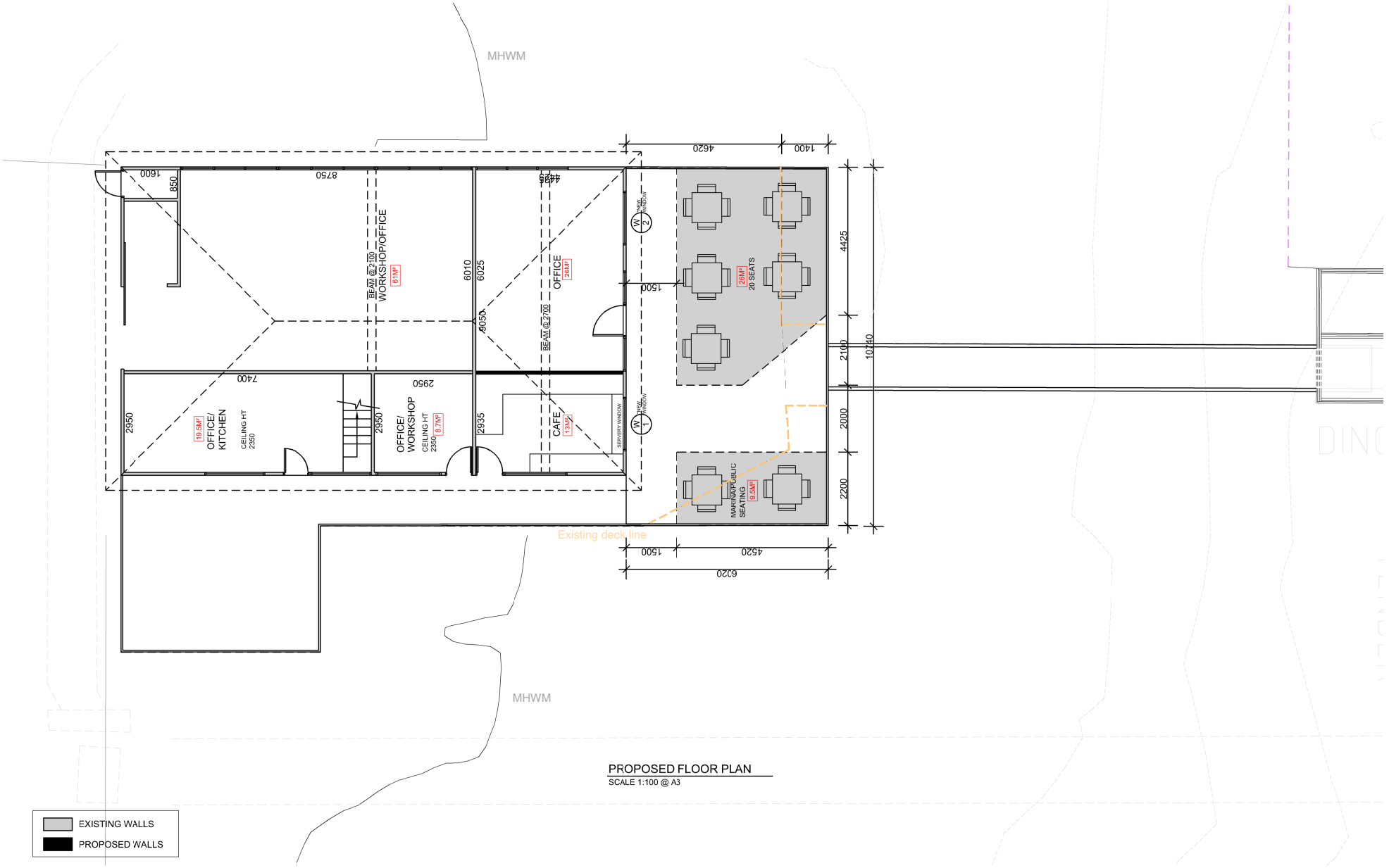
CLIENT:
ADDENBROOKE PTY. LTD.

PROJECT:
NORTH HARBOUR MARINA

TITLE:
PROPOSED MARINA CHANNEL AND SWING MOORING REARRANGEMENT

Date:	15/08/2023
Drawing No.:	6318-02/L
Scale:	AS SHOWN
Drawn By: J.C.	Checked By:
Approved By:	

FIGURE 3 NORTH HARBOUR MARINA - BUILDING FLOORPLAN



PROPOSED FLOOR PLAN

SCALE 1:100 @ A3

EXISTING WALLS

PROPOSED WALLS

NOTE:
ALL EXISTING & OVERALL DIMENSIONS ARE NOMINAL & SUBJECT TO VERIFICATION ON SITE. WHERE ANY DISCREPANCY OCCURS BETWEEN NEW WORK & EXISTING BETWEEN NEW WORK & EXISTING DIMENSIONS - EXISTING DIMENSIONS/WORK SHOULD TAKE PREFERENCE WHERE NECESSARY - OTHERWISE NOTIFY VISION GROUP ARCHITECTS

NOTE:
SELECTED TERMITE PROTECTION TO BE USED ON SITE IN ACCORDANCE WITH LOCAL ACCORDANCE WITH LOCAL COUNCIL'S REQUIREMENTS, B.C.A. AND ALL RELEVANT AUSTRALIAN STANDARDS

NOTE: 5
SMOKE DETECTORS TO COMPLY WITH REQUIREMENTS OF SPECIFICATION E1.7 (NSW) FIRE AND SMOKE ALARMS SHALL COMPLY WITH AS 3786 AND BE CONNECTED TO THE MAIN POWER SUPPLY.

ISSUE	AMENDMENT	DATE	INIT
A	3A- DEVELOPMENT APPLICATION	OCT 2023	D.S.

TRUE NORTH

Client: ADDENBROOKE Pty Ltd

Address: GOURLAY AVE
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Project: **North Harbour Marina**

Drawing Title: PROPOSED FLOOR PLAN

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Member Australian Institute of Architects

Drawn: S.D	Date: OCT 2023
Check: D.S	Job Number: 1421

Scale: 1:100 A3
Issue: A
Sheet: 04

ANNEXURE A

THE TRAFFIC AND PARKING

IMPLICATIONS OF MARINA

DEVELOPMENTS

SEPTEMBER 2012

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CONTENTS

1.0 INTRODUCTION

We prepared the report dated April 2001 and titled *"The Car Parking Implications of Marina Developments",* for the Boating Industry Association of NSW.

We subsequently prepared in September 2006 a report titled "*Traffic and Parking Assessment of Proposed Modifications to Rose Bay & Point Piper Marinas"* plus *"Supplementary Report on Traffic and Parking Implications of Proposed Modifications to Rose Bay and Point Piper Marinas",* in May 2007. We also undertook surveys of Rozelle Bay Marina over Summer 2007/2008.

Section 2 repeats information set out in our September 2006 report on surveys of boat usage and parking demand and expands the information using survey data collected between September 2006 and May 2012. This provides extensive background information on the traffic and parking characteristics of marina developments, with a particular emphasis on the implications of replacing swing moorings with marina berths.

Section 3 summarises the results and recommends parking rates.

