Mission Beach
Safe Boating Infrastructure
Options Workshop

Report prepared for

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1. Introduction

1.1 Background

In response to the community's need for improved maritime safety in Boat Bay, Mission Beach the Commonwealth Government contributed $5.5 million towards the development and construction of maritime infrastructure aimed at improving boating conditions in the Bay.

The Queensland Government subsequently contributed approximately $10.8 million towards the project, resulting in a project budget of about $16.3 million to deliver a fit-for-purpose solution to improve maritime safety. It should be stressed that the funding is to be directed to maritime infrastructure.

Proposals conceived for safe boating facilities are at various stages of development and range from artistic impressions, concept plans and preliminary engineering drawings with high level cost estimates. Site options identified by earlier investigations for maritime infrastructure, to improve the safety of boating conditions within Boat Bay, are shown in Figure 1, and are summarised below;

Option 1 – a jetty and a detached rock breakwater at Mid-Boat Bay (*refer red lines*);

Option 2 – an extension to the rock breakwater at the Clump Point Boat Ramp (*refer red lines*) with associated land based facilities; and

Option 3 – a wave screen (refer pink line) connected to the head of the reinstated Clump Point Jetty and a detached rock breakwater (refer red line) in near proximity to the jetty (the high level cost estimates for the scale of infrastructure envisaged in those plans exceeded the project budget).

Please note that the two white lines, in Figure 1, mark the 2-metre and 5-metre depth levels in Boat Bay.

None of the current concepts has been progressed in detail or been subject to assessment from an environmental, engineering, approval or costing perspective.

Therefore, it was considered prudent to conduct an Options Workshop to utilise the expertise of a variety of maritime engineering, environmental and community consultants to investigate the current and alternative maritime infrastructure concepts (refer Appendix A).

1.2 Mission Beach Safe Boating Infrastructure Options Workshop

On Friday 30 November 2012, GHD hosted a workshop to discuss infrastructure options for providing safer boating conditions for the unloading and loading of passengers and goods at Boat Bay under ambient conditions (which will be established at the conclusion of the preliminary design stage of development of the preferred concept design).

The workshop considered the available concepts and explored potential infrastructure alternatives. The concepts identified for further consideration will be developed as part of a future consultancy which will undertake planning, environmental studies, design development and the securing of project

approvals. Finalisation of a detailed design will follow to enable the project to proceed to construction.

It must be noted, however, that this project has received its budget allocation (of about $16.3 million), derived from one-off funding contributions from the State and Commonwealth Governments. With the numerous financial demands confronting both governments in the current fiscal environment, there is no realistic expectation that more funds will be forthcoming. Hence, the consultant will need to analyse the performance criteria and design parameters for infrastructure options to produce a solution that will provide safer boating conditions that can be delivered within the available budget.

The purpose of the workshop was to discuss and document the perceived advantages and disadvantages of potential locations for the construction of maritime infrastructure, designed to improve boating safety within Boat Bay. As indicated above, three locations within Boat Bay were discussed at the workshop as potential site options for the new maritime infrastructure (refer Figure 1).

1. Mid-Boat Bay;
2. At the existing Clump Point Boat Ramp; and
3. In the vicinity of the reinstated Clump Point Jetty.

These three site options recognise the potential for the construction of a range of infrastructure at each location, to allow the safe transfer of passengers and goods on and off boats under ambient conditions. Infrastructure options are not expected to provide safe boating loading/unloading conditions in cyclonic conditions or gale force wind conditions. Boat Bay provides all options with a level of natural protection from the prevailing south-east winds and waves that predominantly occur in the morning. There is, however, no natural protection within Boat Bay from the northerly winds that often occur in the afternoon. The workshop was to consider infrastructure options for the three locations which would allow the safe transfer of passengers and goods, especially when the winds are prevailing from the north.

Infrastructure considered in this assessment included generic rock breakwaters and fixed wave screens at the Clump Point Jetty site. The draft proposals for the Clump Point Boat Ramp site submitted by the Community for Coastal and Cassowary Conservation (C4) (refer Figure 2) and the Cassowary Coast Safe Boating Association (CCSBA) (refer Figure 3) were used as the basis for considering infrastructure issues related to extending the protective breakwater, allowing for additional boat ramps and pontoons, accessing the site and taking note of the land-based support infrastructure.

It must be stressed, however, that the draft proposals for the Clump Point Boat Ramp and Clump Point Jetty were not analysed in detail.

This report summarises the discussions of the three options discussed during the workshop. Section 2 provides a summary of the methodology applied to the assessment of the feasibility and suitability of the three options, as well as the range of constraints considered during the assessment. Section 3 briefly describes the three options and summarises discussions of their feasibility and suitability with regard to primary and secondary constraints. Studies that may be required for the approval of the options are also discussed in Section 3. These should assist in determining the potential costs and timeframes of each option.

