



Church Point Commuter Wharf

Feasibility Study

Northern Beaches Council

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311010-00457

Advisian
Worley Group

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Executive summary

A feasibility assessment has been completed in order to rank options aimed at alleviating boat overcrowding at the Church Point Commuter Wharf. Options considered included extension to the existing facility as well as additional structures at various locations within the area. A summary of the options is provided in the Table E1 and shown on Figure E-1.

Table E-1 Church Point Commuter Wharf Options Summary

Option	Description
Option 1b	Extension to the existing commuter wharf through the addition of additional curved arm.
Option 2a	Additional Structure Rostrevor Reserve.
Option 2b	Additional Structure Church Point Reserve.
Option 3a	Additional Boat Berths Rowland Reserve.
Option 3b	Additional Boat Berths McCarrs Creek Reserve.
Option 3c	Additional Boat Berth Bayview Baths.
Option 4	Combination of Stage 1 Option 1b and 2a



Figure E-1 Church Point Commuter Wharf Location of Options

The assessment of each option has been based on a multi-criterion ranking that considered environmental impact, planning approvals required, number of additional boat berths, parking, accessibility and transport impacts, security, impacts to coastal processes, indicative cost, and stakeholder response. A score of 10 represents the highest score achievable with subsequent scores assigned based on comparing each option and each individual criteria. Each assessment criteria has been evaluated differently, for example looking at boat berths as an assessment criteria, the option providing the most number of additional berths (Option 2b) was assigned a 10, with alternative options then ranked accordingly. Further detail of the scoring system is provided in Section 4. A summary of the ranking of each option is presented in Table E-2.

Table E-2 Church Point Commuter Wharf Options Ranking

Option	Assessment Criteria and Score									Score	Rank
	Environmental	Boat Berths	Parking	Accessibility	Transport	Coastal Processes	Planning Approvals	Cost	Community		
Option 1b	8	9	10	10	10	6	10	10	5	78/90	2
Option 2a	8	8	10	10	10	10	10	7	6	79/90	1
Option 2b	7.5	10	10	10	10	5	10	8	4	74.5/90	4
Option 3a	7.5	6	10	6	10	6	10	6	5	66.5/90	5
Option 3b	8	6	10	5	10	4	10	6	3	62/90	7
Option 3c	8	6	10	6	10	4	10	6	3	63/90	6
Option 4	8	7	10	10	10	7.5	10	9	6*	77.5/90	3

* This option was not assessed during the stakeholder engagement however the community score for Options 1b and 2a have been applied.

Option 2a achieved the highest score followed by Option 1b then Option 4. Option 4 provides a combination of the two highest ranked options (stage 1 only). If this combination of options were selected it would enable minimal impact to berth users during construction, Option 2a could be constructed first and used for berthing during construction/extension of 1b (stage 1). Option 4 would provide increased berth numbers with minimal impact to operation, navigation and swing moorings.

During consultation with Stakeholders, it was recognised by both on and offshore residents that changes to operation and policies relating to the commuter wharf may alleviate some of the issues associated with overcrowding. Examples of these changes to operation and policy are detailed in Section 5.8 and in summary could include time limits, a casual tie up area, survey of current permit holders and use frequency, encourage ferry usage and size limits on vessels. These changes could be implemented prior to any further berths being created to gauge whether overcrowding was still an issue.

These options have been developed at a conceptual level for consultation purposes and if progressed, they would be further optimised with regards to the user requirements, site constraints, further stakeholder consultation and community feedback and input from future potential studies (e.g. traffic/parking assessment, navigation study, ecological studies etc.).

1 Introduction

1.1 Background

The Church Point Commuter Wharf is an important transport hub for the local offshore community. The offshore community comprises residents from Scotland Island and the Western Foreshores of Pittwater (Elvina Bay, Lovett Bay and to a lesser extent Morning Bay, Coasters Retreat and Great Mackerel Beach).

Residents with private vessels may use the Commuter Wharf to access the mainland if they have a permit (Figure 1-1). At present the wharf can accommodate up to 111 boats. With 300 boat permits currently in possession and 21 residents on the waiting list for permits, the existing facility is unable to accommodate demand and experiences frequent overcrowding.



Figure 1-1 Church Point Commuter Wharf

1.2 Scope

Northern Beaches Council (NBC) has engaged Advisian to undertake a feasibility assessment of future wharf upgrade options to address boat mooring demand. The feasibility assessment involves developing and assessing options based on stakeholder engagement, strategic analysis of the issues and constraints, benefits and costs and pros/cons of each.

2 Current Site

The existing Commuter Wharf is located on the shores of Pittwater, off McCarrs Creek Rd adjacent to the Church Point Ferry Wharf within the Northern Beaches Local Government Area (LGA) (Figure 2-1). It provides a vital connection to the mainland, vehicle parking, local services and a social meeting place.



Figure 2-1 Current Site Location (circled in red)

The shoreline of the Church Point area is comprised of commercial entities at Thomas Stephens Reserve, namely the 'Pasadena' restaurant and the General Store (Figure 2-2a). The Holmeport Marina adjoins Rostrevor Reserve and provides services including boat moorings, storage, sales, maintenance, and secure car parking (Figure 2-2b). The Cargo Wharf is a heavy duty timber wharf located to the east of Rostrevor Reserve (Figure 2-2c,d). The wharf provides access to barges, collecting and delivering building material, household items and general heavy goods to the offshore residents.



Figure 2-2 Church Point Features. (a) Pasadena, (b) Holmeport Marina, (c) Cargo Wharf and (d) Rostrevor Reserve.

The commuter wharf was upgraded in 2012 and construction of an additional two level carpark adjacent to the wharf completed in 2018. The carparking facility comprises approximately 120 parking spots with 60 permits available for offshore residents (Figure 2-3). The Cargo Wharf (Figure 2-4) was upgraded in 2019 and plans exist to upgrade the foreshore area around the Pasadena.



Figure 2-3 Church Point Two Level Carpark.



Figure 2-4 Cargo Wharf Adjacent to Rostrevor Reserve.

3 Concept Options

As part of this study, options aimed at alleviating overcrowding at the existing commuter wharf are to be assessed (Figure 3-1). These options comprise extension to the existing facility, structures/boat bays at various location within the local area and an alternative 'present day' option comprising policy and operational changes, as detailed below.



Figure 3-1 Options to be Assessed

3.1 Option 1a and 1b

Option 1a and 1b involve an extension to the existing Church Point Commuter Wharf as depicted in Figure 3-2. Option 1a includes six fingers perpendicular to the current wharf and Option 1b includes an additional structure running parallel with the existing facility. Option 1b would provide an additional 119 boat berths, bringing the total available to 230.



Figure 3-2 Option 1a and 1b. Extension to the Existing Church Point Commuter Wharf

3.2 Option 2a and 2b

Option 2 includes an additional structure at either Rostrevor Reserve (2a) or Church Point Reserve (2b) (also known as Stephens Reserve) (Figure 3-3). During construction of the new seawall adjacent to the commuter wharf in 2016 an additional pontoon was installed at Rostrevor Reserve. It was later removed once construction works were complete. The community survey results indicate that many residents support the installation of a structure at Rostrevor Reserve to provide additional berths. Church Point Reserve is currently used in an ad-hoc manner for offshore residents with many berthing their boats on the beach due to limited spots at the Commuter Wharf.



Figure 3-3 Option 2a and 2b. Additional structures at either Rostrevor Reserve (2a) or Church Point Reserve (2b).

Concept options for 2a and 2b have been developed for assessment. An initial Option 2a was presented to Stakeholders, shown in Figure 3-4a. Based on outcomes of the stakeholder consultation this option has been reduced in size to minimise impact to navigation and the need to relocate swing moorings. The updated Option 2a (Stage 1) comprises approximately 32 additional boat bays as shown in Figure 3-4. This version of Option 2a is further analysed within this report however stakeholder comment is based on the initial concept. The revised structure would consist of an arrangement of floating pontoons, fingers and piles. Further extension to the structure (Stage 2), if deemed necessary, would provide a further 25 boat bays (total 57). The staged approach has been nominated to enable usage assessment of Stage 1 to determine if Stage 2 is deemed necessary.

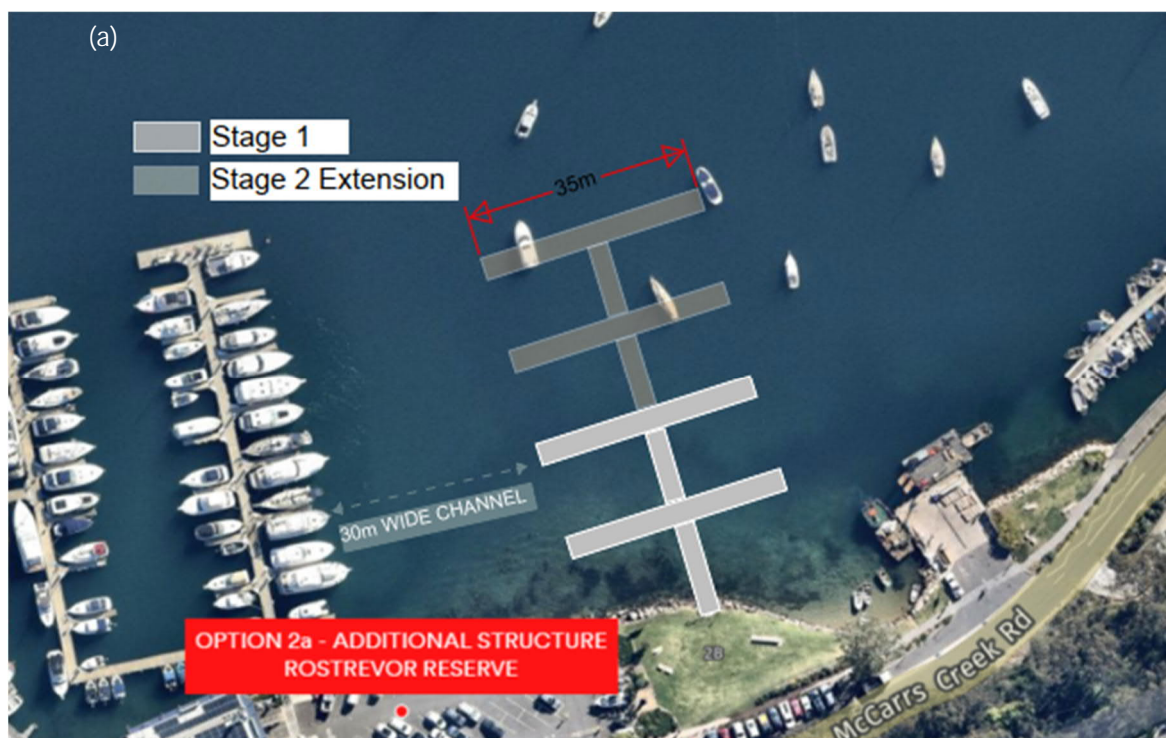




Figure 3-4 Option 2a Staged Concept Floating Pontoons Rostrevor Reserve. (a) Initial Concept Option 2a Presented to Stakeholders and (b) Revised Concept Options 2a With Stage 1 Additional 32 Boat Berths and Stage 2 Additional 25 Boat Berths After Relocation of Swing Moorings.