2.0 SURVEYS OF BOAT USAGE AND DEMAND

2.1 Standards and Guidelines

Australian Standard 3962

We have previously undertaken detailed surveys of marinas in the Sydney region. In April 2001 we prepared a report for the Boating Industry Association of New South Wales on the subject *"The Car Parking Implications of Marina Developments".*

This research for the Boating Industry Association concluded that there was not a significant difference between the parking demands of swing moorings and marina berths. General findings included:

- Swing moorings are used more for yachts, with owners more likely to use their boats than those on marina berths
- On marina berths, there is some potential for larger group size per boat, but this is tempered by a lower usage rate

The research recommended that when a new marina or a change in the configuration of an existing marina is proposed, the best method of analysis is to survey a similar, or the same marina, to assess current usage patterns and car parking demands. Where comparisons cannot be drawn, the recommendation was:

- Wet marina berths & swing moorings 1 space/3 boats
- Dry berths 1 space/5 boats
- Employees 1 space/2 employees

The results of this research were forwarded to Standards Australia, with a request to review the parking requirements in AS3962-1991. This Standard was revised in 2001, with AS3962-2001 recommending the following car parking rates:

- Wet berths 0.3-0.6 spaces/berth
- Dry berths 0.2-0.4 spaces/berth
- Swing moorings 0.3-0.6 spaces/berth
- Employees 0.5 spaces/employee

The key point is that the Standard has the same parking requirement for swing moorings as it does for wet marina berths. It follows that the replacement of swing moorings with wet marina berths would not change traffic generation and parking demands.

The Roads & Traffic Authority's *Guide to Traffic Generating Developments*

This Guide recommends that surveys be undertaken of similar developments, but in the absence of such a survey, parking be provided at the following rates:

- 0.6 spaces per wet berth
- 0.2 spaces per dry storage berth
- 0.2 spaces per swing mooring
- 0.5 spaces per marina employee

These rates were inserted in the RTA Guide based on the current Australian Standard of the time, the 1991 version of AS3962, with the only difference being that this Standard had ranges in parking rates for wet berths, averaging out at about 0.6 spaces per berth. The following comment is made:

> *"Parking demands at marinas vary substantially depending on the season, the type of berth or mooring and the type of boat. Ideally, surveys should be undertaken of similar developments, over summer weekends. Boats parked in wet marina berths are more accessible and therefore more likely to be used than boats in dry berths or on swing moorings. Use also varies with boating purpose. While a typical marina might have 30% of boats used on a summer weekend, racing yachts are more highly utilised with an average of over 60% at one club surveyed. The size of the boat affects the number of crew or passengers, while the location of the marina affects the crew's transport mode."*

The section of the RTA *Guide* dealing with traffic generation suggests daily vehicle trips of 2.7 per fixed berth and 1.4 per swing mooring *"based on a marina with a mix of boat types (both power boats and yachts); the design is based on a summer weekend day. These rates also include an allowance for shore-based facilities such as boat sales and repairs."* This section repeats the general comments made in the parking section:

> *"The two key factors in the traffic generation of marinas are the level of usage and the transport mode of boats [*boat users presumably*]. Boats that are more accessible (in wet marina berths) are more likely to be used than boats in dry berths or on swing moorings. Use also varies with boating purposes. For example, yachts which engage in regular racing, are used more often than yachts used only for social outings. Surveys of four marinas in Pittwater in 1978 over the summer weekend/public holidays found an average utilisation of 30% over all berths. Surveys of racing yachts at one club on Middle Harbour in 1990/91 found an average utilisation on summer racing days of 65%.*
>
> *Traffic generation also varies with the boat crew numbers. Larger boats, that are often in wet marina berths, can accommodate larger numbers of crew/passengers than smaller boats that might be stored in dry berths or on swing moorings."*

The basis of the above traffic generation rates is not clear. We have reviewed the survey data that is quoted. The Pittwater boat usage data was collected for Sunday 15/1/78, Saturday 21/1/78 and Monday 30/1/78, the Australia Day public holiday. As such, they are peak usage days. The overall boat usage rate of 30% is for marina berths only. Swing moorings were not separately assessed. Car usage was not surveyed. This information was presented in a Marina Development Seminar in 1985. The survey of the Middle Harbour Yacht Club in 1990 (by Stapleton & Hallam – Chris Hallam) covered the usage of racing yachts only, since the objective of the commission was to recommend additional parking for the extension of a hardstand area used for storing racing yachts. As such, the data was only relevant for such a use, where racing yachts, whether on hardstands, wet berths or moorings, were very highly utilised on race days. This survey did not cover recreational boating, or other uses at Middle Harbour.

As a check, if there were 100 boats in a marina, with 30% used on a peak day, and say 1.5 cars per boat, there would be 0.9 car movements per berth per day. For 100 boats on swing moorings, if 30% were used on a peak day, and say 1.0 car per boat, there would be 0.6 car movements per mooring per day. The rates of 2.7 and 1.4 cannot be substantiated. Even the relativities are wrong, if the assumption is that boats on moorings only attract one third the number of cars parked compared with boats in berths.

The key issue is that where there is no actual survey data available, surveys should be undertaken of other similar marinas. Data collected on boat usage over three days some 30 years ago, and on racing yacht usage at Middle Harbour Yacht Club some 16 years ago, does not provide adequate data for assessing the impact of replacing swing moorings with marina berths. The surveys undertaken in 2000/2001 and 2006-2012 of marinas in the Sydney region is vastly more comprehensive.

Marinas are like any land uses. There are expectations about user behaviour. Compared to the actual survey data, the most obvious miscomprehension is that boats on marina berths are used more than boats on swing moorings, because the berths makes them more accessible. This is simply not true, as is further discussed in detail. People use their boats for a number of reasons, including the time of year, the weather on the day and the owner's time availability on the day. When boats are in a marina berth, the owner and friends walk along the wharf to their berth and get on. When boats are on a swing mooring serviced by a commercial marina, the owner and friends walk along the wharf and transfer into a tender, to be taken out to their boat. On return, they ring up the marina and request tender pick up. Note that the discussion in this Section only deals with swing moorings that are attached to commercial marinas. It does not deal in any way with "private" moorings. Based on the extensive surveys and analysis discussed in the following Section, we are strongly of the opinion that the convenience factor of berths compared to moorings is a minor factor in the decision of the boat owner to use their boat on a particular day.

2.2 Boat Usage Surveys for Sydney Harbour Marinas

Details of previous surveys of marinas are set out in the original research report for the BIA. In our recent surveys, we employed the same approach. On each day surveyed, details of time, boat name, group size and cars parked were recorded. The surveys of Double Bay Marina were undertaken at Easter 2006 and in early December 2006. The surveys at Rose Bay and Point Piper Marinas were initially undertaken over the two month period 1st July to 3rd September 2006. A parallel survey was undertaken at the Royal Motor Yacht Club, over the period 26th June to 27th August 2006. Further surveys at Rose Bay and Point Piper Marinas were subsequently undertaken over the Spring period 4th September to 19th October 2006, and then from 20th October to 13th December 2006. In addition, surveys were undertaken at Rozelle Bay Marina in Summer 2007/2008. Double Bay, Rose Bay and Point Piper Marinas have proposed alterations to provide additional wet berths. The data collected at these marinas is relevant to all marinas. With the substantially greater data base for the Rose Bay/Point Piper Marinas, these surveys are first discussed.

Over the Winter survey period, at Rose Bay and Point Piper Marinas, there was full occupancy in the berths, with 29 boats at Rose Bay and 23 boats at Point Piper. There were vacancies in the swing moorings. All of the following analysis is based on the actual berths/moorings occupied. A lower rate of boat usage would be calculated if the total mooring capacity was used.

We have combined both marinas in the analysis, since they are side by side and part of the same proposal. Improved accuracy follows from a larger sample size. The results for boat usage were:

TABLE 2.1 ROSE BAY AND POINT PIPER MARINAS BOAT USAGE PER DAY

	WINTER 2006			SPRING-SUMMER 2006	
Day	**Moorings**	**Berths**	**Day**	**Moorings**	**Berths**
Weekdays (45)	0.026 boats/mooring/day	0.011 boats/berth/day	Weekdays (75)	0.039 boats/mooring/day	0.005 boats/berth/day
Weekend days (20)	0.068 boats/mooring/day	0.055 boats/berth/day	Weekend days (28)	0.072 boats/mooring/day	0.036 boats/berth/day

Table 2.1 shows the patterns found in previous surveys at these and other marinas, of a higher usage of boats on swing moorings than in berths. Weekend usage was of course higher than weekday usage. On weekdays, the usage rate of boats on moorings was over twice that of boats in berths. The relativities are also of interest. If the data for Winter and Spring-Summer is averaged, on moorings, the weekday boat usage rate is 49% of the weekend usage rate. For berths, the ratio of 17% on weekdays compared to weekend use.