Figure 1 Boat Bay, Mission Beach – Potential Safe Boating Infrastructure Site Options

Figure 2 Community for Coastal and Cassowary Conservation (C4) - Draft Proposal for Safe Boating Infrastructure

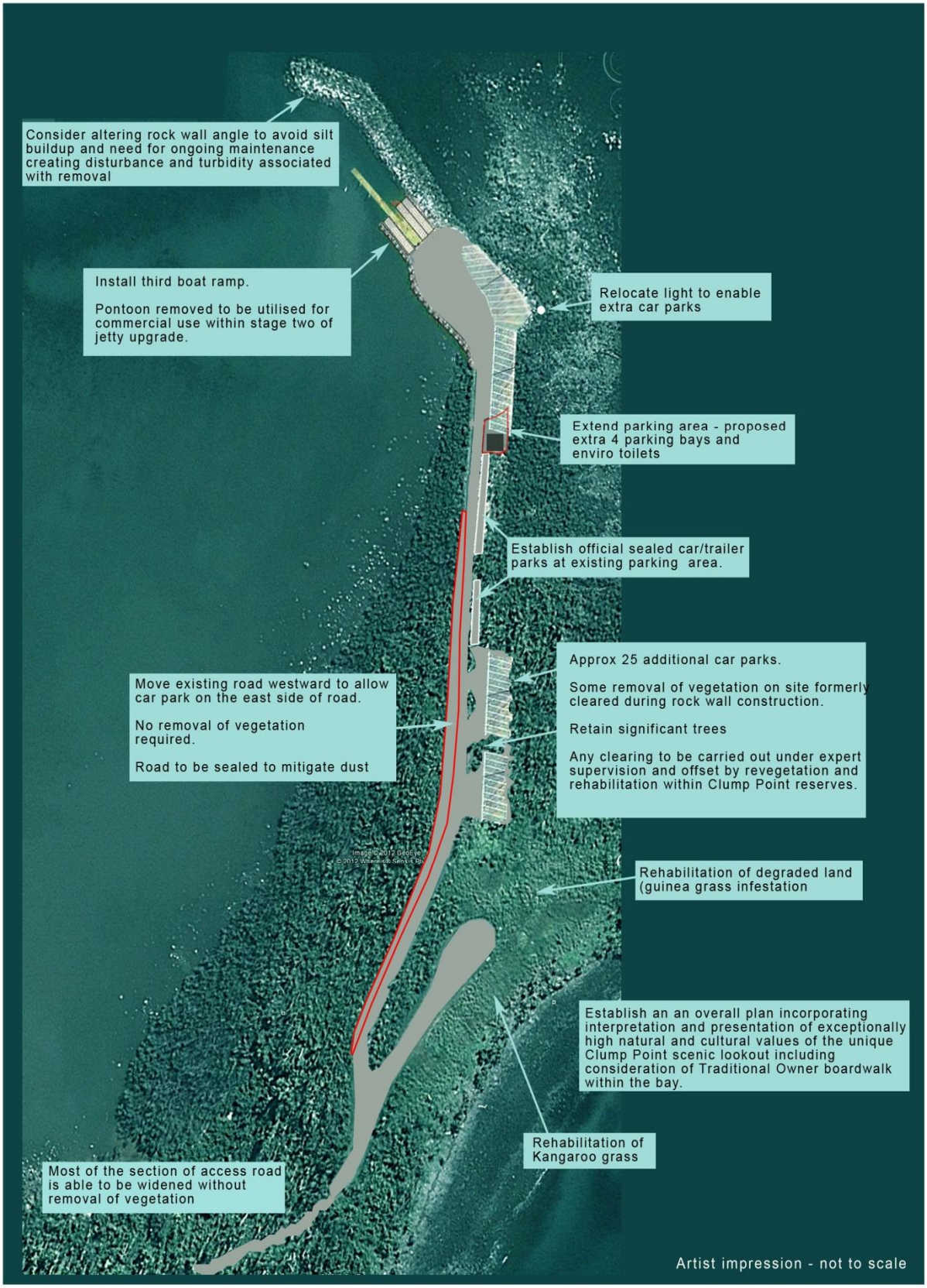

Figure 3 Cassowary Coast Safe Boating Association (CCSBA) - Draft Proposal for Safe Boating Infrastructure

2. Methodology

Prior to the workshop the three locations listed in Section 1 and shown in Figure 1 were identified for discussion. For each of the three site options, the range of infrastructure that could be constructed to allow safe transfers of passengers and goods on and off boats under ambient conditions were discussed with respect to the following primary and secondary constraints:

- Primary constraints on the options were identified as:
  - Available project funding;
  - Environmental approvals/impacts;
  - Community needs (to be determined via targeted consultation with key stakeholders);
  - Commercial and public usage;
  - Technical parameters, especially engineering standards and wave climate; and
  - Other approval requirements.

- Secondary constraints (all the responsibility of the Cassowary Coast Regional Council (CCRC)) on the options were identified as:
  - Reinstatement of the Clump Point Jetty (through Natural Disaster Relief and Recovery Arrangements (NDRRA) funding);
  - Availability of land;
  - Availability of services; and
  - Availability of car parking.

The available project budget will be expended on securing the necessary approvals for, and designing and constructing, the maritime infrastructure to allow safe transfers of passengers and goods on and off boats at Mission Beach. This funding is not intended for the purchase of land for access roads or car parking or for the construction of land-based ancillary infrastructure such as toilet facilities.

Discussions regarding the advantages and disadvantages of the three options with regards the above constraints were recorded in the workshop and have been tabulated in Section 3. Approvals which may be required for the types of infrastructure options discussed at the workshop are listed in an initial approvals register in Appendix B. In the absence of detailed designs, no differentiation has been made between the approvals that might be required for the different infrastructure types and site options.

A list of acronyms and a glossary of some of the terms used in this report have been included in Appendix C.