Figure 3-5 presents a concept option for an additional structure at Church Point Reserve (Option 2b). A two-stage approach could be adopted with both Stage 1 and 2 providing an additional 90 berths, 180 berths in total. This option would be positioned where the obsolete boat ramp is located (Figure 3-6) and would comprise floating pontoons, fingers and piles with an approximate overall length of 100m running parallel with the shore. Available water depth is required to be investigated further as this may limit access of deeper draft vessels or require the structure to be located further seaward which may impact on swing moorings.



Figure 3-5 Option 2b Staged Concept Floating Pontoons Church Point Reserve. Stage 1 Additional 90 Boat Bays and Stage 2 Additional 90 Bays.



Figure 3-6 Church Point Reserve Obsolete Boat Ramp and Proposed Location of Option 2b.

3.3 Option 3a, 3b and 3c

Option 3 covers provision of boat bays at other locations in Pittwater including Rowland Reserve (3a), McCarrs Creek Reserve (3b) and Bayview Baths (3c) (Figure 3-7). Rowland Reserve is approximately 3km from the Scotland Island Ferry Wharf travelling by water and McCarrs Creek and Bayview Baths are both approximately 2.3km.



Figure 3-7 Option 3a, 3b and 3c. Additional Boat Bays at either Rowland Reserve (3a), McCarrs Creek Reserve (3b) and Bayview Baths (3c).

Concept options have been developed as detailed in Figure 3-8 to Figure 3-10. All options would comprise floating pontoon structures approximately 35m long accommodating approximately 32 additional boats. Option 3c has the potential for a total of 64 boat berths if Stage 2 were undertaken after relocation of swing moorings. Available water depth is required to be investigated further for Option 3c as access for deeper draft vessels may be limited thus requiring dredging.



Figure 3-8 Option 3a Concept Floating Pontoon Rowland Reserve. Additional 32 Boat Bays.



Figure 3-9 Option 3b Concept Floating Pontoon McCarrs Creek Reserve. Additional 32 Boat Bays.



Figure 3-10 Option 3c Concept Floating Pontoon Bayview Baths. Stage 1 Comprises an Additional 32 Boat Bays. Stage 2 Additional 32 Boat Bays. Total Increase in Berths 64.

3.4 Option 4 - Combination

Option 4 comprises a combination of Stage 1 of Options 1b and 2a, extension to the existing Church Point Commuter Wharf and additional structure at Rostrevor Reserve (Figure 3-11). If additional berths were required in the future, Stage 2 of each could be implemented.



Figure 3-11 Option 4 Combining Stage 1 of Option 1b and 2a. Providing an Additional 66 Berths and 177 in Total.

3.5 Alternative – Operational and Policy Management Changes

During consultation with Stakeholders, it was recognised by both on and offshore residents that changes to operation and policies relating to the commuter wharf may alleviate some of the issues associated with overcrowding. Further details of potential operational and policy changes are provided in Section 5.8.

4 Assessment Criteria

4.1 General

The assessment of each of the options described in Section 3 has been based on a multi-criterion ranking considering the following:

- Environmental impact
- Planning approvals required
- Number of additional boat berths
- Parking, Accessibility and transport impacts
- Security
- Impacts to coastal processes
- Indicative cost
- Stakeholder response

Each criterion has been scored and a total score for each option calculated and presented to provide an overall ranking of options. The scoring system adopted is shown in Table 4-1. Options are ranked with the highest scoring most favourable.

Table 4-1 Assessment Ranking Scores

Colour	Score
Green	8 to 10
Yellow	4 to 7
Red	0 to 3

**Note relative to the environmental impacts Green = not a constraint (based on review of existing mapping/data) and Yellow = potential constraint. For all environmental constraints green = 10 and yellow = 7. An overall average score has been calculated for each option based on each of the environmental constraints considered.*

4.2 Environmental Assessment

A Planning and Environmental Constraints Report (Appendix A) has been prepared to assess each of the proposed options. The assessment included review and scoring of the following constraints:

- Land use and property
- Cultural heritage
- Aquatic and terrestrial biodiversity
- Hydrology, water quality and groundwater
- Geology, sediments and soils
- Socio-economic
- Landscape character and visual amenity

- Traffic, transport and access
- Noise and vibration
- Air quality

The identification of constraints was based on a desktop review of existing data as well as a general site inspection undertaken on 16th August 2021. No specialist surveys of flora (aquatic or terrestrial) or fauna were undertaken as part of the general site inspection but should be included for the following stage of approvals (i.e., preparation of an REF). An overall summary of the results of the environmental component is provided in Section 5 relative to each option.

4.3 Planning Approvals

As part of preliminary options analysis, a review of relevant legislative, regulatory, Commonwealth, State and Local statutory planning instruments has been undertaken to identify any planning issues and to advise on the expected planning approvals that would be required to construct and operate each option based on their respective location and environmental setting, scope of construction works and future use(s). A detailed summary of the planning approvals required for each option is provided within the Planning and Environmental Constraints Report (Appendix A). A summary of site-specific information relevant to individual options is included within this Section 5.

4.4 Number of Additional Boat Berths

An approximate number of boat berths for each of the concept options has been determined. This has enabled options to be ranked based on accommodating both current and future permit holders. Typically berth dimensions adopted for all the options considered are approximately 5 m long x 2.2 m wide. Total boat berths are calculated based on adding current and proposed. The scoring of this criteria has been based on assigning a score of 10 for the option achieving the most additional berths with each subsequent option scored accordingly.

4.5 Traffic, Parking and Access

Potential impacts on traffic movements and additional cars associated with boat permit holders is discussed and a score given to each option. Parking space requirements as set out in AS3962:2020 Marina Design require 0.25 car spaces per berth. However, this is based on people driving to a marina to access their berth, usually for recreational purposes (i.e. infrequently). For this project a higher value of 0.5 car spaces per berth has been adopted due to the likelihood that most offshore residents would have a car on the mainland and would be used for commuter purposes (i.e. regularly).

Parking availability near each of the nominated options is discussed and ranked. Each option has been given a score of 10 based on complying with the requirements of AS3962:2020. Ease of access for offshore residents, distance to carparking, public transport and shops is also considered, and a ranking assigned for each option.

4.6 Coastal Processes

A desktop assessment has been undertaken evaluating the coastal processes. The effect of coastal processes on the proposed structures as well as potential impact on coastal processes resulting from the structures is discussed. The following are considered, and each option ranked accordingly:

- Significant wave height at each structure
- Impact to coastal processes and sediment transport
- Boat wake
- Dredge requirements
- Vessel access and impact to navigation
- Tidal/flood currents

4.7 Cost Estimates

Indicative cost estimates for each of the prefeasibility options have been prepared. As the options are concept, cost estimates are within $\pm 50\%$ accuracy and contain a 25% contingency in accordance with Advisian's cost estimate guidelines. Approximate dimensions based on typical pontoon arrangements have been adopted for costing. The option with the lowest cost per berth has been assigned the highest score with subsequent scores allocated accordingly.

4.8 Community Opinion

Initial community survey undertaken in 2021 (Appendix B) identified community preference regarding additional boat parking. Subsequent community engagement (September 2021) has provided further insight into community requirements with details provided in the Church Point Consultation Outcomes (Appendix C).

Advisian held four targeted workshops with those stakeholders directly impacted or with a vested interest in changes to the existing commuter wharf facility. The consultation was aimed at obtaining stakeholder input and feedback on the options being assessed. Due to COVID-19 public health restrictions, the workshops were held online via Microsoft Teams. The key options assessed as a part of the Feasibility Study were presented at the workshop by the Advisian Senior Coastal Engineer using PowerPoint. Following the presentation, stakeholders were given the opportunity to provide their comments of each option assessed, including any benefits or concerns. Stakeholders were also invited to share any comments about current usage of the wharf and alternative suggestions to address this. Key outcomes from the community engagement are summarized in the following section with the full report provide in Appendix C.

5 Option Assessment

5.1 Option 1a and 1b

5.1.1 General

As detailed in Section 3.1 Option 1a and 1b include an extension to the existing Church Point Commuter Wharf. It has been determined that Option 1a will not provide additional boat berths and has the potential to reduce the number of berths available, as such the following assessment relates to Option 1b only.