Looking at the Weekend days, the Spring survey found an increased use of boats on moorings, compared with the Winter survey. The Spring figures for boats in berths showed a reduced usage.

At the Royal Motor Yacht Club there are 90 berths and 18 swing moorings. As with the other marinas, there is a low level of usage on weekdays. Over the 18 weekend days surveyed, the overall usage rate for all 108 of their berths and moorings was:

* RMYC Saturday & Sunday (18 days) 0.045 boats/berth/day used

Looking at the influence of the cars parked, Table 2.2 sets out the results over the three marinas, for all days surveyed, both weekday and weekend, for Winter 2006. This data is relevant to the question of the number of cars per berth type, with a reflection on group size.

TABLE 2.2 ROSE BAY, POINT PIPER AND RMYC MARINAS – WINTER 2006

Marina	Avg Group Size	Avg Cars/Berth or Mooring	Avg Cars/Person	Days Surveyed
RMYC Berth	3.79	1.08	0.32	114
RB/PP Berth	4.01	1.22	0.34	77
RB/PP Mooring	2.56	1.04	0.55	242

Table 2.2 indicates that the average group size – the number of people on each boat used - is lower for boats on swing moorings compared to boats in berths. The influence of boat length is further discussed in Section 2.3. However the cars used per person reduces with increases in group size. This can be explained simply. An average group size of 2.56 would include many groups of two, arriving in one car. As group size increases, there is a trend towards car sharing, or perhaps family groups arriving in the one car. Looking at the figures for Rose Bay and Point Piper, while the average group size for moorings is substantially lower than that for berths, with berths having a lower rate of cars per person, the difference between the cars/mooring used and cars/berth used is reduced. Note that the average cars/person has been calculated as the average over all boats in the survey, from the original survey data and does not necessarily give the same answer if working across the Table. The difference is not an issue because the figures for average cars/person are given as illustrations of patterns. The figures that are ultimately used in the analysis are the cars per berth/mooring, combined with the usage rates for each.

Table 2.3 presents equivalent information for the Spring-Summer 2006 survey.

TABLE 2.3 ROSE BAY AND POINT PIPER MARINAS SPRING-SUMMER 2006 (8/9/06 – 15/12/06)

Type	Avg Group Size	Avg Cars/Berth or Mooring	Avg Cars/Person	Days Surveyed
Berth	4.51	1.41	0.31	103
Mooring	2.61	0.94	0.36	103

Table 2.3 shows similar trends to Table 2.2, with the average group size for the users of boats on berths being higher than the users of boats on moorings, but with this difference not fully reflected in the cars per berth or mooring because car usage decreases with increasing group size.

Putting these rates together, the parking demands for the critical weekend days are:

TABLE 2.4 PARKING DEMAND PER MOORING/BERTH – WINTER 2006 POINT PIPER & ROSE BAY: SATURDAYS AND SUNDAYS

Marina	Berth/Mooring	Boat Usage/Day	Cars/Boat Used	Cars/Mooring or Berth
Pt Piper + Rose Bay	Mooring	0.0679	1.04	0.071
Pt Piper + Rose Bay	Berth	0.0548	1.22	0.067
RMYC	Berth	0.0448	1.08	0.048

Table 2.4 indicates that while berths have a higher number of cars per group using berthed boats, when the boat usage is taken into account, the effect is that moored boats have a higher parking demand than berthed boats. The parking demand rates for the RMYC berths were lower again. The Spring-Summer 2006 figures show similar car parking demands per berth if the Table 2.4 berth figures are averaged. Just for Pt Piper + Rose Bay, the parking demand per berth is lower because of lower boat usage. The figures for moorings are similar.

TABLE 2.5 PARKING DEMAND PER MOORING/BERTH SPRING-SUMMER 2006: POINT PIPER & ROSE BAY SATURDAYS AND SUNDAYS

Berth/Mooring	Boat Usage/Day	Cars/Boat Used	Cars/Mooring or Berth
Mooring	0.0720	0.959	0.069
Berth	0.0364	1.472	0.054

Peak Period Surveys at Rose Bay and Point Piper Marinas

The surveys at Point Piper and Rose Bay Marinas have been on-going, with currently available data extending to 31 January 2007. In December 2006 there were 12 days that were either weekends or public holidays. In January 2007 there were 10 days that were either weekends or public holidays. These days are typically considered to be the peak times of the year of boat usage. Table 2.6 gives the equivalent data to Tables 2.4 and 2.5, for the weekend days and public holidays in December 2006 and January 2007. Note that there is some overlap of days with Table 2.5.

TABLE 2.6 PARKING DEMAND PER MOORING/BERTH USED
1 DECEMBER 2006 to 31 JANUARY 2007:
POINT PIPER & ROSE BAY
SATURDAYS, SUNDAYS, PUBLIC HOLIDAYS

Berth/Mooring	Boat Usage/Day	Cars/Boat Used	Cars/Mooring or Berth Used
Mooring	0.0814	1.060	0.0864
Berth	0.0700	1.338	0.0935

These figures show a higher boat usage than for Winter and Spring periods. The differences in the cars used per boat are similar to those earlier in the year. While the usage of boats on moorings was higher than that in berths, the differences in the Cars/Boat Used mean that the Cars/Mooring or Berth were marginally higher for the berths, a relationship not evident in the earlier surveys.

Peak Period Surveys at Double Bay Marina

The Easter 2006 surveys at the Double Bay Marina provide information on the nominally peak time of Easter at the subject Marina. This marina currently has 40 marina berths and 25 swing moorings. The same type of surveys conducted in Rose Bay were conducted in Double Bay. Table 2.7 summarises the results.

TABLE 2.7 SURVEY OF USE OF DOUBLE BAY MARINA, EASTER 2006

Factor	Friday	Saturday	Sunday	Monday	Mean
Boats used/berth	20%	7.5%	10%	7.5%	11%
Avg Group size/berth	4.13	8.67	4.50	6.00	5.82
Cars/Berth Used	1.62	2.33	2.00	2.00	1.99
Cars/Berth Overall	0.325	0.175	0.200	0.150	0.212
Boats used/mooring	40%	20%	40%	32%	33%
Avg Group size/mooring	2.70	2.60	2.40	3.88	2.90
Cars/Mooring used	1.00	1.20	1.00	1.38	1.14
Cars/Mooring Overall	0.400	0.240	0.400	0.440	0.370

At this marina the trend in the figures is consistent with Rose Bay/Point Piper results for Winter and Spring/early Summer:

- Boats on moorings are used more than boats in berths.
- Average group sizes: 5.8 on berths, 2.9 on moorings.
- Cars per berth a bit higher, but tempered by lower usage per berth.
- Cars per berth overall are lower than cars/mooring overall
- If more highly used boats on moorings are replaced with the more typically less used boats in the berths, the traffic generation and parking demand will reduce.

Surveys were also undertaken at Double Bay Marina in December 2006, with Table 2.8 setting out the results. Note that the Mean rates have been calculated directly from the survey data and are not necessarily the averages of the daily figures.

TABLE 2.8 SURVEY OF USE OF DOUBLE BAY MARINA DECEMBER 2006

Factor	Sat 2nd	Sun 3rd	Sat 9th	Sun 10th	Mean
Boats used/berth	0.250	0.125	0.100	0.125	0.150
Avg Group size/berth	1.50	2.80	1.75	4.00	2.33
Cars/Berth Used	0.70	1.00	1.00	1.40	0.96
Cars/Berth Overall	0.175	0.125	0.100	0.175	0.144
Boats used/mooring	0.080	0.200	0.200	0.320	0.200
Av Group size/mooring	1.00	2.40	3.80	5.75	3.95
Cars/Mooring Used	0.50	0.80	1.60	1.50	1.20
Cars/Mooring Overall	0.040	0.160	0.320	0.480	0.240

Putting together all of the survey results from both the 2006 surveys and the previous surveys, Table 2.9 sets out the results.