3. Workshop findings

3.1 Option 1: Mid-Boat Bay

3.1.1 Option 1 Description

Option 1 is the potential site for the construction of new infrastructure near the Boat Bay shoreline approximately half-way between the Clump Pont Jetty and the Clump Point Boat Ramp (Figure 1). New infrastructure could be constructed seaward of the promontory to the southeast of the existing Clump Point Jetty. Facilities at this location could include a jetty with either a breakwater or fixed wave screen to confer protection on passengers and goods while they are being transferred on and off boats at the jetty. No boating facilities or road access currently exist at this location, i.e. it is a "greenfield" site.

3.1.2 Advantages and Disadvantages of Option 1

The advantages and disadvantages of the mid-Boat Bay option, as discussed in the workshop, are summarised in Table 3-1. Development of maritime infrastructure at this location was not considered feasible given the probable costs of construction of infrastructure and provision of supporting facilities (i.e. access road, car parking and lighting), as well as the likely significant environmental impacts of construction at this site. Other constraints were not considered further for this option as it was not considered feasible based on the two primary constraints, i.e. the available project budget and environmental impacts.

Table 3-1 Option 1: Mid-Boat Bay – workshop findings

Primary Constraints	*Comments*	*Advantages*	*Disadvantages*
Available project funding			Cost to develop at the site would be prohibitive due to lack of any existing facilities or land access. The requirement to provide a new access road across a "greenfield" site makes this option financially unfeasible.
Environmental issues			Construction of new facilities and the provision of road access would require extensive environmental disturbance, particularly to mangroves, in a previously undisturbed area.

3.1.3 Securing Approvals – Required Studies

Nevertheless, for completeness, the workshop identified the following additional studies that would be required to support an application for approval of construction of infrastructure at this location:

- flora and fauna surveys to identify those present in the area requiring clearing;
- marine benthic surveys to identify the location and extent of benthic primary producers (corals and seagrass) and other sensitive receptors (macrobenthic communities);
- assessment of marine megafauna usage of the area to allow an assessment of the likely impact of the infrastructure on their use of the area;
- conducting a cultural heritage survey;
- hydrodynamic and coastal processes modelling to assess the likely impacts of the infrastructure on water and sediment movement, including sediment accretion and erosion;
- sediment sampling and analysis to identify physical and chemical properties (including acid sulphate soils) of sediment prior to dredging;
- dredged material relocation and reuse options assessment to identify the best option for the relocation of dredged material; and
- development of a Construction Management Plan, including a dredge management plan, cultural heritage management plan, flora and fauna management plan, traffic management plan, and erosion and sediment control plan.

The above studies are likely to be required for the types of approvals necessary to construct and maintain maritime infrastructure at this site. A generic list of the approvals required is provided in Appendix B. Depending on the spatial extent of existing baseline environmental studies completed for construction of the existing Clump Point Boat Ramp and the construction of the former Clump Point Jetty, it is possible that some of the findings of those studies may be applicable for approvals required for construction at this site. However, given that these studies were completed over a decade ago, further investigations of the site will be necessary.

3.2 Option 2: Clump Point Boat Ramp Upgrade

3.2.1 Option 2 Description

Option 2 involves the potential upgrade or expansion of the existing infrastructure at the Clump Point Boat Ramp (Figure 1). Upgrading of the infrastructure at this location includes a number of options ranging from minor changes to the current facilities, such as an extension of the current breakwater, to a considerably larger expansion, including the construction of an additional breakwater and boat ramp as proposed by the Cassowary Coast Safe Boating Association (CCSBA) (refer Figure 3).

Potential infrastructure options for this location discussed at the workshop included:

- an extension to the current breakwater (attached or detached from the mainland) to provide a deep water sheltered area for a jetty or pontoon for commercial use, as shown in Figure 1;

- the construction of a third boat ramp adjacent the current Clump Point Boat Ramp for use by commercial operators (as proposed by C4) as shown in Figure 2); and
- the construction of an additional breakwater and a two lane boat ramp to the north of the current Clump Point Boat Ramp (as proposed by the CCSBA as displayed in Figure 3).

The construction of a piled jetty structure with a fixed wave screen at the Clump Point Boat Ramp site was not discussed specifically at the workshop, however this possibility is also summarised below for completeness.

Please note that in this report, the term wave barrier is used to generically refer to a rock breakwater or fixed wave screen.

Road access and boat ramp facilities service this location ensuring that the existing maritime infrastructure is utilised to its full potential.

3.2.2 Advantages and Disadvantages of Option 2

As discussed in the workshop, the advantages and disadvantages of upgrading or extending the existing infrastructure at the Clump Point Boat Ramp, to allow transfers of passenger and goods on and off boats at this site are summarised in Table 3-2.

An overarching consideration of workshop participants was to be cognizant of the boundaries of the Great Barrier Reef Marine Park as defined in the *Great Barrier Reef Marine Park Act 1975* (Cwlth). Any alteration to these boundaries would require approval by both houses of Federal Parliament. The limited exception would be if the alteration to the boundary was so minimal and incidental as to fall within the *de minimus* legal principle, that is, "the law does not concern itself with trivial matters".

For example, a rock wall extending from the coastline into the ocean could change the Marine Park boundary. In contrast, a free-standing structure or artificial island which wasn't attached to the mainland would probably not change the Marine Park boundary.

No strict definition of "de minimus" exists within the Act, but the Great Barrier Reef Marine Park Authority (GBRMPA) has indicated that a legal decision would be based on the size, scale and environmental significance of the area proposed to be removed from the Marine Park. As a guideline, the Courts have previously ruled that a proposal to change the coastline by 0.2 hectares was insignificant, whereas a proposal of 0.9 hectares was deemed significant.

Although this consideration is particular to the Great Barrier Reef Marine Park, many other considerations are also discussed in Table 3-2.