Option 1b (Figure 5-1) would comprise additional pontoons/walkways approximately 3 m wide and piles located every 30 m (one side only) secured with fingers (2 m wide) as per the existing structure (Figure 5-2). Location of this option and the fact it is already being used as the commuter wharf are advantageous. Relocation of swing moorings would be required in order to maintain a clear navigation channel. Adopting a staged approach for construction (Figure 5-1) would allow time for relocation of the mooring. If this were deemed a preferred option further investigation into the potential affects to navigation would be required in the form of a navigation impact study.

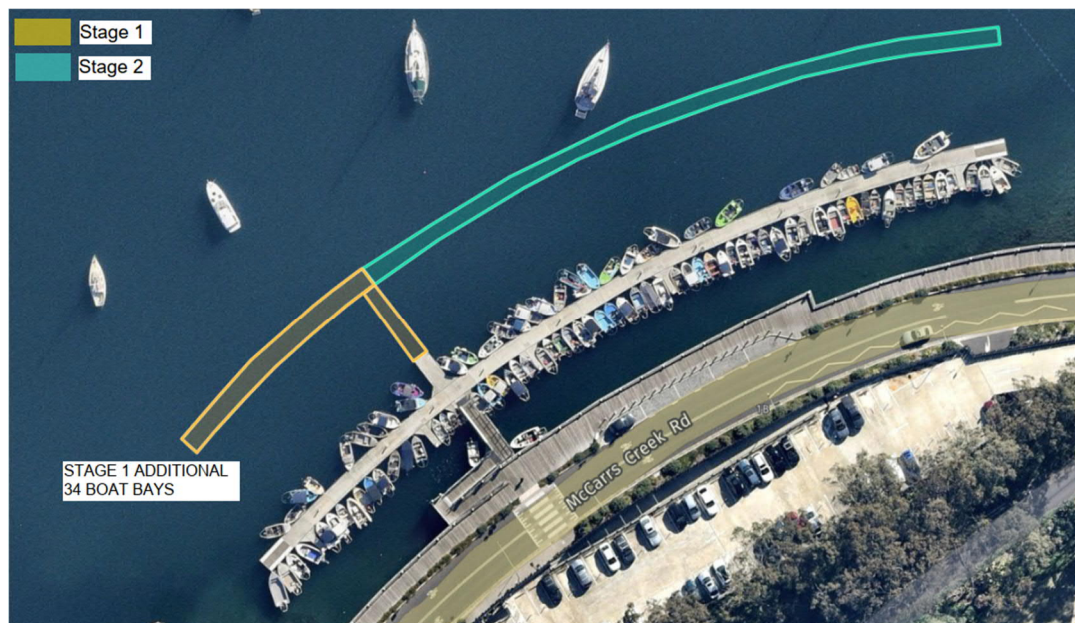


Figure 5-1 Option 1b Staged Approach. Stage 1 34 Boat Berths and Stage 2 85 Boat Berths. Total of 230 Berths at Completion.



Figure 5-2 Existing Commuter Wharf Pile/Finger Arrangement.

5.1.2 Environmental Assessment

A summary of the environmental assessment of Option 1b is provided in Table 5-1. The Planning and Environmental Constraints Report provides further summary of the assessment (Appendix A).

Table 5-1 Option 1b Environmental Assessment (Green – not a constraint, Yellow – constraint)

Criteria	Option 1b – Extension to Existing Commuter Wharf
Planning and Permissibility	10
Land Use and Property	10
Aboriginal Heritage	7
European Heritage	7
Aquatic Biodiversity	7
Terrestrial Biodiversity	10
Hydrology, Water Quality, Groundwater	7
Geology, Sediments and Soil	7
Socio-Economic	7
Landscape Character and Visual Amenity	10
Traffic, Transport and Access	10
Noise and Vibration	7
Air Quality	7
Weighted Score	106/130 = 8/10

5.1.3 Planning Approvals

It is expected that the construction of Option 1b can be carried out under the provisions of ISEPP. The planning approval pathway is development for the purpose of 'wharf or boating facilities' under Clause 68(4) when undertaken by or on behalf of a public authority may be carried out without development consent subject to the preparation and determination of a REF under Part 5 of the EP&A Act. Statutory consultation would be required with Transport for NSW and NTS Corp.

Other notification and permits that are likely to be required under the FM Act include:

- Section 199: Notification for carrying out of dredging and reclamation works.
- Section 205: Permit for works that harm marine vegetation.

5.1.4 Additional Boat Berths

Extension to the existing Church Point Commuter Wharf via Option 1b (Figure 5-1) would provide an additional 119 boat berths. This would bring the total number of available boat berths to 230.

5.1.5 Traffic, Parking and Access

The main road leading to Option 1a and 1b (McCarrs Creek Road), is a single carriageway with two lanes, primarily utilised by cars, busses, and bicycles. There is a bus stop approximately 150m west and 200m east of Option 1b. Water access is available via ferries and water taxis at the Church Point Wharf.

The existing wharf is in close proximity to the two-level carpark accommodating up to 120 vehicles with 60 designated spots for Church Point Permit holders and Church Point Reserve with 148 designated spots for permit holders (*Church Point Parking Demand Management Strategy 2016*). Disabled, motorcycle, and bicycle parking is also available in the carpark. The wharf is convenient for public transport, shops and offshore residents.

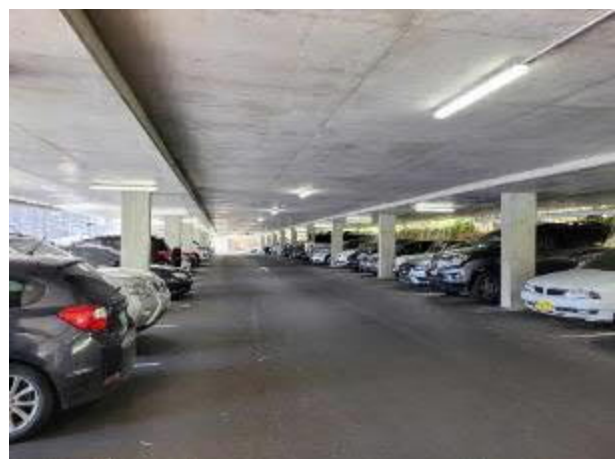


Figure 5-3 McCarrs Creek Road and the carpark in the vicinity of Option 1a and 1b.

An estimated 116 car spaces are required to be available for offshore residents (Table 5-32). If directions contained within the 2016 Parking Management Plan have been implemented car parking spaces are adequate for the anticipated 230 berths.

Table 5-2 Option 1b Car Space Requirements

Facility	Berths	Car Spaces Required (0.5 x berths)
Existing Commuter Wharf	111	56
Extension (Option 1b)	119	60
TOTAL	230	116

5.1.6 Coastal Processes

Due to the Option 1b orientation of the proposed additional berths the vessels would not be subject to beam-on seas with respect to prevailing wave climate. Provided the outer pontoon is of suitable width it would provide protection to those vessels berthed at the inner pontoon. For 'head' seas the 50yr ARI significant wave height (H_s) is 0.6m, just on the boundary of a 'good' wave climate according to AS3962, condition for the existing berths would be the same as existing.

Option 1b would not have any significant impact on local coastal processes or sediment transport apart from any potential impact from increased boat traffic. There would likely be a reduction in wave climate at the Cargo Wharf due to the effects of the outer pontoon.

Regarding vessel access Option 1b would impact on the navigation channel used by barge operators to the cargo wharf. If this option were deemed as preferred a navigation study should be undertaken prior to proceeding.

5.1.7 Cost

A cost estimate for Option 1b (stage 1 and 2) is provided in Table 5-3. Costs have been determined assuming a floating pontoon structure would be adopted.

Table 5-3 Option 1b Cost Estimate

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
1.0	Mobilisation	1	No.	\$200,000.00	\$200,000.00	Mobilisation of plant/equipment
1.1	Walkway Pontoon	450	m ²	\$1,000.00	\$450,000.00	Assumed walkway pontoon width of 3m
1.2	Finger Pontoon	24	m ²	\$1,000.00	\$24,000.00	Assumed finger pontoon width of 2m every 30m along walkway
1.3	Walkway Pile	4	No.	\$15,000.00	\$60,000.00	Assumed steel pile every 30m
1.4	Finger Pile	4	No.	\$10,000	\$40,000.00	Assumed steel pile every finger

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
1.5	Services Bollard	5	No.	\$5,000.00	\$25,000.00	Assumed services bollard every 20m
1.6	Demobilisation	1	No.	\$100,000.00	\$100,000.00	Demobilisation of plant/equipment
Contingency (25%)					\$224,750.00	
TOTAL					\$1,123,750.00	
COST PER BERTH (Total/119 berths)					\$9,443.00	Used for comparison of options

Disclaimer: This cost estimate includes construction cost and contingency allowance. The estimate is based on Advisian's experience and judgement as a firm of practising professional engineers familiar with the construction industry. The construction cost estimate can NOT be guaranteed as we have no control over Contractor's prices, market forces and competitive bids from tenderers. The cost estimate does not include further design development or owners' costs (eg site management).

5.1.8 Community Opinion

The key outcomes from the stakeholder and community engagement are provided in Table 5-4.


Table 5-4 Engagement Outcomes – Option 1b- Curved Arm Existing Wharf

Theme	Key points
Location	<ul style="list-style-type: none"> Stakeholders expressed that this was the best option for offshore residents as it was located close to parking, shops, and the post office.
Design	<ul style="list-style-type: none"> Stakeholders expressed that extending the existing facility could encroach on the existing channel potentially causing navigational issues.
Swing moorings	<ul style="list-style-type: none"> This option would involve the movement of swing moorings, which could take a long time, therefore a staged approach of a combination of the design of option 1b and 2a may need to be considered. Alternatively, further investigations, to assess whether moving the swing mooring could be avoided, could be undertaken if this was selected as the preferred option.
Car parking	<ul style="list-style-type: none"> Car parking at Church Point, can be an issue at time (e.g., weekends) as a result a parking study may be required if this option is selected to assess the adequacy of existing parking.