TABLE 2.9 SUMMARY OF MARINA BOAT USAGE AND PARKING DEMAND – SATURDAYS AND SUNDAYS

Marina	Season	Boats Used per Berth	Parking Demand per Berth	Boats Used per Mooring	Parking Demand per Mooring
RB	Autumn 2000	0.143	0.175	0.193	0.295
RB	Summer 2000/1	0.153	0.238	0.225	0.362
PP	Autumn 2000	0.111	0.114	0.083	0.121
RB+PP	Winter 2006	0.055	0.067	0.068	0.071
RB+PP	Spr-Summ 2006	0.036	0.054	0.072	0.069
RMYC	Winter 2006	0.045	0.048	-	-
DB	Easter 2006 *	0.11	0.212	0.33	0.37
DB	December 2006	0.150	0.144	0.200	0.240
RB+PP	1/12/06 to 31/1/07 + hols	0.070	0.094	0.081	0.086
RB+PP Mean Summer		0.111	0.166	0.153	0.224

* 4 days, Friday-Monday

Table 2.9 generally indicates a trend to a higher parking demand for moorings compared to marina berths, although in the December 2006/January 2007 RB + PP data the parking demand per berth is marginally higher. The Mean Rates are simple averages of the rates for Summer at Rose Bay and Point Piper Marinas. They reflect the trend of higher parking demands for boats on moorings compared with boats in berths, for the subject site in Summer.

The results in Table 2.9 reflect a number of factors, including boat usage, mode split, group size. The survey results for the period 20th October 2006 to 31st January 2007 were also reviewed to see trends in mode split. Table 2.10 summarises the results.

TABLE 2.10 Transport Mode of Rose Bay & Point Piper Marina Patrons 20th October 2006 – 31st January 2007

Mode	Car	Taxi	Bus	Bike/Scooter	Walk
Moorings	82.2%	7.5%	0.7%	1.1%	8.5%
Berths	91.3%	6.7%	0%	0.1%	1.9%
All	84.7%	7.3%	0.5%	0.8%	6.7%

The total number of people sampled in Table 2.10 was 2854, so the results are statistically valid. The proportion walking suggests that many people are local residents. Overall, some 15% of boat users do not arrive by private car and hence do not seek parking in the area.

The data also gives the numbers of cars in each group. This indicates that for mooring users, the average car occupancy is 2.39 persons, while for berth users, the average car occupancy is 3.04 persons, with the overall average being 2.55 persons per car. Table 2.10 indicates that users of boats in berths have a slightly higher car usage than users of boats on swing moorings. However this difference is tempered with the higher car occupancies for marina berth boat users. This can be seen:

- Berths 0.300 cars/user (3.33 users per car parked)
- Moorings 0.345 cars/user (2.90 users per car parked)

The data collected reflects the boats that were used over the three month period. This data indicates that the average length of boats on moorings that were used was 33.24 foot. The average length of boats in marina berths that were used was 33.16 foot, a figure insignificantly different to those on moorings. This does not necessarily mean that boats on moorings and in berths are of a similar length, but that of the boats on moorings/berths, the average length of boat actually used is similar, and with the rate of car usage higher for mooring users than for berth users.

2.3 Implications of Boat Length

The BIA report presented an analysis of the influence of boat length on parking demand, with the theory being that the bigger the boat, the more people and hence the higher parking demand. The shortfall in the analysis was due to the fact that there were not enough boats in the longer category – over 50 foot – to draw firm conclusions about larger boats.

This issue was addressed in the recent surveys, particularly for boats at RMYC. Table 2.11 presents the results for boats at RMYC, by boat length.

TABLE 2.11 ANALYSIS OF EFFECT OF BOAT LENGTH – RMYC, WINTER 2006 (90 Berths + 18 Swing Moorings)

Length (foot)	Mean Length(ft)	Sample Size	Avg Group	Cars/Boat	Cars/Person in Group
0-29	25.0	4	1.25	1.00	0.88
30-39	35.2	22	3.77	1.09	0.28
40-49	42.5	59	3.78	1.17	0.34
50-59	50.9	22	4.14	0.96	0.25
60-69	61.3	4	4.00	0.75	0.18
70 +	72.7	3	4.67	0.67	0.22
All	-	114	3.79	1.08	0.32

The Cars/Boat column is the key. While group size increases with boat length, the Cars/Person reduces, with the effect that the Cars/Boat remains relatively constant but with a downward trend with larger boats.

Tables 2.12 and 2.13 present equivalent data for Rose Bay + Point Piper Marinas, for marina berths and for swing moorings respectively.

TABLE 2.12 ANALYSIS OF THE EFFECT OF BOAT LENGTH –

POINT PIPER + ROSE BAY – BERTHS - WINTER 2006

Length (foot)	Mean Length(ft)	Sample Size	Avg Group	Cars/Boat	Cars/Person in Group
0-29	24.4	28	3.82	1.14	0.30
30-39	33.7	29	3.79	1.24	0.41
40-49	44.3	18	4.17	1.06	0.29
50-59	50.0	2	8.5	3.5	0.42
All	-	77	4.01	1.22	0.34

Apart from the 50-59 foot category, where the sample size was only 2, the trends are similar to those at RMYC.

TABLE 2.13 ANALYSIS OF THE EFFECT OF BOAT LENGTH – POINT PIPER + ROSE BAY – MOORINGS - WINTER 2006

Length (foot)	Mean Length(ft)	Sample Size	Avg Group	Cars/Boat	Cars/Person in Group
0-29	24.4	111	2.47	1.03	0.56
30-39	32.4	96	2.72	1.10	0.54
40-49	46.1	25	1.80	0.72	0.55
50-59	53.8	10	4.00	1.40	0.59
All	-	242	2.56	1.04	0.55

The critical Cars/Boat results show some variations, although not linear. Putting all results together, with the combination of Tables 2.11-2.13, gives the summary results shown in Table 2.14.

TABLE 2.14 SUMMARY OF THE EFFECT OF BOAT LENGTH
RMYC + POINT PIPER + ROSE BAY – WINTER 2006

ALL BERTHS AND MOORINGS

Length (foot)	Mean Length(ft)	Sample Size	Avg Group	Cars/Boat	Cars/Person in Group
0-29	24.4	143	2.70	1.05	0.52
30-39	33.1	147	3.09	1.13	0.48
40-49	43.7	102	3.36	1.04	0.38
50-59	51.7	34	4.35	1.24	0.36
60 +	66.1	7	4.29	0.71	0.20

There is a consistent trend in an increasing group size with increasing boat length. At the same time, the number of cars per person in the group reduces consistently with increasing boat length. As noted previously, the Cars/Person in Group averages are taken from the individual survey results, rather than across the page in this table. The key output is the Cars/Boat. While there is a small increase for 50-59 foot, the 40-49 foot figure is lower than the 30-39 foot figure, while the 60 + figure is the lowest of the lot. A sample size of 7 is not as high as the others, but is still of some significance. In summary, there is not a clear pattern of increasing parking numbers with increasing boat length. The difference between the lowest rate – 1.05 cars/boat – and the highest rate – 1.24 cars/boat – is 18%. Even though the rate for boats in excess of 60 foot is lower, a conservative assumption would be for boats in the larger length category to have +18%, say +20% parking demands.

With the surveys undertaken at Rose Bay and Point Piper marinas over the busier period of 20th October 2006 to 31st January 2007, a further analysis of the influence of boat length has been undertaken. The results are set out in Tables 2.15-2.17.