Table 3-2 Option 2: Clump Point Boat Ramp Upgrade – workshop findings

Primary Constraints	*Comments*	*Advantages*	*Disadvantages*
Available project funding	• Available funding is targeted at the provision of a wave barrier to provide safe transfers of passengers and goods on and off boats under ambient conditions.	• Construction of a wave barrier at this location allows for construction from the land, which should be lower in cost than purely marine-based construction. Tenders would also be open to more contractors if land based.	• Construction activities over the existing access would degrade the road. • Construction activities will interfere with existing recreational activities.
Environmental issues		• Concept design could aim to avoid capital dredging through placement of the new pontoon / jetty in existing deep water. However, capital and maintenance dredging is likely to be needed to maintain navigable depth in the long term. • New wave barrier or jetty structures will provide new habitat for fish and coral. • The new development would likely require an EPBC referral, but may not be declared a Controlled Action (as for Option 3).	• Extension of the current breakwater or any new barrier/jetty construction may have direct impacts on fringing coral reefs in the vicinity of the breakwater, with potential indirect impacts on corals and seagrass from changes in hydrodynamics. • To allow larger commercial vessels access, some amount of dredging and disposal of dredged material may be required. Dredging may have consequences for benthic primary producers (BPP) (corals and seagrass), macrobenthic communities and marine megafauna. The potential impact will require modelling and assessment. • Any pontoon may shade the seabed with potential consequences for BPP. • New structures will change the local wave regime and sediment movement with potential consequences for BBPs and benthic invertebrates. The risk of these consequences occurring would require assessment. • Improving facilities may increase boat usage, therefore increase risk of strikes to inshore megafauna such as dugongs, dolphins, turtles and crocodiles. The risk of this impact occurring will require assessing.

Primary Constraints	Comments	Advantages	Disadvantages
Commercial and public usage	• The relative utilisation, by recreational and commercial users, of expanded facilities is unknown. • Commercial users are currently using the ramp in the absence of a jetty. They also use the pontoons / ramp during rough weather. This contention over access to these facilities has generated tension between the commercial and recreational users.	• The new commercial operational area (pontoon / jetty) could be designed to separate it from the existing recreational operational area (boat ramp and pontoons) in order to minimise competing access to these facilities. • Potential for larger tourism vessels to use area if facilities are available. • Load limits on the existing boat ramp limit the size of barges and the frequency of use. New facilities could be designed to accommodate larger commercial vessels.	• Aggregation of safe boating facilities at the Clump Point Boat Ramp site increases the potential for continued tension between commercial and recreational users. • No refuelling facilities currently exist at the boat ramp. Commercial users will require refuelling facilities. • Load limits on the existing boat ramp limit the size of barges and the frequency of use. New facilities would need to accommodate large commercial vessels. • Siltation at the end of the boat ramp will potentially limit the size of vessels that use the ramp. This can be resolved by regular maintenance dredging but this could represent a considerable operational expense.
Technical parameters	• Detailed hydrodynamic, wave, and cyclonic wave modelling will be required to: – Determine that the layout and design of the wave barrier structure satisfies the requirements of the Australian Standard “Guidelines for design of marinas” acceptable for small craft. – Provide the design criteria for the infrastructure under extreme conditions as determined by a specific risk profile. – Locate pontoon / jetty such that capital dredging is not required. If that’s not possible, determine quantity, sediment type, and the presence of contaminants of capital	• A design that satisfies the criteria may be possible at this site. The challenge is to find a design that complies with the environmental requirements and which can be constructed within budget. • An extension to the breakwater may be able to be approved under the GBRMP Act as a minor work in terms of the changes to the boundary of the GBRMP. This will allow the breakwater extension to be constructed from the land, which is likely to be less expensive than a detached breakwater. However, the length of such an extension will be limited and may not be long enough to provide adequate protection and hence not fulfil its purpose.	• Approval for dredging (both capital and maintenance) and disposal of dredged spoil require a sea dumping permit and dredged material disposal options assessment. • The assessment of the proposal on coastal management and the design of mitigation measures to minimise the adverse effects on coastal management, will be required as part of the granting of a development approval for tidal works. • The option of a detached fixed wave screen instead of a rock breakwater type of structure could be considered. However this type of infrastructure may not be suitable at this location due to the more energetic wave climate to which it would be exposed.

Primary Constraints	Comments	Advantages	Disadvantages
	dredging and details of the dredge disposal area (land or sea). – Design of rock breakwater – armour rock size and availability. – Design of alternative fixed wave screen structural design under extreme wave conditions. – Design of pontoon / jetty layout for disability access, structural design for extreme conditions, options for cyclone survival (removal of gangway or sinking or removal of pontoon). – Level of protection provided to users and the conditions for which facility has been designed needs to be clearly defined.		
Approval requirements	• The existing Clump Point breakwater was constructed under the *de minimis* principle, that is, it did not constitute a significant change to the Queensland coastline or the Marine Park boundary. It is possible that a minor lengthening or widening of the existing breakwater could be undertaken without triggering a change to the Marine Park boundary. Construction involving significant change to the Marine Park Boundary is not permitted under the current Commonwealth legislation (i.e. GBRMP Act). • Any offshore structure must have a water boundary at mean low water and be	• A concept design discussed during the workshop involved a **detached** breakwater structure in the order of 150m long to provide the minimum level of protection from waves. By detaching a new breakwater from the existing breakwater at the Boat Ramp, the GBRMP Act would not be contravened. • The concept design for a new **detached** breakwater would ensure that there is sufficient separation between the mainland breakwater and the detached breakwater to minimise the need for maintenance dredging.	• For the development to qualify as minor under the GBRMP Act, an extension to the existing rock breakwater could probably be no longer than ~50 m (approximately 0.2 ha at Mean Sea Level). To provide adequate protection from waves a 150 m-long rock breakwater is likely to be required. At 0.6 ha in area, such a rock breakwater might be deemed to be significant trigger a change to the Marine Park boundary unless it were constructed as an artificial island detached from the mainland. The need for temporary access (and its removal on completion of construction of the rock breakwater) to the construction site for the rock breakwater could significantly increase the construction costs.