5.1.9 Summary Option 1b

A summary and final score of Option 1b is provided in Table 5-5.

Table 5-5 Criteria and Scoring Summary Option 1b

Option 1b		
Description	Extension the existing commuter wharf through the addition of another curved arm. 	
Criteria	Description	Score
Environmental	Score out of 10 for all criteria assessed under the environmental assessment.	8
Additional Boat Berths	Current – 111 Additional – 119 Total - 230	9
Parking	Additional – 60 spaces Total – 116 required Available = 208	10
Accessibility	Convenient	10
Transport Impacts	Minimal	10
Coastal Processes	Impact to navigation and swing moorings	6
Planning Approvals	Minimal	10
Cost	\$9,443/berth	10
Stakeholder		5
TOTAL		78/90
RANKING		2 nd

5.2 Option 2a

5.2.1 General

An additional berthing structure at Rostrevor Reserve (Figure 5-4) was one of the preferred options as deemed by those members of the community who provided input in the initial survey (Appendix B) relating to increasing commuter berths. Proximity to the existing commuter wharf, two-level carpark, Church Point Reserve Parking, General Store and public transport are some of the positive attributes of this option.

The following sections provide a summary of the assessment of Option 2a.



Figure 5-4 Rostrevor Reserve Looking North and Proposed Concept Option 2a.

5.2.2 Environmental Assessment

Table 5-6 provides a summary of results from the environmental assessment. Option 2a achieves a total score of 8/10.

Table 5-6 Option 2a Environmental Assessment (Green – not a constraint, Yellow – potential constraint)

Criteria	Option 2a
Planning and Permissibility	10
Land Use and Property	10
Aboriginal Heritage	7
European Heritage	7
Aquatic Biodiversity	7
Terrestrial Biodiversity	10
Hydrology, Water Quality, Groundwater	7
Geology, Sediments and Soil	7
Socio-Economic	7
Landscape Character and Visual Amenity	10
Traffic, Transport and Access	10
Noise and Vibration	7
Air Quality	7
Weighted Score	106/130 = 8/10

5.2.3 Planning Approvals

It is expected that the construction of Option 2a can be carried out under the provisions of ISEPP. The planning approval pathway is development for the purpose of 'wharf or boating facilities' under Clause 68(4) when undertaken by or on behalf of a public authority may be carried out without development consent subject to the preparation and determination of a REF under Part 5 of the EP&A Act. Statutory consultation would be required with Transport for NSW and NTS Corp.

Other notification and permits that are likely to be required under the FM Act include:

- Section 199: Notification for carrying out of dredging and reclamation works.
- Section 205: Permit for works that harm marine vegetation.

5.2.4 Additional Boat Berths

If a staged approach is adopted for the construction of Option 2a an initial 32 additional boat berths can be created under Stage 1 and a further 25 boat berths as part of Stage 2. This would provide a total of 57 additional boat berths achieved at the new facility. Combined with the existing Church Point Commuter Wharf a total of 168 berths would be available.

5.2.5 Traffic, Parking and Access

Option 2a is located off McCarrs Creek Road, following the same structure of Option 1a and 1b. There are bus stops located directly adjacent to Option 2a travelling in both directions, with on-street parking lining the northern side of McCarrs Creek Road for approximately 100m (Figure 5-5). Water access is available via ferries and water taxis at the Church Point Wharf.



Figure 5-5 McCarrs Creek Road and on-street parking options in the vicinity of Option 2a.

Option 2a provides access to the local amenities regularly used by offshore residents. Navigation between Scotland Island and Rowland Reserve is direct and of short distance. Adopting a ratio of car spaces to berths of 0.5, Option 2a would require 64 car spaces (0.5 x 57). The existing commuter wharf requires approximate 56 car spaces, bringing the total required to 85 (Table 5-7).

Table 5-7 Option 2a Car Space Requirements

Facility	Berths	Car Spaces (0.5 x berths)
Existing Commuter Wharf	111	56
Additional Structure (Option 2a)	57	29
TOTAL	168	85

5.2.6 Coastal Processes

In order to achieve under keel clearance some dredging may be required at the south-western end of the proposed Stage 1 works or these berths be reserved for smaller vessels. The Estuary Planning level at the existing foreshore is 3.1m AHD (Lawson and Treloar, 2004) as such a raised pad may be required for placement of the gangway.

The addition of the structure would provide protection to the existing rock revetment at Rostrevor Reserve and some protection from westerly seas to the Cargo Wharf.

If this option were deemed as preferred a navigation study should be undertaken prior to proceeding in order to ensure minimal impact to the navigation channel.

5.2.7 Cost

A cost estimate for Option 2a is provided in Table 5-8. Cost have been determined assuming a floating pontoon structure would be adopted. The price is for both stage 1 and 2 inclusive.

Table 5-8 Option 2a Cost Estimate

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
1.0	Mobilisation	1	No.	\$200,000.00	\$200,000.00	Mobilisation of plant/equipment
1.1	Walkway Pontoon	210	m ²	\$1,000.00	\$210,000.00	Assumed walkway pontoon width of 3m
1.2	Finger Pontoon	18	m ²	\$1,000.00	\$18,000.00	Assumed finger pontoon width of 2m every 30m along walkway
1.3	Walkway Pile	4	No.	\$15,000.00	\$60,000.00	Assumed steel pile every 30m
1.4	Finger Pile	3	No.	\$10,000	\$30,000.00	Assumed steel pile every finger
1.5	Gangway	1	No.	\$20,000.00	\$20,000.00	Assumed 12m long and 1.5m wide

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
1.6	Services Bollard	3	No.	\$5,000.00	\$15,000.00	Assumed services bollard every 20m
1.7	Demobilisation	1	No.	\$100,000.00	\$100,000.00	Demobilisation of plant/equipment
Contingency (25%)					\$163,250.00	
TOTAL					\$816,250.00	
COST PER BERTH (Total/57 berths)					\$14,320.00	Used for comparison of options

Disclaimer: This cost estimate includes construction cost and contingency allowance. The estimate is based on Advisian's experience and judgement as a firm of practising professional engineers familiar with the construction industry. The construction cost estimate can NOT be guaranteed as we have no control over Contractor's prices, market forces and competitive bids from tenderers. The cost estimate does not include further design development or owners' costs (eg site management).

5.2.8 Community Opinion

The initial option proposed during stakeholder engagement provided an additional 64 berths for stage 1 and a further 64 berths at stage 2. Following conversations with local boating services the design and number of berths proposed under this option have been revised due to potential navigational safety impacts.

The key points raised by stakeholders in relation to the initial Option 2a is presented in Table 5-9.

Table 5-9 Engagement Outcomes – Initial Option 2a- Rostrevor Reserve

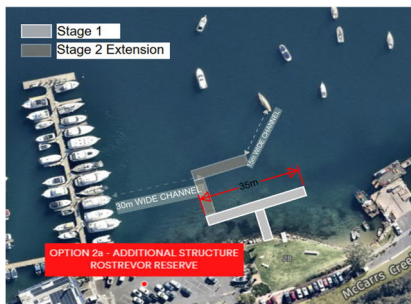
Theme	Key points
Location and amenity	<ul style="list-style-type: none"> Stakeholders expressed a number of positive aspects regarding the location of this option including its proximity to the existing wharf, offering an easy overflow wharf facility. The location also offered easy access to the bus stop (located at entry to Holmeport Marina). It was also noted as a site sheltered from the wind and on a reserve, making it convenient for families if they need to wait there. It would also have low visual amenity impacts on Pittwater. Potential issues with pick up and drop offs; noise impacts and previous commitments regarding a permanent wharf at this location would need to be investigated further by Council. The proposed location is close to the high use cargo wharf and would need to consider pedestrian activity and safety; boat parking may also be an issue
Navigational safety	<ul style="list-style-type: none"> Navigational safety is a potential risk in this area, particularly around increased interaction between commercial and private vessels. Larger boats navigating to Holmeport Marina may be impacted if the full stage 2 wharf structure was to proceed; if only stage 1 proceeded navigational issues between the cargo wharf and Marina may be avoided. It was noted by stakeholders that when the temporary wharf was in place there were limited impacts to cargo wharf operations.

Theme	Key points
Environment	<ul style="list-style-type: none"> Although there is no mapped vegetation for this location, it was recognised as a low impact option in terms of fish habitat.
Design	<ul style="list-style-type: none"> Stakeholders suggested a staged approach to the development could be considered, to minimize potential navigational impacts; a stage approach would need to consider cost benefit scenarios. Stakeholders noted that the onshore infrastructure is already in place for this option which could reduce costs associated with the development.
Swing moorings	<ul style="list-style-type: none"> TfSNW commented that swing moorings would need to be relocated for this option if both stages were developed. If the proposed structure was smaller than the option presented, swing moorings may not be impacted.

5.2.9 Summary Option 2a

A summary and final score of Option 2a is provided in Table 5-10.

Table 5-10 Criteria and Scoring Summary Option 2a

Option 2a		
Description	Additional Structure Rostrevor Reserve	
Criteria	Description	Score
Environmental	Score out of 10 for all criteria assessed under the environmental assessment.	8
Additional Boat Berths	Current – 111 Additional – 57 Total - 168	8
Parking	Additional – 29 spaces Total – 85 required Available = 208	10
Accessibility	Convenient	10
Transport Impacts	Minimal	10
Coastal Processes	Minimal	10

Option 2a		
Planning Approvals	Minimal	10
Cost	\$14,320.00/berth	7
Community		6
TOTAL		79/90
RANKING		1 st

5.3 Option 2b

5.3.1 General

Church Point Reserve is a popular recreational area for the local community being near the Pasadena, ferry wharf and beach area. The beach is currently used in an ad hoc manner for boat mooring (Figure 5-6)



Figure 5-6 Ad hoc Boat Mooring at Church Point Reserve.