TABLE 2.15 IMPACT OF BOAT LENGTH AT ROSE BAY & POINT PIPER MARINAS, 20th OCTOBER 2006 TO 31st JANUARY 2007

BOATS ON SWING MOORINGS

Factor	<25 ft	26-30	31-35	36-40	41-45	46-50	51-55	56-60	>60
Sample size	151	187	154	51	50	43	0	64	1
Avg length(ft)	22.4	27.7	32.1	36.8	43.1	48.3	-	56.7	68
Group size	2.675	2.818	3.169	3.725	3.400	1.721	-	3.422	2
Cars parked	0.881	0.963	1.084	1.196	1.240	0.953	-	0.906	1

TABLE 2.16 IMPACT OF BOAT LENGTH AT ROSE BAY & POINT PIPER MARINAS, 20th OCTOBER 2006 TO 31st JANUARY 2007

BOATS IN MARINA BERTHS

Factor	<25 ft	26-30	31-35	36-40	41-45	46-50	51-55	56-60	>60
Sample size	26	58	15	42	23	14	0	0	0
Avg length(ft)	23.2	27.7	32.7	37.0	42.9	47.6	-	-	-
Group size	3.923	3.155	4.867	4.738	4.957	6.929	-	-	-
Cars parked	1.269	0.983	1.600	1.452	1.478	2.143	-	-	-

TABLE 2.17 IMPACT OF BOAT LENGTH AT ROSE BAY & POINT PIPER MARINAS, 20th OCTOBER 2006 TO 31st JANUARY 2007 ALL BOATS ON MOORINGS & BERTHS

Factor	<25 ft	26-30	31-35	36-40	41-45	46-50	51-55	56-60	>60
Sample size	177	245	169	93	73	57	0	64	1
Avg length(ft)	22.5	27.7	32.2	36.9	43.1	48.1	-	56.7	68
Group size	2.859	2.898	3.320	4.183	3.890	3.000	-	3.422	2
Cars parked	0.944	0.967	1.130	1.312	1.315	1.246	-	0.906	1

There is a general trend to larger group sizes and car numbers up to 45 foot, but above that, average group sizes reduce as do car numbers. The size range of 56-60 foot has the lowest car usage, even with a sample size of 64 boats.

If the length ranges are aggregated, the following general trends are evident:

0-30 foot	31-40 foot	41-50 foot	51-60 foot	Over 60 foot
0.96 cars/ boat	1.20 cars/ boat	1.29 cars boat	0.91 cars boat	1.0 cars/boat

Again it cannot be assumed that marina changes that result in longer boats will necessarily result in more cars parked, although there is a trend for up to 45 foot lengths. The data is inadequate to make any comments about boats in excess of 60 foot in length, although Table 2.14 reflects the lower parking demand of boats in excess of 60 foot that Table 2.17 suggests for boats over 55 foot.

Surveys of larger boats were undertaken at Rozelle Bay Marina by Christopher Hallam & Associates (CHA) , and by Sinclair Knight Merz(SKM), in Summer 2007/2008. The CHA surveys went from 26th December 2007 to 28th January 2008. The results can be summarised:

Cars Parked per Berth – Peak Summer Weekends & Public Holidays

(a) Boats < 20m 0.1282 Boats/Berth x 1.200 Cars/Boat = 0.1538 Cars/Berth

(b) Boats > 20m 0.1204 Boats/Berth x 1.361 Cars/Boat = 0.1639 Cars/Berth

Surveys by SKM focussed only on boats at least 20m in length. The conclusions SKM drew were:

Survey Period	Total Parking Demand per Berth
August-September 2007 (11 days)	0.266 Cars/Berth
December 2007 & February 2008 (8 days)	0.420 Cars/Berth

CHA considered the combined survey results at Rozelle Bay Marina for the Summer surveys, with 8 days of data collected by SKM and 13 days of data collected by CHA, for a total of 21 days of Summer weekend data. CHA concluded that the average Summer weekend parking demand rate for boats on marinas of at least 20m in length was 0.2234 Cars/Berth.

2.4 Seasonal and Other Factors

Seasonal Factors

We have reviewed all of the boat usage data for both Point Piper and Rose Bay Marinas, for the period 1st July 2006 to 31st January 2007. Table 2.18 shows the total boats used each day, with figures for both marinas added.

TABLE 2.18 BOAT USAGE AT POINT PIPER & ROSE BAY MARINAS (TOTAL BOATS USED PER DAY)

Date	July	August	September	October	November	December	January
1	15	4	4	8	5	7	17
2	8	4	4	9	6	23	13
3	3	4	12	5	3	3	11
4	0	4	5	4	12	4	13
5	1	7	6	6	7	8	17
6	4	6	4	12	4	6	17
7	4	2	3	24	4	8	14
8	26	3	6	8	4	14	15
9	23	7	11	5	3	14	6
10	3	5	7	3	5	17	9
11	1	3	2	4	13	2	8
12	7	3	3	4	10	4	4
13	3	9	3	4	6	4	4
14	2	4	3	8	5	4	20
15	2	3	2	8	5	9	9
16	6	5	14	4	4	11	6
17	3	5	10	2	6	20	7
18	3	5	4	3	8	13	6
19	5	15	8	4	4	13	6
20	2	12	7	4	5	17	8
21	4	5	9	10	4	10	5
22	7	5	12	14	6	16	3
23	17	6	16	2	4	16	5
24	3	6	9	7	5	13	3

25	2	5	8	3	8	0	5
26	1	11	8	2	9	23	9
27	4	11	6	6	6	9	13
28	3	4	7	11	5	7	12
29	9	5	7	14	5	14	8
30	17	4	6	4	2	12	6
31	4	3		4		24	6
Mean	6.2	5.7	6.9	6.9	5.8	11.6	9.2

It is interesting to note that there is no strong trend towards increasing boat usage as Summer approaches, but the December and January usages clearly stand out as the peak months of the year. However there can still be days in other months where usage can be high, for various reasons. The peak days were:

- 8 July 2006 26 boats used
- 7 October 2006 24
- 31 December 2006 24
- 9 July 2006 23
- 2 December 2006 23
- 26 December 2006 23

We have further reviewed in detail the peak days, in regard to the numbers of cars parked. We have gone beyond the approach followed in all of the previous data analysis and have considered the length of stay of all cars associated with the marinas. This has been done by using the survey results for Time OUT and Time IN, allowing a 15 minute leeway for drivers to access their cars. We have considered all of the existing 172 boats at both marinas, combined, and determined in each hour how many cars were parked near the marinas. Table 2.19 summarises the results.

TABLE 2.19 PARKING LENGTH OF STAY ANALYSIS FOR PEAK MARINA USAGE DAYS

Date	Boats Used	Total Cars	Peak Cars at One Time	Cars/Berth or Mooring Used
8/7/06	26	44	44	0.256
31/12/06	24	34	27	0.157
7/10/06	24	26	23	0.134
2/12/06	23	28	21	0.122
26/12/06	23	28	27	0.157
9/7/06	23	30	28	0.163
Mean	24	32	28	0.165

Table 2.19 indicates that the parking demand rates shown in Table 2.9 will be generally higher than actual rates because of the time distribution of boat usage over the day, with the one exception being the peak day of the year. Over these six peak days, the ratio of Peak Cars to Total Cars had a mean of 0.888. For these peak days, the mean Cars/Berth or Mooring Used was 0.165.