Primary Constraints	Comments	Advantages	Disadvantages
	separated from the mainland by a gap wide enough such that it does not silt up in order to avoid any inadvertent change to the Marine Park boundary. Subsequent siltation can be addressed by maintenance dredging adding a further level of complexity and approval requirements. • The proposed development may fit within these parameters depending on its scale. Only changes to the Marine Park boundary will be allowed if: – the area is relatively insignificant (the maximum size considered to date to be insignificant was 0.2 ha whereas a reclamation of 0.9 ha was deemed to be significant and therefore was rejected). – the area is not environmentally significant, or the environmental impact of removing the area from the Marine Park would not be significant. – the reclamation is a minor and incidental consequence of some other major activity, e.g. the major activity of building a jetty which requires a small land extension to form a stable footing or the major activity of building a coastal road which requires a small groyne to protect the shoreline from erosion. • The current permit for the operation of	• The concept design aims to avoid capital dredging by placing the new pontoon / jetty structure in naturally deep water sufficient for the safe navigation of the vessels expected to be using the facility. • The use of a **breakwater extension** attached to the existing breakwater could be considered provided it was deemed to be relatively insignificant in area (i.e. 0.2ha). This would result in a relatively inexpensive structure due to its restricted length and land-based construction.	• The scale of works proposed for this area would require impact assessment by some State agencies, GBRMPA, and would most likely require a referral to the Commonwealth Department of Sustainability, Environment, Water, Population and Communities under the EPBC Act, as a potential Controlled action. • Impact assessment, including ecological, hydrodynamic and coastal processes studies, will be required. • Constant tidal flow around all sides of the **detached** rock breakwater will be required so as to not change the Marine Park boundary. Maintenance of the gap between the rock breakwater and the mainland will also be required in order to comply with the legislation and this would likely require periodic dredging at additional cost. • The use of a rock breakwater extension attached to the existing breakwater could be considered provided it was deemed to be extremely small in area (i.e. 0.2 ha). This would result in a relatively inexpensive structure due to its restricted length and land-based construction. However, it is highly likely that this structure would not provide adequate protection from waves (particularly from the northeast) thereby failing to fulfil its purpose. • This option does not address the issue of north-easterly wave conditions at the Clump Point Jetty. This will mean that commercial users might use the jetty when conditions are calm and then be forced to return to the boat ramp on the same day (or vice versa) if the wave direction changes during the day. This could result in the unnecessary transfers of passengers

Primary Constraints	Comments	Advantages	Disadvantages
	the boat ramp and jetty expires in 1-3 years.		between the two sites.
Community needs (social/cultural)	• Indigenous community negotiation: this is one of the few areas where volcanic rocks are present on the coastline and the location has cultural significance. • Public consultation on the final design would be expected. • Social Impact Assessment will be required. • Visual impact assessment will be required. • Cultural heritage survey will be required.	• The improved facilities will lead to an increase in the usage of the Clump Point Boat Ramp site, thereby justifying previous public investment at Clump Point. • Additional maritime infrastructure in this location is likely to have less visual impact compared with a similar structure near the reinstated Clump Point Jetty, as it is located further away from the majority of residents.	• Construction in this area has the potential to impact indigenous cultural heritage values given their close proximity to this site. • Increased traffic at this site may create conflict with the local residents and tourists holidaying nearby.
Additional Considerations			
Availability of land	• Access to the Boat Ramp from the main road is via a narrow access road with limited potential for widening because of the physical constraints of Clump Point and its environmental sensitivity.	• There is existing legal access to the Clump Point Boat Ramp.	• The access road is very narrow and would need to be widened for the expected increase in use. This would require clearing of vegetation and approval of this activity. Construction activities could damage the access road.
Car parking	• Limited car parking spaces results in parking of cars and trailers along the narrow access road on weekends.		• Limited car parking is available at the ramp. More car parking places are required. Existing parking spaces are already inadequate on busy days. At peak times, parking occurs along the edge of the access road and creates the potential for conflict between users. • A new facility would require the need for bus parking which would put pressure on the need to upgrade the access road (location and width).

3.2.3 Securing Approvals – Required Studies

Approvals that may be required for the construction of the infrastructure options discussed are provided in Appendix B.

Additional studies that may be required to support the application for approval of the upgrading or extension of infrastructure at the Clump Point Boat Ramp include:

- flora and fauna surveys to identify those present in the area requiring clearing;
- marine benthic surveys to identify the location and extent of benthic primary producers (corals and seagrass) and other sensitive receptors (macrobenthic communities);
- assessment of marine megafauna usage of the area to allow an assessment of the likely impact of the infrastructure on their use of the area;
- hydrodynamic and coastal processes modelling to assess the likely impacts of the infrastructure on water and sediment movement, including sediment accretion and erosion;
- sediment sampling and analysis to identify physical and chemical properties (including acid sulphate soils) of sediment prior to dredging;
- dredged material relocation and reuse options assessment to identify the best option for the relocation of dredged material; and
- development of a Construction Management Plan, including a dredge management plan, cultural heritage management plan, flora and fauna management plan, traffic management plan, and erosion and sediment control plan.