The proposed structure would comprise floating pontoons, fingers and piles located adjacent to the obsolete boat ramp (Figure 5-7). The existing ramp would potentially need to be removed should this option be deemed as preferred.



Figure 5-7 Option 2b Staged Concept Floating Pontoons Church Point Reserve.

5.3.2 Environmental Assessment

The environmental assessment (Appendix A) has identified expansive beds of *Posidonia* and smaller areas of *Zostera* seagrass in the vicinity of the proposed additional structure. Construction in this area will most likely impact directly on aquatic vegetation. Following stakeholder consultation this option has been deemed unlikely to proceed due to the potential impact to aquatic vegetation. A summary of the assessment of the option is still provided in the below sections.

Table 5-11 provides a summary of the environmental assessment.

Table 5-11 Option 2b Environmental Assessment (Green – not a constraint, Yellow – constraint, Red – high constraint)

Criteria	Option 2b
Planning and Permissibility	10
Land Use and Property	10
Aboriginal Heritage	7
European Heritage	7
Aquatic Biodiversity	1

Criteria	Option 2b
Terrestrial Biodiversity	10
Hydrology, Water Quality, Groundwater	7
Geology, Sediments and Soil	7
Socio-Economic	7
Landscape Character and Visual Amenity	10
Traffic, Transport and Access	10
Noise and Vibration	7
Air Quality	7
Weighted Score	100/130 = 7.5/10

5.3.3 Planning Approvals

It is expected that the construction of Option 2b can be carried out under the provisions of ISEPP. The planning approval pathway is development for the purpose of 'wharf or boating facilities' under Clause 68(4) when undertaken by or on behalf of a public authority may be carried out without development consent subject to the preparation and determination of a REF under Part 5 of the EP&A Act. Statutory consultation would be required with Transport for NSW and NTS Corp.

Other notification and permits that are likely to be required under the FM Act include:

- Section 199: Notification for carrying out of dredging and reclamation works.
- Section 205: Permit for works that harm marine vegetation.

5.3.4 Additional Boat Berths

The proposed structure at Church Point Reserve would comprise two stages each approximately 100 m long (Figure 5-7). Adopting a berth width of 2.2 m the structure would provide an additional 90 berths under Stage 1 and 90 as part of Stage 2, 180 in total. Combining these extra berths with those already available (111) would provide a total of 291 berths.

5.3.5 Traffic, Parking and Access

Option 2b is located at the northern end of Pittwater Road, which follows the same structure of McCarrs Creek Road. The Church Point Parking Area, a large, open-air, ticketed car park lining 600m, is directly adjacent to the site. Bus stops can be found at either end of the carpark, travelling in both directions. Disabled, motorcycle, and bicycle parking is available in the carpark. Water access is available via ferries and water taxis at the Church Point Wharf.



Figure 5-8 McCarrs Creek Road, bus stop, and Church Point Wharf in the vicinity of Option 2b.

Navigation from this proposed location to Scotland Island is direct. Under Stage 2 of the Parking Demand Management Strategy (2016) a total of 148 designated parking spots for offshore residents at Church Point Reserve were to be provided. Table 5-12 Identifies approximate number of parking spots required based on berths.

Table 5-12 Option 2b Car Space Requirements

Facility	Berths	Car Spaces Required (0.5 x berths)
Existing Commuter Wharf	111	56
Additional Structure (Option 2b)	180	90
TOTAL	291	146

5.3.6 Coastal Processes

Option 2b is subject to a south-easterly fetch distance of 2.3km, as such vessels at the outer stage 2 pontoon would be subject to beam seas with a 50yr ARI significant wave height of 0.83 m which exceeds criteria for a 'moderate' wave climate for both beam and head seas according to AS3962. This means vessels would not be able to be berthed on the outside of the outer pontoon.

Sediment transport is south to north, as such there may be a need for maintenance dredging in order to clear sediment moving into the area from the beach to the south.

5.3.7 Cost

A cost estimate for Option 2b is provided in Table 5-13. Cost have been determined assuming a floating pontoon structure would be adopted. The price is for both stage 1 and 2 inclusive.

Table 5-13 Option 2b Cost Estimate

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
1.0	Mobilisation	1	No.	\$200,000.00	\$200,000.00	Mobilisation of plant and equipment
1.1	Walkway Pontoon	835	m ²	\$1,000.00	\$835,000.00	Assumed walkway pontoon width of 3m
1.2	Finger Pontoon	48	m ²	\$1,000.00	\$48,000.00	Assumed finger pontoon width of 2m every 30m along walkway
1.3	Walkway Pile	8	No.	\$15,000.00	\$120,000.00	Assumed steel pile every 30m
1.4	Finger Pile	8	No.	\$10,000	\$80,000.00	Assumed steel pile every finger
1.5	Gangway	1	No.	\$20,000.00	\$20,000.00	Assumed 12m long and 1.5m wide
1.6	Services Bollard	8	No.	\$5,000.00	\$40,000.00	Assumed services bollard every 20m
1.7	Demobilisation	1	No.	\$100,000.00	\$100,000.00	Demobilisation of plant and equipment
Contingency (25%)					\$360,750.00	
TOTAL					\$1,803,750.00	
COST PER BERTH (Total/180 berths)					\$10,020.00	Used for comparison of options

Disclaimer: This cost estimate includes construction cost and contingency allowance. The estimate is based on Advisian's experience and judgement as a firm of practising professional engineers familiar with the construction industry. The construction cost estimate can NOT be guaranteed as we have no control over Contractor's prices, market forces and competitive bids from tenderers. The cost estimate does not include further design development or owners' costs (eg site management).

If this option were to be preferred, further consideration should be given to the cost associated with ongoing maintenance dredging if sedimentation were to be an issue. An indicative rate of \$20/m³ with a mobilisation/demobilisation of approximately \$200,000. These rates are based on assuming the dredged material is free from Acid Sulphate Soils and could be reused locally.

5.3.8 Community Opinion

The key points raised by stakeholders in relation to this option are presented in

Table 5-14.


Table 5-14 Engagement Outcomes – Option 2b- Church Point Reserve

Theme	Key points
Environment	<ul style="list-style-type: none"> Stakeholders noted that the additional proposed berths are located in an ecologically sensitive zone with extensive threatened seagrasses present- Posidonia and Zostera. DPIE seek to avoid impacts (e.g., propeller wash, dredging) to ecologically sensitive areas and as a result it is unlikely this option would be approved for development.
Design	<ul style="list-style-type: none"> Stakeholders noted that as the water in this area is shallow, dredging may be required. Whilst dredging is not prohibited in the Pittwater region, there would need to be significant public benefit to justify it.
Swing moorings	<ul style="list-style-type: none"> The development of this option may involve the relocation of swing moorings.
Location and amenity	<ul style="list-style-type: none"> The wave climate and the capacity of boats to travel in this area require further investigation should the option be selected as preferred.

5.3.9 Summary Option 2b

A summary and final score of Option 2b is provided in Table 5-15.

Table 5-15 Criteria and Scoring Summary Option 2b

Option 2b		
Description	Additional Structure Church Point Reserve	
Criteria	Description	Score
Environmental	Impact to aquatic vegetation	7.5
Additional Boat Berths	Current – 111 Additional – 180 Total - 291	10
Parking	Additional – 90 spaces Total – 146 required Available = 208	10

Accessibility	Convenient	10
Transport Impacts	Minimal	10
Coastal Processes	Exceeds criteria for 'moderate' wave climate Sedimentation	5
Planning Approvals	Minimal	10
Cost	\$10,020.00/berth	8
Community		4
TOTAL		74.5/90
RANKING		4 th

5.4 Option 3a

5.4.1 General

Located at Rowland Reserve option 3a would comprise a combination of pontoon walkways, fingers and piles (Figure 5-10). By water Rowland Reserve is approximately 3.5km from Scotland Island. The area is a popular for boat launching (fishing, dragon and surf boats), walking and off leash dog walking (Figure 5-10).



Figure 5-9 Option 3a Concept Floating Pontoon Rowland Reserve. Additional 32 Boat Bays.



Figure 5-10 Rowland Reserve Boat Ramp, Dog Park, Dragon Boating and Surf Boats.

5.4.2 Environmental Assessment

Areas of aquatic vegetation and coastal wetlands are located at or in the vicinity of Option 3a. Table 5-16 provides a summary of results from the environmental assessment. Option 3a achieves a total score of 7.5/10.

Table 5-16 Option 3a Environmental Assessment (Green – not a constraint, Yellow – constraint)

Criteria	Option 2b
Planning and Permissibility	10
Land Use and Property	10
Aboriginal Heritage	7
European Heritage	10
Aquatic Biodiversity	7
Terrestrial Biodiversity	7
Hydrology, Water Quality, Groundwater	7

Criteria	Option 2b
Geology, Sediments and Soil	7
Socio-Economic	7
Landscape Character and Visual Amenity	7
Traffic, Transport and Access	7
Noise and Vibration	7
Air Quality	7
Weighted Score	100/130 = 7.5/10

5.4.3 Planning Approvals

It is expected that the construction of Option 3a can be carried out under the provisions of ISEPP. The planning approval pathway is development for the purpose of 'wharf or boating facilities' under Clause 68(4) when undertaken by or on behalf of a public authority may be carried out without development consent subject to the preparation and determination of a REF under Part 5 of the EP&A Act. Statutory consultation would be required with Transport for NSW and NTS Corp.

Other notification and permits that are likely to be required under the FM Act include:

- Section 199: Notification for carrying out of dredging and reclamation works.
- Section 205: Permit for works that harm marine vegetation.

5.4.4 Additional Boat Berths

Option 3a will provide an additional 32 berths. This combined with the 111 already available at the Commuter Wharf would provide a total of 143 berths.