While this rate reflects the peak six days over seven months, an arguably more correct approach is to consider the 85th percentile demand day. The Roads & Traffic Authority, in its *Guide to Traffic Generating Developments,* generally recommends peak parking rates based on the average of the peak demands on the days surveyed. To put this into context, for shopping centres, the peak days of the week are Thursday, Friday and Saturday. The RTA took the peak parking demands on these days surveyed, at each site, and calculated the mean peak parking demand, irrespective of the seasonal variations. However it recognised that where adequate data was available, parking rates based on the 85th percentile demand day were more appropriate. As stated on page 5.12 of this Guide (referring to shopping centres):

> *"The above car parking provisions reflect the mean results of the centres which were surveyed, for the peak parking demand on either Thursday, Friday or Saturday. There may be situations where parking provision at these levels would be inadequate. However, provision based on the 85 percent level of demand must be considered."*

Over all of the 215 days over seven months covered in Table 2.18, the 85th percentile demand was 13 boats used, or 7.5% of the occupied berths/moorings.

In terms of the RTA methodology, the most correct approach is to consider the peak days only, being Saturdays, Sundays and Public Holidays. Over the period 1/7/06 to 31/1/07 there were 67 days of this type. For these peak days, the 85th percentile demand was 17 boats, or 9.9% of the occupied berths/moorings. Thus, the design day will have just 10% of boats actually used.

Other Factors

Whenever there are work boats, such as Waterways boats and dive boats, their levels of utilisation are consistently higher, as would be expected. The Appendix also indicates that yachts have a higher level of use than power boats, with Table 3.15 in the Appendix indicating a Summer weekend average rate of usage for yachts of 0.21 boats per berth/mooring, compared with 0.16 boats per berth/mooring for power boats. There are typically a larger proportion of yachts on swing moorings than in marina berths, which is part of this trend. There can also be peak usage situations with yachts involved in racing. Our view on these patterns is that keen yachties prefer to put their money into their boats instead of into their monthly berthing cost.

The location of the marina can also affect boat usage patterns.

2.5 Land and Environment Court Proceedings – Rose Bay

Addenbrooke Pty Ltd applied to Woollahra Municipal Council (Council) for consent to alter and extend the Rose Bay and Point Piper Marinas. Following refusal by Council, an appeal was lodged with the NSW Land & Environment Court (LEC Proceedings 11179 of 2007). While the appeal was refused, the discussion on parking did provide some guidance on marina parking issues.

The proposal was to replace the existing 52 marina berths (all boats < 20 metres) and 172 swing moorings, with 159 marina berths, of which 21 berths would cater for boats over 20 metres in length.

On the question of the appropriateness of using published guidelines and codes to assess parking needs, the experts for the applicant (Chris Hallam) and for the Council (Alastair Burns) drew the following conclusions, which were quoted in the Judgement:

> *"The Contentions rely on parking calculations based on the NSW Roads & Traffic Authority Guide to Traffic Generating Developments and on Woollahra Municipal Council's Development Control Plan for Off-Street Parking Provision and Servicing Facilities. [The experts] both agree that these documents provide a guide only and should only be considered if surveys were not undertaken at other appropriate marina developments. [The*

experts] both agree that there have been adequate and sufficient surveys undertaken of parking demand at other appropriate marinas. [The experts] agree that the results and analysis of these surveys should be used in the assessment of parking issues, rather than the RTA and Council guidelines."

Based on peak Summer weekend boat usage, for boats of up to 20 metres in length, the experts both agreed that the design parking rates to apply are:

- Swing moorings 0.224 cars/mooring
- Marina berths 0.166 cars/berth

For boats in excess of 20 metres in length, surveys at Rozelle Bay Marina by both experts gave a range in parking rates, with one expert (C Hallam) recommending a rate of 0.2234 cars/boat, while the other expert (A Burns) recommended a rate of 0.420 cars/boat.

The judgement concluded:

"Based on the evidence of the traffic experts, the proposal will not generate an unacceptable demand for parking which cannot be met by the availability of on street parking…"

A subsequent Appeal was lodged with the Land & Environment Court, being Appeal 10005 of 2009. Judgement was handed down by Biscoe J on 18 August 2009. Clauses 164 and 165 provide a key to the judgement, in which conditional consent as granted:

"164. I propose to grant conditional consent to:

(a) The Rose Bay Marina development application except for:
(i) The eastern arm and the associated walkway providing access to the eastern arm.
(ii) Four twenty metre berths on the middle arm and two twenty metre berths on the western arm.
(b) The Point Piper Marina development application with the important changes made during the hearing summarised at (11) above.

165. The conditions will be as I have determined above. They include an important condition for both marinas that the maximum height of boats is six metres, except for the four 30 metre berths at the end of the Rose Bay Marina where the height limit is seven metres."

Under Contentions in clause 17 it is noted that Council had withdrawn its contention in relation to parking. Notwithstanding, clause 28 talks of some resident concerns about traffic and parking, which is addressed in this clause:

"28. The Wunulla Residents submitted that the present traffic situation is unacceptable, the PPM proposal fails to provide for parking or to alleviate the parking problem, and this is

sufficient reason to refuse the development application. I do not accept this submission. It ignores the contrary, unchallenged report of the parking experts."

The conclusion clearly found in this landmark LEC Appeal is that as a general proposition, the replacement of swing moorings with marina berths will not increase the demand for parking.

2.6 Other Marina Surveys

Smith's Boatshed, located on Parriwi road at The Spit, is on Middle Harbour. We have undertaken two surveys at this marina, with the first survey covering the 26 marina berths in use in early and late 2011, with the survey extending over 18 weekend days. All boat users accessing their boats were interviewed and asked for the number in their party, the transport mode and their times of arrival and departure from the marina. With some boats returning to the marina before other boats left, the maximum number of boats on the water at any one time, and hence the peak parking demand, might be less than the maximum number of boats used each day. We have set out in Table 2.20 the results of these surveys.

TABLE 2.20 SURVEY OF USAGE OF 26 BERTHS AT SMITHS BOATSHED

Day	Date	Peak Boats Used	Peak Parking Demand
Saturday	22/1/11	4	3
Sunday	23/1/11	4	4
Saturday	29/1/11	3	3
Sunday	30/1/11	5	4
Saturday	19/2/11	5	3
Sunday	20/2/11	4	3
Saturday	12/3/11	3	3
Sunday	13/3/11	2	2
Saturday	3/9/11	4	2
Sunday	4/9/11	3	3
Saturday	17/9/11	3	3
Sunday	18/9/11	3	3
Saturday	8/10/11	2	1
Sunday	9/10/11	1	1
Saturday	15/10/11	3	2
Sunday	16/10/11	2	3
Saturday	22/10/11	3	2
Sunday	23/10/11	5	3
MEAN	18 DAYS	3.28	2.67

The mean peak parking demand of 2.67 cars represents a parking rate of 2.67/26 = 0.103 cars/berth. The typical parking demand of 3 cars suggests a parking rate of 0.115 cars/berth. The absolute peak parking demand of 4 cars suggests a peak parking rate of 0.154 cars/berth.

Following the approved extensions to the marina, which expanded the berth capacity to 38, new boat usage surveys were undertaken. These new surveys undertaken over 18 weekend and holiday days recorded the boats used each survey day, the time they left and returned, the number of people in the party and the number of cars driven to The Spit. With the "time out" and "time in" records, the survey not only recorded the total number of boats used during the survey day but also the maximum number of boats being used at any one time. This detail allows the maximum number of cars parked at The Spit from Smiths Boatshed users to be calculated. When calculating the maximum number of boats in use at any one time, a 30 minute leeway was allowed at both the start time and the finish time, to allow for users to move from their cars to the boat, and from the boat to their cars. Table 2.21 sets out the results.