The above studies are likely to be required to accompany approvals applications for the construction of maritime infrastructure at this location. Baseline environmental studies completed for construction of the existing Clump Point Boat Ramp may be valid supporting documentation for approvals applications to construct at this site. However, given that these studies were completed over a decade ago, further investigations of the site will be necessary.

3.3 Option 3: Reinstated Clump Point Jetty: Fixed Wave Screen or Offshore Rock Breakwater

3.3.1 Option 3 Description

Option 3 proposes the construction of new infrastructure at or adjacent to the head of the reinstated Clump Point Jetty to provide conditions which allow safe transfers of passengers and goods on and off boats under ambient conditions (Figure 1). For the available funding, the size and height of a structure could be tailored to provide a level of protection for the berthing of vessels at a specific risk level. The infrastructure options for this location discussed in the workshop included:

- a fixed wave screen attached to the head of the reinstated jetty; and

- a structural offshore rock breakwater, detached from both the mainland and the reinstated jetty, to absorb the energy of the waves and block their passage.

A fixed wave screen or rock breakwater (referred to generically as wave barriers) could be placed east of the existing Clump Point Jetty head to provide protection to the berths at the jetty head from easterly and north-easterly waves. The height and size of the structure will need to be determined by the risk profile for safe transfers of passengers and goods. A lower and smaller structure will result in relatively more hazardous conditions than a larger, taller structure, however a larger structure will be more expensive to construct.

Floating wave screens are unsuitable for this location as the wave period typically exceeds four seconds at this location. Fixed wave screens located in a breaking-wave climate would be subject to greater stresses than if located in a non-breaking-wave climate. Therefore, wave studies will need to establish the nature of the prevailing wave climate in Boat Bay.

3.3.2 Advantages and Disadvantages of Option 3

The advantages and disadvantages of the construction of additional infrastructure in the vicinity of the reinstated Clump Point Jetty, to be completed in 2013, which were discussed in the workshop are summarised in Table 3-3.

Table 3-3 Option 3: Reinstated Clump Point Jetty – workshop findings

Primary Constraints	*Comments*	*Advantages*	*Disadvantages*
Available project funding	• The planned size and height dimensions of the wave barrier will be determined by the required conditions for safe transfer of passengers and goods, and by the risk that the conditions will be exceeded. Funding, within the project's budget, can be geared to the acceptable risk.	• This option utilises the reinstated jetty so available funding can be expended on the provision of new infrastructure only. • For the available funding, the size and height of a wave barrier structure could be tailored to provide a level of protection at a specific risk level. • The structural rock breakwater option is likely to be more economical than a fixed wave screen in the long-term. A rock breakwater is likely to be more resilient in extreme events with lower lifetime costs and should require less maintenance than a fixed wave screen. • Baseline environmental studies completed for the reinstated Clump Point Jetty may be able to be used, thereby saving costs.	• Offshore construction would be required which is generally more expensive than land-based construction. This type of construction can only be undertaken by a limited number of contractors. This potentially higher cost may limit the size of the wave barrier that can be constructed with the available funding. • A fixed wave screen is less resilient to extreme events than a rock breakwater, such as cyclones. The long-term maintenance costs associated with this type of wave barrier are potentially much higher than for a rock breakwater. • A rock breakwater would be expected to cost more initially due to transport of rock to the site and the greater relative volume of the raw material required (vis-à-vis a wave screen) but it will require less repairs and maintenance in the long-term than a wave screen.
Environmental issues		• The location near the reinstated jetty is perceived by the community to be of less environmental concern than the area near the boat ramp. • Benthic communities in the area of impact are likely to be well represented elsewhere in Boat Bay and the surrounding Marine Park. • A fixed wave screen has a smaller footprint than a rock breakwater. • The reinstated jetty and an associated wave barrier would attract fish with flow on benefits for recreational fishers using the jetty.	• A rock breakwater has a larger seabed footprint than a fixed wave screen. • Construction in this area may impact some low density sea grass and benthic invertebrate communities. Surveys beyond the jetty head will be required to determine the benthos in the area of impact. • The construction of an offshore breakwater from the land using temporary access ways will create increased impact given the need to remove the temporary access way after construction has

Primary Constraints	*Comments*	*Advantages*	*Disadvantages*
		• The new development would likely require an EPBC referral, but may not be declared a Controlled Action (as for Option 2). • Baseline environmental studies conducted for the reinstated Clump Point Jetty construction might be able to be used for assessment of this project. This would reduce costs of project. However, additional studies would also likely to be required. • Dredging and associated approvals should not be required to gain deep water access for boats in common use in this area but only if they avoid the shoal south of the jetty head. • A rock breakwater will likely absorb more wave energy than a fixed wave screen and so may have less impact on adjacent areas in terms of the impacts of reflected waves.	been completed.
Commercial and public usage	• Commercial operators would like floating pontoons to be installed on the reinstated jetty. However, there are concerns about their ability to survive extreme weather events undamaged.	• Sinkable or removable pontoons would decrease the long term cost of replacements following cyclone damage. • Attracting commercial users from the Clump Point Boat Ramp should decrease tensions between recreational and commercial users.	• No more than a dozen commercial boats operating in the area will gain benefit from this project, however recreational use of the jetty might be increased by the project.
Technical parameters	• Structures will be subject to weather conditions (SE to NE winds) and extreme events (cyclones). Hydrodynamic, wave and sediment transport modelling will be required. Weather conditions are highly seasonal. Long-term wind conditions would need to be	**Rock Breakwater:** • More resilient under extreme events. • Various shapes of breakwater have been assessed in concept form. The shape and height are determined by the areas at the jetty that require protected conditions for loading and unloading of passengers and goods. • A rock breakwater is capable of withstanding	• Water depth to the south of jetty head may create restrictions to use. • Maritime Safety Queensland may require navigational aids (beacons and lights) to be provided (also true of Option 2). <u>Rock Breakwater</u>: • Availability of materials (particularly armour rock) is important because of its size, i.e. type and size