5.4.5 Traffic, Parking and Access

Rowland Reserve is approximately 3.5km by water from Scotland Island. The conveniences of the General Store, Marina and Cargo Wharf are approximately 3 km by road from the reserve. Bus stops are located south of the carpark travelling in both directions, as well as on-street parking, with access to the site via foot through Rowland Reserve.

Parking at Rowland Reserve is pay and display or permits (all Northern Beaches Residents eligible) with a total of 42 spaces.

Table 5-17 identifies approximate number of parking spots required based on berths.

Table 5-17 Option 3a Car Space Requirements

Facility	Berths	Car Spaces Required (0.5 x berths)
Existing Commuter Wharf	111	56
Additional Structure (Option 3a)	32	16
TOTAL	142	72

5.4.6 Coastal Processes

Option 3a is well protected from waves due to the presence of the sand spit to the north.

Navigational access would be slow due to the 4 knot zones between Rowlands and offshore and the narrow access channel could be difficult to navigate.

5.4.7 Cost

An indicative cost estimate for Option 3a is provided in Table 5-18. Cost have been determined assuming a floating pontoon structure would be adopted.

Table 5-18 Option 3a Cost Estimate

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
1.0	Mobilisation	1	No.	\$200,000.00	\$200,000.00	Mobilisation of plant and equipment
1.1	Walkway Pontoon	129	m ²	\$1,000.00	\$129,000.00	Assumed walkway pontoon width of 3m
1.2	Finger Pontoon	6	m ²	\$1,000.00	\$6,000.00	Assumed finger pontoon width of 2m every 30m along walkway
1.3	Walkway Pile	2	No.	\$15,000.00	\$30,000.00	Assumed steel pile every 30m
1.4	Finger Pile	2	No.	\$10,000	\$20,000.00	Assumed steel pile every finger
1.5	Gangway	1	No.	\$20,000.00	\$20,000.00	Assumed 12m long and 1.5m wide
1.6	Services Bollard	2	No.	\$5,000.00	\$10,000.00	Assumed services bollard every 20m
1.7	Demobilisation	1	No.	\$100,000	\$100,000	Demobilisation of plant and equipment

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
	Contingency (25%)				\$128,750.00	
	TOTAL				\$643,750.00	
	COST PER BERTH (Total/32 berths)				\$20,117.00	Used for comparison of options

Disclaimer: This cost estimate includes construction cost and contingency allowance. The estimate is based on Advisian's experience and judgement as a firm of practising professional engineers familiar with the construction industry. The construction cost estimate can NOT be guaranteed as we have no control over Contractor's prices, market forces and competitive bids from tenderers. The cost estimate does not include further design development or owners' costs (eg site management).

5.4.8 Community Opinion

The key points raised by stakeholders in relation to this option are presented in Table 5-19.

Table 5-19 Engagement Outcomes – Option 3a- Rowland Reserve

Theme	Key points
Location and amenity	<ul style="list-style-type: none"> Stakeholders expressed that the additional proposed berths would be located on community land, close to the dog beach and trailer users. Competing uses of the area and potential safety issues would need to be considered, particularly during weekends. As this option is located 3.5km from Scotland Island it would not be convenient for offshore residents, particularly in bad weather. The location was noted as far from amenities; stakeholders suggested the development of a private bus route between the reserve and Church Point to address this issue. The location would be ideal for when shopping at Mona Vale., some also thought it could assist in alleviating parking pressure at Church Point.
Car parking	<ul style="list-style-type: none"> Some stakeholders expressed a preference for the development of an option away from the main Church Point area due to the existing parking and traffic issues at Church Point. Stakeholders suggested that parking could be expanded at Rowland Reserve, through the development of a one-story carpark or relocation of existing SES facilities to allow for more parking.
Ferry services	<ul style="list-style-type: none"> Due to the distance offshore residents would have to travel to this location, which could be an issue in bad weather, it was suggested a ferry service could operate between Scotland Island and Rowland Reserve. Cost implications on the existing ferry service would need to be investigated.

5.4.9 Summary Option 3a

A summary and final score of Option 3a is provided in Table 5-20.

Table 5-20 Criteria and Scoring Summary Option 3a

Option 3a		
Description	Additional Structure Rowlands Reserve	
Criteria	Description	Score
Environmental	Potential impact to aquatic vegetation and coastal wetland	7.5
Additional Boat Berths	Current – 111 Additional – 32 Total - 143	6
Parking	Additional – 16 spaces Total – 16 required (just Rowland) Available = 42 (Rowland)	10
Accessibility	Not convenient	6
Transport Impacts	Minimal	10
Coastal Processes	Difficult to navigate due to narrow access channel	6
Planning Approvals	Minimal	10
Cost	\$20,117.00/berth	6
Community		5
TOTAL		66.5/90
RANKING		5 th

5.5 Option 3b

5.5.1 General

Option 3b is located at McCarrs Creek Reserve and would comprise a combination of gangways, floating pontoons and piles (Figure 5-11). A dry stack storage facility, boat ramp and jetty are located at the reserve (Figure 5-12). Travelling by water the reserve is located approximately 2.3km from the main wharf at Scotland Island.



Figure 5-11 Option 3b Concept Floating Pontoon McCarrs Creek Reserve. Additional 32 Boat Bays.



Figure 5-12 McCarrs Creek Reserve Dry Stack Storage and Boat Ramp

5.5.2 Environmental Assessment

Areas of aquatic vegetation and coastal wetlands are located at or in the vicinity of Option 3b. Table 5-21 provides a summary of results from the environmental assessment.

Table 5-21 Option 3b Environmental Assessment (Green – not a constraint, Yellow – constraint)

Criteria	Option 2b
Planning and Permissibility	10
Land Use and Property	10
Aboriginal Heritage	10
European Heritage	7
Aquatic Biodiversity	7
Terrestrial Biodiversity	7
Hydrology, Water Quality, Groundwater	7
Geology, Sediments and Soil	7
Socio-Economic	10
Landscape Character and Visual Amenity	7
Traffic, Transport and Access	7
Noise and Vibration	7
Air Quality	7
Weighted Score	103/130 = 8/10

5.5.3 Planning Approvals

It is expected that the construction of Option 3b can be carried out under the provisions of ISEPP. The planning approval pathway is development for the purpose of 'wharf or boating facilities' under Clause 68(4) when undertaken by or on behalf of a public authority may be carried out without development consent subject to the preparation and determination of a REF under Part 5 of the EP&A Act. Statutory consultation would be required with Transport for NSW and NTS Corp.

Other notification and permits that are likely to be required under the FM Act include:

- Section 199: Notification for carrying out of dredging and reclamation works.
- Section 205: Permit for works that harm marine vegetation.

5.5.4 Additional Boat Berths

Option 3b will provide an additional 32 berths. This combined with the 111 already available at the Commuter Wharf would provide a total of 143 berths.

5.5.5 Traffic, Parking and Access

Access to Option 3b is via a car park and Reserve off McCarrs Creek Road (Figure 5-13). The closest bus stop is approximately 400m from the car park entrance travelling northbound, with no footpaths leading to the site. Water access is also limited. The conveniences of the General Store, Marina and Cargo Wharf are approximately 3 km by road from the reserve.

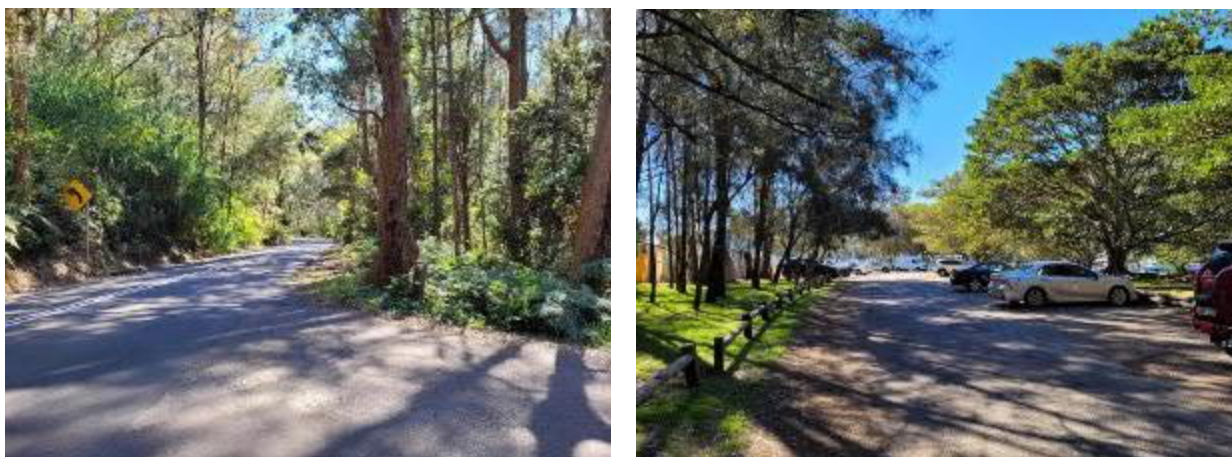


Figure 5-13 McCarrs Creek Road, and the carpark in the vicinity of Option 3b.

Parking at Rowland Reserve is pay and display. Table 5-22 identifies approximate number of parking spots required based on berths.

Table 5-22 Option 3b Car Space Requirements

Facility	Berths	Car Spaces Required (0.5 x berths)
Existing Commuter Wharf	111	56
Additional Structure (Option 3b)	32	16
TOTAL	142	72

5.5.6 Coastal Processes

Option 3b could be subject to significant tidal and/or flood currents from McCarrs Creek. There is also the potential that ongoing maintenance dredging would be required.

Navigation to this location would be difficult with no designated navigation channel.

5.5.7 Cost

An indicative cost estimate for Option 3b is provided in Table 5-23. Cost have been determined assuming a floating pontoon structure would be adopted.