TABLE 2.21 SURVEY OF USAGE OF 38 BERTHS AT SMITHS BOATSHED

Day/Date	Total Boats used	Total in party	Total Cars	Cars/ Boat	Peak Boats used	Peak people	Peak cars	Peak Cars/ Boat
Sat 19/1/11	3	5	2	0.667	3	5	2	0.667
Sun 20/11/11	4	8	3	0.750	4	8	3	0.750
Sat 17/12/11	3	5	3	1.000	3	5	3	1.000
Sun 18/12/11	3	8	3	1.000	3	8	3	1.000
Sat 31/12/11	3	13	4	1.333	3	13	4	1.333
Wed 11/1/12	3	5	2	0.667	5	7	4	0.800
Sat 21/1/12	4	5	4	1.000	5	7	5	1.000
Sat 4/2/12	3	7	4	1.333	5	10	6	1.200
Sun 12/2/12	3	4	1	0.333	4	5	2	0.500
Wed 22/2/12	4	6	4	1.000	4	6	4	1.000
Sat 3/3/12	2	2	1	0.500	5	6	4	0.800
Sun 4/3/12	4	11	3	0.750	4	11	3	0.750
Sat 17/3/12	4	9	3	0.750	5	11	4	0.800
Sun 18/3/12	2	5	2	1.000	2	5	2	1.000
Wed 4/4/12	6	13	5	0.893	6	13	5	0.893
Mon 9/4/12	6	11	5	0.893	7	12	6	0.857
Sat 12/5/12	6	10	6	1.000	6	10	6	1.000
Sun 13/5/12	4	13	5	1.250	4	13	5	1.250
Mean number	3.72	7.77	3.33	0.895	4.33	8.61	3.94	0.922
Mean Boats/Berth	0.0979				0.1139			
85%ile number	6				6			
85%ile Boats/Berth	0.1579				0.1579			

In the estimation of peak parking demand, it is appropriate to use these weekend and public holiday boat usage figures. The parking rate should be calculated using the "peak" figures, since these represent the peak number of boats used and hence cars parked at any one time. We suggest that the 85%ile figure for peak boat usage be used, to be conservative. To be more conservative, we suggest that this figure be matched with the (higher) total Cars/Boat, since the latter is based on a higher sample size. Thus the estimated peak parking rate is:

85%ile Demand: 0.1579 x 0.922 = 0.1456 cars per berth

For comparison, if the Mean Peak boat usage figure of 0.0979 is used, coupled with the Mean Peak Cars/Boat, the parking demand rate is:

Mean Demand: 0.0979 x 0.895 = 0.0876 cars per berth

These figures are lower than those set out in Sections 2.2-2.5 above.

It should be noted that Smiths Boatshed might have a lower parking demand per berth because a large proportion of the boats berthed are for sale and hence do not have usage in the traditional peak times.

2.7 Review

This Section sets out the results of extensive surveys of marinas, particularly Rose Bay and Point Piper Marinas. The usage rates vary from season to season, as do the car parking demands per berth or mooring. There is a very strong trend for the parking demand per mooring to be higher than the parking demand per berth, with the main reason being that boats on swing moorings are used more than boats in berths. This trend is consistent over all survey periods, as indicated in Table 2.9. There is also a trend for boats in berths to attract larger groups, with consequent higher parking demands. With the exception of Summer 2006/2007, parking demands are still higher with moorings. In Summer 2000/2001, the differences were marked, and the boat usage rates were the highest observed, giving the peak parking demand of about one car per four marina berths, and one car per three swing moorings. In Summer 2006/2007, both rates were substantially lower, and quite similar.

The seasonal variations are not as great as might have been anticipated, in terms of peak days. There are clearly average monthly boat usage variations that are consistent with the logical view that Summer is busiest, but without increases in boat usage in Spring, compared with Winter. A very interesting observation is that the peak day of boat usage over the seven months of surveys was in July and was not Boxing Day, or Australia Day. Over the weekends and public holidays in the seven month period July 2006 to January 2007 the 85th percentile boat usage was 10% of all boats berthed/moored, a relatively low figure.

The analysis of boat length found a small trend towards increasing group size and parking demands with increasing boat lengths, but not in a linear manner and only up to about 45-50 foot in length. Based on the Winter surveys, the difference in the cars/boat for the longest boat length range and for boats in the 0-29 foot category was just + 18%. This suggests a parking increase factor for new marinas with larger boats of say + 20%. The Summer 2006/2007 data shows an increasing trend up to 45 foot, but with lower numbers beyond this length.

The surveys at Rozelle Bay Marina covered large boats of at least 20m in length. It was concluded that boats of at least 20m in length have a higher overall parking demand, with the Summer weekend rate of 0.2234 Cars/Boat recommended.

A sensitivity analysis of current and proposed average boat length could be undertaken, based on these results.

For the assessment of current and proposed marina parking demands, the average of the rates for Rose Bay + Point Piper for Summers in 2000/2001 and 2006/2007 is suggested, with the Rozelle Bay Marina rates used for boats 20m or longer in length. This is summarised in Section 3.

3.0 CONCLUSIONS

The recommended parking rates for marinas, based on Summer weekend boat usage and parking demand are:

- Boats on swing moorings 0.224 cars/mooring
- Boats in wet marina berths, <20m in length 0.166 cars/berth
- Boats in wet marina berths, >20m in length 0.223 cars/berth

ANNEXURE B

JOINT EXPERT REPORT

COURT DETAILS	
Court	Land and Environment Court of New South Wales
Class	1
Case number	2021/192265
First Applicant	ENARES PTY LTD

EXPERTS	
Applicant's Expert	Christopher Hallam
Respondent's Expert	Craig McLaren – McLaren Traffic Engineering

1. This joint report has been prepared by Traffic Engineering Experts Mr Christopher Hallam (**CH**) of Christopher Hallam & Associates Pty Ltd acting on behalf of the Applicant, ENARES PTY LTD, and Mr Craig McLaren (**CM**) of McLaren Traffic Engineering acting on behalf of the Respondent, City of Canada Bay Council.

2. This report was prepared following a joint experts' conference commenced on 11 April 2022 and continued to 28 April 2022 in subsequent emails and phone calls in response to Contention 4 (Parking Impacts) and Contention 5 (Traffic Impacts).

3. This joint report outlines the matters agreed and not agreed and the reasons for any disagreement.

4. We have read the Expert Witness Code of Conduct in Schedule 7 of the Uniform Civil Procedure Rules 2005 (UCPR) and agree to be bound by Part 31 Division 2 of the UCPR and the Expert Witness Code of Conduct.

5. The Expert's qualifications and experience are set out in the curriculum vitae of **CH** and **CM** attached in **Annexures A** and **B** respectively of this joint report.

6. In preparing this joint expert report, the experts considered and had regard to the following:

a. NSW Land and Environment Court policies on Joint Reports and on Conference of Expert Witnesses.

b. Short Minutes of Order made by the Registrar on 29 March 2022.

c. First Respondent's Amended Statement of Facts and Contentions filed 11 March 2022.

d. Applicant's Amended Statement of Facts and Contentions in Reply filed 29 March 2022.

e. Australian Standard for Off Street Car Parking Facilities – AS2890.1 – 2004 (AS 2890.1).

f. Australian Standard for Off Street Commercial Vehicle Facilities – AS2890.2 – 2018 (AS 2890.2).

g. Australian Standard Guidelines for Design of Marinas – AS3962:2001 (AS3962).

h. City of Canada Bay Development Control Plan – Date of adoption 18 February 2020 (DCP).

7. The Contentions and Particulars as set out in the First Respondent's Amended Statement of Facts and Contentions are set out below, underlined, followed by responses by **CH** and **CM**.

ASSESSMENT OF CONTENTIONS

CONTENTION 4 – PARKING IMPACTS

The proposed development is unsatisfactory with regard to section 4.15(1)(b) of the EP&A Act, 1979 as it lacks sufficient on-site car parking and the configuration of the proposed on-site car parking is impractical.

a) The proposal does not comply with the car and bicycle parking requirements of Parts C3.1 and C3.2 of CB DCP 2017 and/or Australian Standard for Marina Design AS3962:2020.