Primary Constraints	Comments	Advantages	Disadvantages
	investigated. • Modelling will provide the parameters for detailed design of the structures, and assist with determining the planned shape and height dimensions of the wave barrier.	extreme events and continuing to provide protection in the event of damage, whereas the fixed wave screen option is more likely to fail when the design parameters are exceeded. • Maintenance costs for the offshore rock breakwater are likely to be minimal depending on events and sediment movement. **Fixed Wave Screen:** • A fixed wave screen could be constructed from the head of the reinstated jetty.	of rocks may need to be sourced from afar. • Wave height and period are the critical parameters for the design of the offshore rock breakwater. • Footprint of the offshore rock breakwater is of concern as it has a larger base than its piled counterpart. <u>Wave screen</u>: • Wave loading (including uplift) is an issue for the design of the structural fixed wave screen. Need to establish whether Boat Bay has a breaking wave climate (which would necessitate a wave screen structure of such a magnitude that it may be financially and aesthetically unacceptable). • Needs to be designed for high wave impact loading and will require greater maintenance than for a rock breakwater.
Approval requirements	• Need to seek guidance from GBRMPA on Commonwealth approvals required. Approvals and studies required might include: – Tidal works approval (Coastal Act). – Marine plant approvals (Fisheries Act). – Ecological surveys - Drop camera survey should satisfy requirements (side scan should be unnecessary). Sea grass growing times Nov-Dec	• This type of infrastructure would not trigger a change in the Marine Park Boundary as would not be attached to the mainland.	• Navigation requirements would require additional beacons and possibly lights to be installed (as does Option 2). • Depending upon the final design of the structure, there may be significant visual impacts.

Primary Constraints	Comments	Advantages	Disadvantages
	would likely be time of most significance. – Mega fauna survey – historical data could be used with a number of new surveys. – Mangrove surveys. – Water quality monitoring. – Visual impact survey. – Cultural heritage survey.		
Community needs	• Rock wall may seem more aesthetically acceptable than a fixed wave screen but the community is currently suggesting that it prefers the fixed wave screen on perceived environmental grounds. • Social Impact Assessment required.	• Visual impact could be softened using aesthetic improvements, e.g. vegetation and sculptures.	• Community concerns exist about the potential environmental impact of such a development
Additional Considerations			
Reconstruction of the Clump Point jetty	• Aim is to reinstate the existing structure.	• This style of infrastructure would improve the usage and conditions under which use of the reinstated Clump Point Jetty is practicable. • Attracting commercial users from the Clump Point Boat Ramp should decrease the tension between recreational and commercial users and create more harmony within the local community.	
Availability of land	• To be determined with the Cassowary Coast Regional Council.		• Land acquisition costs for additional parking to cater for the increased use of jetty will need to be funded from sources other than the project's budget.
Availability of services	• To be determined with the		• No land-side infrastructure exists to support

Primary Constraints	Comments	Advantages	Disadvantages
	Cassowary Coast Regional Council		increased usage, but this is also true of all other potential sites (Option 1 and 2).
Car parking	• Users of the reinstated jetty will need to use the existing car park area.	• There may be potential for additional car parking near the existing car park.	

3.3.3 Securing Approvals – Required Studies

Approvals that may be required for the types of infrastructure options discussed are provided in Appendix B.

Additional studies that may be required to support the application for approval of construction of a rock breakwater or fixed wave screen off the head of the reinstated Clump Point Jetty include:

- flora and fauna surveys to identify those present in the area requiring clearing;
- marine benthic surveys to identify the location and extent of benthic primary producers (corals and seagrass) and other sensitive receptors (macrobenthic communities);
- assessment of marine megafauna usage of the area to allow an assessment of the likely impact of the infrastructure on their use of the area;
- hydrodynamic and coastal processes modelling to assess the likely impacts of the infrastructure on water and sediment movement, including sediment accretion and erosion; and
- development of a Construction Management Plan, including a cultural heritage management plan, flora and fauna management plan, traffic management plan, erosion and sediment control plan.

The above studies are likely to be required to accompany approvals applications for the construction of infrastructure at this site. Recent baseline environmental studies completed to support the approval of the construction of the reinstated Clump Point Jetty are likely to be acceptable for supporting the construction of a rock breakwater or fixed wave screen offshore from the reinstated jetty. However, depending on the spatial coverage of these previous studies, additional studies of the area further away from the jetty head may be required.

4. Conclusions

Option 1 is not considered feasible given the likely financial and environmental costs associated with construction in a “greenfield” location. Therefore, this option was not considered further as a possible solution for improving boating conditions in Boat Bay.

The following conclusions pertain to the Clump Point Boat Ramp (Option 2) and the Clump Point Jetty (Option 3) sites.