Table 5-23 Option 3b Cost Estimate

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
1.0	Mobilisation	1	No.	\$200,000.00	\$200,000.00	Mobilisation of plant and equipment
1.1	Walkway Pontoon	129	m ²	\$1,000.00	\$129,000.00	Assumed walkway pontoon width of 3m
1.2	Finger Pontoon	6	m ²	\$1,000.00	\$6,000.00	Assumed finger pontoon width of 2m every 30m along walkway
1.3	Walkway Pile	2	No.	\$15,000.00	\$30,000.00	Assumed steel pile every 30m
1.4	Finger Pile	2	No.	\$10,000	\$20,000.00	Assumed steel pile every finger
1.5	Gangway	1	No.	\$20,000.00	\$20,000.00	Assumed 12m long and 1.5m wide
1.6	Services Bollard	2	No.	\$5,000.00	\$10,000.00	Assumed services bollard every 20m
1.7	Demobilisation	1	No.	\$100,000.00	\$100,000.00	Demobilisation of plant and equipment
Contingency (25%)					\$128,750.00	
TOTAL					\$643,750.00	
COST PER BERTH (Total/32 berths)					\$20,117.00	Used for comparison of options

Disclaimer: This cost estimate includes construction cost and contingency allowance. The estimate is based on Advisian's experience and judgement as a firm of practising professional engineers familiar with the construction industry. The construction cost estimate can NOT be guaranteed as we have no control over Contractor's prices, market forces and competitive bids from tenderers. The cost estimate does not include further design development or owners' costs (eg site management).

5.5.8 Community Opinion

The key points raised by stakeholders in relation to this option are presented in Table 5-24.


Table 5-24 Engagement Outcomes – Option 3b- McCarrs Creek

Theme	Key points
Location and amenity	<ul style="list-style-type: none"> Stakeholders expressed a number of concerns regarding the location and existing infrastructure at this option, including: <ul style="list-style-type: none"> Limited access to public transport Limited infrastructure – additional lighting and public footpaths would be required Long distance from Scotland Island, including through areas harder to navigate which could present issues, especially at night. Long distance to drive to wharf location Proximity to national parks and potential impacts would need further consideration
Environment	<ul style="list-style-type: none"> As the water is very shallow in this area, dredging may be required which could be an issue due to the presence of Zostera seagrass.

5.5.9 Summary Option 3b

A summary and final score of Option 3b is provided in Table 5-25.

Table 5-25 Criteria and Scoring Summary Option 3b

Option 3b		
Description	Additional Structure McCarrs Creek Reserve	
Criteria	Description	Score
Environmental		8
Additional Boat Berths	Current – 111 Additional – 32 Total - 143	6
Parking	Additional – 16 spaces Total – 16 required (just McCarrs) Available = Yes	10
Accessibility	Not convenient	5
Transport Impacts	Minimal	10

Coastal Processes	Sedimentation and potential significant flood currents. Difficult navigation	4
Planning Approvals	Minimal	10
Cost	\$20,117.00/berth	6
Community		3
TOTAL		62/90
RANKING		7 th

5.6 Option 3c

5.6.1 General

Located at Bayview Baths, Option 3c would comprise an extension off the existing Bayview Baths Wharf. The structure would comprise a combination of pontoon walkways, fingers and piles (Figure 5-14).

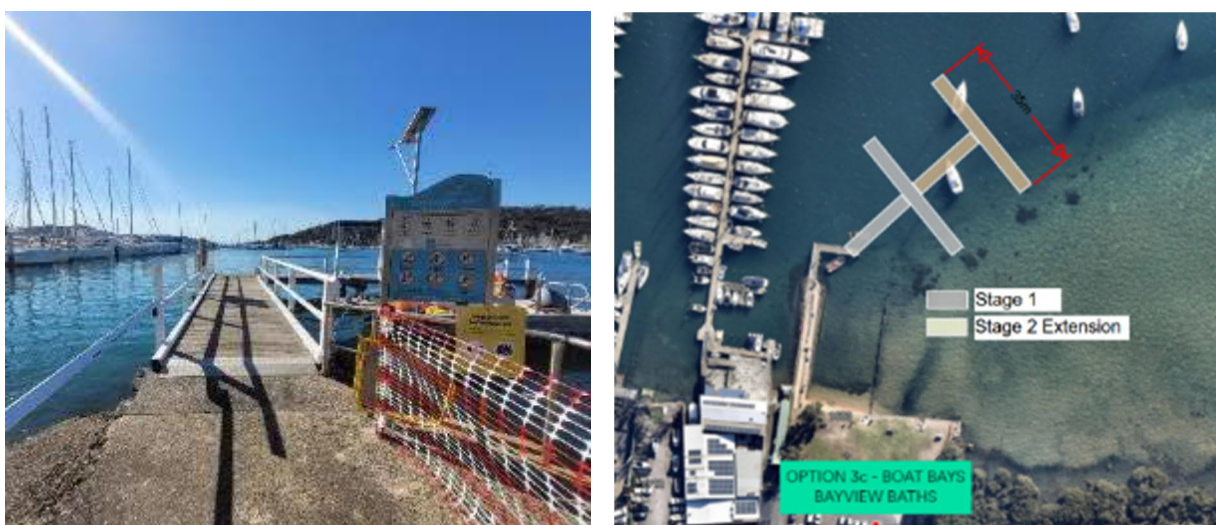


Figure 5-14 Existing Bayview Baths Wharf and Proposed Concept Option 3c.

5.6.2 Environmental Assessment

The environmental assessment has identified the following potential constraints relating to Option 3c. The Planning and Environmental Constraints Report provides further summary of the assessment (Appendix A).

Table 5-26 Option 3c Environmental Assessment (Green – not a constraint, Yellow – constraint)

Criteria	Option 2b
Planning and Permissibility	10
Land Use and Property	10
Aboriginal Heritage	7
European Heritage	7
Aquatic Biodiversity	7
Terrestrial Biodiversity	10
Hydrology, Water Quality, Groundwater	7
Geology, Sediments and Soil	7
Socio-Economic	7
Landscape Character and Visual Amenity	10
Traffic, Transport and Access	7
Noise and Vibration	7
Air Quality	7
Weighted Score	103/130 = 8/10

5.6.3 Planning Approvals

It is expected that the construction of Option 3c can be carried out under the provisions of ISEPP. The planning approval pathway is development for the purpose of 'wharf or boating facilities' under Clause 68(4) when undertaken by or on behalf of a public authority may be carried out without development consent subject to the preparation and determination of a REF under Part 5 of the EP&A Act. Statutory consultation would be required with Transport for NSW and NTS Corp.

Other notification and permits that are likely to be required under the FM Act include:

- Section 199: Notification for carrying out of dredging and reclamation works.
- Section 205: Permit for works that harm marine vegetation.

5.6.4 Additional Boat Berths

Option 3c will provide an additional 32 berths. This combined with the 111 already available at the Commuter Wharf would provide a total of 143 berths. Stage 2 extension of Option 3c has not been considered due to the number of swing moorings that would require relocation.

5.6.5 Traffic, Parking and Access

Option 3c is located off Pittwater Road, with an open-air car park adjacent to the site, with disabled and boat trailer parking available (Figure 5-15). There are bus stops located approximately 100m north

of the site, travelling north and southbound. Option 3c is approximately 2.3 km by water from Scotland Island. The conveniences of the General Store, Marina and Cargo Wharf are approximately 2.5 km by road from the baths. Water access is limited to water taxis.



Figure 5-15 Pittwater Road, and the carpark in the vicinity of Option 3c.

Parking at Bayview Baths is pay and display. Table 5-27 identifies approximate number of parking spots required based on berths.

Table 5-27 Option 3c Car Space Requirements

Facility	Berths	Car Spaces (0.5 x berths)
Existing Commuter Wharf	111	56
Additional Structure (Option 3c)	32	16
TOTAL	142	72

5.6.6 Coastal Processes

In order to accommodate Option 3c dredging of the large sandbank will be required in order to allow safe access to berths. Ongoing maintenance dredging is anticipated due to encroachment of the adjacent large sandbank.

The orientation of the structure and the 4km fetch to the North may require the structure to be orientated so vessels berthed at the outer pontoon are head-on to the northerly seas.

5.6.7 Cost

An indicative cost estimate for Option 3c is provided in Table 5-28. Cost have been determined assuming a floating pontoon structure would be adopted and only stage 1.

Table 5-28 Option 3c Cost Estimate

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
1.0	Mobilisation	1	No.	\$200,000.00	\$200,000.00	Mobilisation of plant and equipment
1.1	Walkway Pontoon	129	m ²	\$1,000.00	\$129,000.00	Assumed walkway pontoon width of 3m
1.2	Finger Pontoon	6	m ²	\$1,000.00	\$6,000.00	Assumed finger pontoon width of 2m every 30m along walkway
1.3	Walkway Pile	2	No.	\$15,000.00	\$30,000.00	Assumed steel pile every 30m
1.4	Finger Pile	2	No.	\$10,000	\$20,000.00	Assumed steel pile every finger
1.5	Gangway	1	No.	\$20,000.00	\$20,000.00	Assumed 12m long and 1.5m wide
1.6	Services Bollard	2	No.	\$5,000.00	\$10,000.00	Assumed services bollard every 20m
1.7	Demobilisation	1	No.	\$100,000.00	\$100,000.00	Demobilisation of plant and equipment
Contingency (25%)					\$128,750.00	
TOTAL					\$643,750.00	
COST PER BERTH (Total/32 berths)					\$20,117.00	Used for comparison of options

Disclaimer: This cost estimate includes construction cost and contingency allowance. The estimate is based on Advisian's experience and judgement as a firm of practising professional engineers familiar with the construction industry. The construction cost estimate can NOT be guaranteed as we have no control over Contractor's prices, market forces and competitive bids from tenderers. The cost estimate does not include further design development or owners' costs (eg site management).