1. In response to this Particular, **CH** made reference to his report dated 13th March 2022 titled REPORT ADDRESSING PARKING AND TRAFFIC IMPACTS OF THE PROPOSAL RAISED IN THE FIRST RESPONDENT'S AMENDED STATEMENT OF FACTS & CONTENTIONS, 11 MARCH 2022. This report is attached as **Annexure C**. **CH** has undertaken extensive surveys of marinas. Looking at the current situation at Gladesville Bridge Marina (GBM), surveys by Colston Budd Rogers & Kafes (CBRK) in 2019 found a peak Summer weekend parking rate of 0.13 spaces per berth/mooring, including staff. If this rate is applied to the currently approved 99 boats, the peak parking demand would be 13 cars, including staff. For the proposed 124 boats, excluding the destination berth, application of this rate would indicate a peak parking demand of 16 cars. Christopher Hallam & Associates(CHA) surveyed GBM in 1998/99 and found peak parking demand rates of 0.100 space/mooring and 0.138 space/berth. Applying these rates to the current situation and allowing for 12 staff, at 0.25 spaces/staff, yields a current peak parking demand of 15 spaces. Using these CHA surveyed rates for the proposed situation and again excluding the destination berth but using the new Marina Standard rate of 0.25 spaces/berth for boats over 20 metres in length, the peak parking demand for the marina expansion would be 21 spaces, including 3 staff spaces. If the surveyed peak parking rate of 0.412 spaces per berth for boats 25m or longer was used for all future GBM boats longer than 20m, the revised Summer weekend peak parking demand would be 23 spaces, less than the proposed supply of 24 spaces.

2. To provide further information on parking demand and traffic movements at the marina, CH undertook traffic counts on Easter Sunday morning, between 8.15am and 11.30am. A sunny Easter Sunday is considered a peak day. The peak parking demand on the site was 10 cars, with a parking supply of 11 cars. At 8.15am the on-street parking in Victoria Place near the site was 100% occupied, at a time when there 6 vacant parking spaces at the marina. Taking this site-specific surveyed peak parking demand on a busy peak Sunday as being representative of the current activities at GBM, the previous surveys of GBM found higher parking rates and hence provide a conservative basis for assessing future peak parking demand. One observation from the Easter Sunday survey was that there was only one member of staff at the marina on the day. Workers undertaking boat maintenance and sales were absent. Hence the addition of staff parking to be basic

peak parking rates is excessive for weekend and public holiday marina operations. In conclusion, based on three sets of surveys at GBM, the surveys showing the highest parking rates show a projection of the future peak parking demand of 21 cars, comfortably met by the proposed parking supply of 24 spaces, or 23 spaces, if a larger rate was applied for boats more than 20m in length. These figures includes staff parking, which could overestimate concurrent peak parking demands, given typically lower staff numbers on weekends.

3. An additional way to estimate peak parking demand is to use parking rates from surveys of other marinas. From surveys at Rose Bay and Point Piper Marinas, the peak parking demand for swing moorings is 0.224 spaces/mooring. The peak parking demand for marina berths for boats 20 metres or less is 0.166 spaces/berth. For boats over 20 metres, the peak parking rate is 0.223 spaces/berth. Recent surveys at Rose Bay and Point Piper Marinas of boats 25 metres or more in length, over the months of November and December 2021 found a mean peak parking rate of 0.311 cars/berth and an 85%ile rate of 0.412 cars/berth. If these Rose Bay/Point Piper parking rates are applied to the current GBM marina and again allowing for 12 staff, the peak parking demand is 22 spaces. With earlier surveys of GBM finding peak parking demands of 13 cars (CBRK) and 13 cars plus staff parking (CHA) and with the CH Easter Sunday survey finding a peak parking demand of 10 cars, including staff cars, the Rose Bay/Point Piper parking rates appear high. If these same rates were applied to the future situation, the peak parking demand would increase from 22 to 27 cars. While this projection shows an increase of 5 cars, at the same time the parking supply would increase from 11 to 24 spaces so that the theoretical parking deficiency would reduce from 11 to 3 spaces. However, based on the specific surveys undertaken at GBM, there would not be a parking deficiency in the future situation. CH notes that both the DCP and the RTA *Guide to Traffic Generating Developments* state, in the preamble to the parking rates: <u>If a survey is not conducted of similar developments, the following levels of parking are recommended.</u> You cannot find a "more similar" development than the actual marina in question. For this reason, CH considers that ultimately, the parking assessment should be based on the GBM surveys, but with the additional input of the higher rates for larger boats, over 20m in length. **CH** concludes that the most appropriate estimate of the future Summer weekend peak parking demand is as follows:

Type	Number	Rate	Peak Parking
Swing moorings	15	0.100	1.500
Berths 20m or less	96	0.138	13.248
Berths >20m	13	0.412	5.356
Staff	12	0.25	3.000
Total			23 spaces

4. **CM** states the following in response to Paragraphs 1 to 3, based on **CH's** detailed responses to **CM's** joint conferencing questions, provided in **Annexure D**, in relation to the car parking requirements for only the boat storage component for the proposed development:
    a. **CM** accepts the rate of 0.166 cars/boat for boats less than 20m;
    b. **CM** accepts the rate of 0.223 cars/boat for boats between 20m and up to 25m;
    c. **CM** accepts the rate of 0.411 cars/boat for boats 25m or longer;
    d. **CM** accepts the rate of 0.224 spaces/mooring per swing mooring;
    e. **CM** supports the AS3962 rate of 0.25 spaces per staff in lieu of supplementary surveys or site-specific analysis.
    f. **CM** states, that currently there are five (5) approved on-site stacked car parking spaces and existing development relies upon six (6) Crown Land car parking spaces as shown in **Annexure E**. There are fundamental access concerns for 'Space 6'. Sole-use rights to Crown spaces has not been provided.
5. **CM** states the existing car parking requirement for the 99 boats and associated staff, based on the accepted rates outlined in Paragraph 4, is 23, resulting in a shortfall of 12 car parking spaces, if owner's consent of the Crown car parking spaces is assumed.
6. **CM** states it is unclear of the additional staff requirements. The existing marina has 12 staff to service the 99 boats, yet there is no staff increase proposed to service the 25 boats. The 25% increase of boats, with the same increase for staff equates to 15 staff.
7. **CM** states the car parking requirement for the proposed 124 berths and staff results is 30 car parking spaces, as per the following breakdown:
    a. 15 swing moorings @ 0.224, resulting in 3.36 spaces;
    b. 63 wet berths up to 20m @ 0.166, resulting in 10.468 spaces;
    c. 34 wet berths between 20m and up to 25m @ 0.223, resulting in 7.582 spaces;
    d. 12 wet berths 25m or greater @ 0.411, resulting in 4.932 spaces;
    e. 15 staff @ 0.25 spaces per staff, resulting in 3.75 spaces.
8. **CM** states it is unclear if existing commercial (and office) space related to the subject site, accessed via the road (ramp) from Victoria Place, are sublet or independent of the operation of the marina, which would require adherence to the relevant DCP car parking requirements and a car parking provision.

the peak hour traffic generation would be 4-5 veh/hr. Added to the current low traffic flows in Victoria Place, the addition of this theoretical extra traffic would be of no consequence.

53. **CM** refers to Paragraph 51 which resolves the vehicle and pedestrian trip generation for the proposed neighbourhood shop and hence **CM** and **CH** agree that this Particular has been resolved.

DRAFT CONDITIONS

54. **CM** recommended the following Draft Conditions:
    a. Only boat owners or skippers are to use the car stacker system;
    b. No visitors are permitted to use the car stacker system;
    c. No guests of charter boats are to board or alight charter vessels at GBM at any time;
    d. The plan of management (PoM) shall include instructions to vessel owners of the operational use of the car stacker system;
    e. The proposed neighbourhood shop shall not be opened to the general public.
55. **CH** agrees with Draft Conditions (c) and (d) above but does not agree to the other Draft Conditions.

Christopher Hallam
29 April 2022

Craig McLaren
29 April 2022