- Constructing maritime infrastructure below the high water mark is feasible for Options 2 and 3 from an engineering point of view (design and construction) and either or both options merit further investigation.
- Both Options 2 and 3 require further environmental investigations identifying and addressing the potential impacts on the marine environment and coastal processes, as well as their subsequent management.
- Both Options 2 and 3 require hydrodynamic and wave modelling studies to determine the magnitude of the breakwater structures required to provide the necessary level of protection. These studies would also determine the design parameters (i.e. wave height and period, and water levels) required for the design of the structural components of the infrastructure, e.g. rock armour size, pile design, pontoon and/or jetty.
- Option 2 requires the requisition of detailed bathymetric survey data for the Clump Point Boat Ramp site. This data is currently available for the Clump Point Jetty site.
- Options 2 and 3 both require a geotechnical investigation prior to the detailed design stage to determine the stability of the bed to support the load from the breakwaters, the amount of settlement, and parameters for the design of piles for the pontoon/jetty.
- Options 2 and 3 both require consultation with the community, especially in relation to potential impacts on the visual amenity of Boat Bay.

Given the nature of the proposed infrastructure options for the project, the project approvals will be complex and involved and the time frames required to secure them will consequently be lengthy.

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Appendices

Appendix A – List of Workshop Participants

- Paul O'Keeffe - Project Director, Mission Beach Safe Harbour Project - Principal Coastal Engineer, GHD.
- Dr Bruce Harper – Principal Professional Environment and Risk, GHD.
- Dr Cathie Page – Senior Marine Ecologist, GHD.
- Corrina Boon – Community Planning and Social Impact Consultant, GHD.
- Rachel Reese - Manager, Major Projects, Environmental Assessment and Management - Great Barrier Reef Marine Park Authority (teleconference from Townsville).
- Stephen Day - Project Manager, Clump Point and Dunk Island Jetties Reinstatements - Consultant Civil Engineer (teleconference from Cairns).
- Brian Thompson – Senior Advisor, Program Development and Operations, State Program Office, Department of Transport and Main Roads.
- Ian McFarland - Director, Major Projects Office, Department of State Development, Infrastructure and Planning (DSDIP).
- Andrew Browne - Principal Project Officer, Major Projects Office, DSDIP.
- Blair Harper - Senior Project Officer, Major Projects Office, DSDIP.

Appendix B – Approvals Register (Initial)

Approval & Act	Rationale	Responsible agency	Comments
Referral and potential assessment as a controlled action *Environment Protection and Biodiversity Conversation Act 1999*	Development within and/or adjacent to the Great Barrier Reef World Heritage Area.	DSEWPaC	✓
Marine Parks Permit *Great Barrier Reef Marine Park Act 1975*	Development within the Great Barrier Reef Marine Park.	GBRMPA	✓
Material Change of Use *Sustainable Planning Act 2009*	If existing use of property is changed or intensified.	Local Government	✓
Reconfiguring of a Lot *Sustainable Planning Act 2009*	If a new easement(s) or change of property boundary is likely to be required.	Cassowary Coast Regional Council	Potentially applies.
Operational Works *Coastal Protection and Management Act 1995*	For the conduct of tidal works being the dredging and disposal of material.	DEHP	✓ Applies to capital dredging works only, not maintenance dredging.
Operational Works *Coastal Protection and Management Act 1995*	For the conduct of tidal works being construction structures below High Water Mark.	DEHP	✓
Vegetation Clearing Permit *Vegetation Management Act 1999*	Where remnant vegetation is disturbed by the construction and operation of the infrastructure.	DEHP	Most likely required.
Vegetation Clearing Permit *Vegetation Management Act 1999*	Clearing of least concern vegetation on freehold land.	DEHP	
Permit for taking or interfering with a protected plant or animal *Nature Conservation Act 1992*	Where the Project interferes or requires the removal of a protected plant or animal. Potentially applies if protected plants are identified during clearing.	DEHP	Must be investigated. Only applies for any areas above High Water Mark.
Marine Plant Permit *Fisheries Act 1994*	Permit required to remove marine plants and to perform works or related activity in a declared fish habitat area. Relevant to the removal of seagrass during capital dredging and reclamation. Interference (e.g. trim, remove, destroy or damage) with marine plants (e.g. mangroves, salt water couch etc.) requires approval.	DEHP	✓ Capital dredging works and reclamation and clearing for construction.

Appendix C – Acronym List and Glossary

Acronym/Term	Description
berthing	In the context of this report, refers to the action of bringing a vessel into a wharf/jetty/pontoon for the purpose of loading/unloading passengers, crew and/or cargo (compare with description of “mooring”)
BPP	Benthic Primary Producers- photosynthesising benthic flora and fauna including corals and seagrass.
Breakwater	A structure (typically a rubble mound rock construction) to provide protection of an area of water from the full impact of waves.
C4	Community for Coastal and Cassowary Conservation
CCSBA	Cassowary Coast Safe Boating Association
DEHP	Department of Environment and Heritage Protection
DSDIP	Department of State Development, Infrastructure and Planning
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
Greenfield	A previously undeveloped site for commercial development or exploitation.
ha	hectares
m	metres
mooring	In the context of this report, refers to the action of locating a vessel in a fixed position by tying up to a wharf/jetty/pontoon/mooring buoy for an indeterminate time (compare with description of “berthing”).
NDRRA	Natural Disaster Relief and Recovery Arrangements
Wave barrier	A structure (either a rock breakwater or fixed wave screen) to provide protection from the full impact of waves.

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