If this option were to be preferred, further consideration should be given to the cost associated with ongoing maintenance dredging if sedimentation were to be an issue. An indicative rate of \$20/m³ with a mobilisation/demobilisation of approximately \$200,000. These rates are based on assuming the dredged material is free from Acid Sulphate Soils and could be reused locally.

5.6.8 Community Opinion

The key points raised by stakeholders in relation to this option are presented in Table 5-29Table 5-24.


Table 5-29 Engagement Outcomes – Option 3c- Bayview Baths

Theme	Key points
Environment	<ul style="list-style-type: none"> Mangroves and mapped seagrass exist within the vicinity of the baths and dredging may be required, as a result DPIE would need to issue permits to address issues with the sand spit migration and ongoing sedimentation. Whilst no seahorses are currently on the baths structure this would need to be investigated further.
Location and amenity	<ul style="list-style-type: none"> Stakeholders suggested that a small facility at Bayview Baths would allow for cycling to the beach and baths and would be a good option to get to Mona Vale. The distance would potentially be an issue for offshore residents. Potential impacts to the redevelopment of Bayview Baths would require further investigation.
Parking	<ul style="list-style-type: none"> Stakeholders noted that location has major existing issues with parking and as a result was not considered a viable option.

5.6.9 Summary Option 3c

A summary and final score of Option 3c is provided in Table 5-30.

Table 5-30 Criteria and Scoring Summary Option 3c

Option 3c		
Description	Additional Structure Bayview Baths	
Criteria	Description	Score
Environmental	Potential impact to aquatic vegetation and coastal wetland	8
Additional Boat Berths	Current – 111 Additional – 32 Total - 143	6
Parking	Additional – 16 spaces Total – 16 required (just Bayview) Available = Yes (If permits provided)	10
Accessibility	Not convenient	6

Transport Impacts	Minimal	10
Coastal Processes	Dredge and ongoing maintenance Dredging requirements Exposure to northerly seas	4
Planning Approvals	Minimal	10
Cost	\$20,117.00/berth	6
Community		3
TOTAL		63/90
RANKING		6 th

5.7 Option 4

5.7.1 General

Option 4 would comprise the stage 1 extension to the existing facility (Option 1b) and the stage 1 component of Option 2a (Rostrevor Reserve). The combination of these two options would provide an additional 66 berths. Adopting stage 1 of these two options would minimise impact to users during construction, Rostrevor reserve could be constructed first and subsequently used during extension of the existing facility (Option 1b). Indicative cost based on stage 1 of both options is shown in Table 5-31.

Table 5-31 Option 1b and 2a Stage 1 Only Cost Estimate

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
Option 1b Stage 1						
1.0	Mobilisation	1	No.	\$200,000.00	\$200,000.00	Mobilisation of plant/equipment
1.1	Walkway Pontoon	120	m ²	\$1,000.00	\$120,000.00	Assumed walkway pontoon width of 3m
1.2	Finger Pontoon	12	m ²	\$1,000.00	\$12,000.00	Assumed finger pontoon width of 2m every 30m along walkway
1.3	Walkway Pile	2	No.	\$15,000.00	\$30,000.00	Assumed steel pile every 30m
1.4	Finger Pile	2	No.	\$10,000	\$20,000.00	Assumed steel pile every finger
1.5	Services Bollard	2	No.	\$5,000.00	\$10,000.00	Assumed services bollard every 20m

Item	Item Description	Quantity	Unit	Unit Rate	Amount	Comment
1.6	Demobilisation	1	No.	\$100,000.00	\$100,000.00	Demobilisation of plant/equipment
Option 2a Stage 1						
1.1	Walkway Pontoon	129	m ²	\$1,000.00	\$129,000.00	Assumed walkway pontoon width of 3m
1.2	Finger Pontoon	6	m ²	\$1,000.00	\$6,000.00	Assumed finger pontoon width of 2m every 30m along walkway
1.3	Walkway Pile	2	No.	\$15,000.00	\$30,000.00	Assumed steel pile every 30m
1.4	Finger Pile	2	No.	\$10,000	\$20,000.00	Assumed steel pile every finger
1.5	Gangway	1	No.	\$20,000.00	\$20,000.00	Assumed 12m long and 1.5m wide
1.6	Services Bollard	2	No.	\$5,000.00	\$10,000.00	Assumed services bollard every 20m
Contingency (25%)					\$126,750.00	
TOTAL					\$633,750.00	
COST PER BERTH (Total/66 berths)					\$9,602.00	Used for comparison of options

If stage 2 of each option were to be completed a total of 176 additional berths would be provided, which when combined with the existing facility would mean a total of 287 berths. Indicative cost for both stages of each option is shown in Table 5-32. Adopting this combination of options offers the lowest cost/berth, \$5,629. This option has combined the mobilisation and demobilisation cost once for both options.

Table 5-32 Total Cost Option 4 – Combination of 1b and 2a

Option	Cost	
Option 1b Total	\$1,123,750.00	
Option 2a Total	\$ 441,250.00	Mob/demob only costed once
Total (Option 4)	\$1,565,000.00	
COST PER BERTH (Total/287 berths)	\$5,629.00	Used for comparison of options

5.8 Alternative – Operational and Policy Management Changes

During consultation with Stakeholders, it was recognised by both on and offshore residents that changes to operation and policies relating to the commuter wharf may alleviate some of the issues associated with overcrowding. These changes could be implemented prior to any further berths being created to gauge whether overcrowding was still an issue.

Recommended changes under this alternative are detailed below.

5.8.1 Commuter Wharf Parking and Permit Policy Changes

Stakeholders have identified issues associated with current operations of the commuter wharf. Some of the issues raised included the length of time a vessel is berthed, the size of vessel, policing of parking at the wharf and permit numbers. The following recommendations are made to address stakeholder concerns and ease overcrowding:

- Time limits for vessel parking be put in place and enforced. It is recommended that a 24 hour limit on parking be enforced and compliance monitored. If a permit holder requires a longer length of time for their vessel to be berthed, they should consider mooring at a marina or alternatively using alternative transport (ferry/water taxi). Vessels berthed more than 24 hours will receive a parking infringement and be impounded.
- Adopt a 'casual' tie up area (2 hour limit) as proposed in the concept master plan (Church Point Plan of Management, 2009) (Figure 5-16).
- Undertake a survey of current permit holders to ascertain frequency of commuter wharf use. This will enable an assessment of whether the 300 permits are being utilised. If a permit holder uses the existing commuter wharf less than 12 times per year consideration should be given to reassigning the permit to a regular commuter.
- Limit the size of vessels using the commuter wharf to a length of 6m or less.



Figure 5-16 Concept Master Plan Showing Location of Time Limited Tie Up Areas (Church Point Plan of Management, 2009).

5.8.2 Ferry Operations

Consideration should be given to increasing the frequency of ferry operations for offshore residents. The weekday ferry service commences at 6.20am from Bells wharf, running every 40 minutes. The last ferry to run from Church Point is 7.20pm, with drop off to Bell wharf only. Increasing the frequency of ferry operations and/or providing an 'on request' pick up/drop off service outside of normal hours may make the ferry a more favourable mode of transport and alleviate the overcrowding at the commuter wharf.

5.9 Summary of Option Assessment

Table 5-33 provides a summary on the total scores of each option along with ranking.

Table 5-33 Summary of Option Assessment

Option	Assessment Criteria and Score									Score	Rank
	Environmental	Boat Berths	Parking	Accessibility	Transport	Coastal Processes	Planning Approvals	Cost	Community		
Option 1b	8	9	10	10	10	6	10	10	5	78/90	2
Option 2a	8	8	10	10	10	10	10	7	6	79/90	1
Option 2b	7.5	10	10	10	10	5	10	8	4	74.5/90	4
Option 3a	7.5	6	10	6	10	6	10	6	5	66.5/90	5
Option 3b	8	6	10	5	10	4	10	6	3	62/90	7
Option 3c	8	6	10	6	10	4	10	6	3	63/90	6
Option 4	8	7	10	10	10	7.5	10	9	6*	77.5/90	3

* This option was not assessed during the stakeholder engagement however the community score for Options 1b and 2a has been adopted.

6 Funding Sources

The delivery of any of the proposed works depends on available funding. Simplistic funding would potentially be sourced from the following:

- Council Funding
- Grant Funding
- State Government Contributions
- Commercial use Permits
- Community Contribution (user-pay system)

A potential funding source for consideration is the *NSW Boating Now Program*. The program provides grant funding to improve maritime infrastructure and facilities across NSW. This investment supports the needs of recreational and commercial boaters and enables broader economic and social benefits for communities. The Program is funded from boating licence, registration and other fees collected by *Transport for NSW (TfNSW)*.

The cost estimates developed are indicative only. Further estimates based on more detailed plans may change estimates and necessitate further economic modelling and fee structures should council proceed with any selected works.

7 Summary

This feasibility study has assessed and ranked various options aimed at providing additional berths for offshore residents due to overcrowding at the current Church Point Commuter wharf. The ranking of options has been based on a review of various criteria including: environmental, planning, berths, traffic, parking, access, coastal processes, cost and stakeholder opinion.

Following stakeholder engagement an additional 'present day' solution has been proposed aimed at making operational and policy changes to assess whether overcrowding issues can be alleviated. If these changes were made in the first instance more detailed analysis of whether additional berth structures were required could be made.

Option 2b was the highest scoring options followed by Option 1b and Option 4. Option 4 provides a combination of the two highest ranked options (stage 1 only). If this combination of options were selected it would enable minimal impact to berth users during construction, Option 2a could be constructed first and used for berthing during construction/extension of 1b.

These options have been developed at a conceptual level for consultation purposes and if progressed, they would be further optimised with regards to the user requirements, site constraints, further stakeholder consultation and community feedback, and input from future potential studies (e.g. traffic/parking assessment, navigation study, ecological studies etc.).



Appendix A

Planning and Environmental Constraints Report



Appendix B

Community Survey



Appendix C

Community Engagement Outcomes Report

