



Clump Point Boating Facilities Upgrade

Development Plan

The Department of State Development

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1 Introduction

1.1 Project background

The Queensland Government, through the Department of State Development (DSD), has responded to community requests to enhance maritime infrastructure within Boat Bay, Mission Beach, to improve boating safety and amenity. The objective of the Mission Beach Safe Boating Infrastructure Project ('the Project') is to provide conditions which allow the safe transfer of passengers and goods in non-extreme wave conditions.

Existing facilities within Boat Bay include the Perry Harvey jetty at Narragon Beach (owned and maintained by the Cassowary Coast Regional Council (CCRC)) and the Clump Point boat ramp (owned and maintained by the Department of Transport and Main Roads (TMR)). Current supporting infrastructure at the Clump Point boat ramp includes a rock breakwater, floating walkway and car and boat trailer parking facilities.

Historically, the jetty has operated as the principal transport link to the Great Barrier Reef and offshore islands (Dunk and Bedarra Islands) and has supported tourism in the region since its initial construction in the early 1900's. However, the jetty has no wave protection, and safe access to the jetty is significantly restricted during periods of adverse wave conditions.

The Clump Point boat ramp has been used for both commercial and recreational boat access since it was constructed as it offers better wave protection during rougher weather. It has become the preferred access point for both recreational and commercial vessels. There is however only a limited area of protected water adjacent to the ramp. During periods of peak demand, over-utilisation of the boat ramp has led to vessel congestion within the navigational channel, and traffic congestion on land where vehicles compete for limited parking and manoeuvring space. Boats are moored in Boat Bay, protected somewhat by the boat ramp breakwater and Clump Point, but the protection is limited in some weather conditions.

DSD has previously proposed improvements to the boat ramp facilities at Clump Point and an overtopping breakwater to provide calmer conditions at the Perry Harvey jetty under some weather conditions. DSD undertook extensive consultation about the proposal starting in 2011 but it was not broadly supported by the community.

Many stakeholders raised concerns about the limited wave protection to the Perry Harvey jetty that would be provided by the suggested overtopping breakwater. They strongly suggested that a better outcome could be achieved if the Project focused on the delivery of infrastructure at Clump Point, including the key aspects of the improvements to boat launching facilities in the previous proposal.

Many boat operators were concerned about using the jetty during rough weather due to potential damage (especially those with fiberglass, thinner aluminium or wooden hulled boats) and the safety of transferring passengers. Concerns were also raised about the available water depths at the jetty, especially during rougher conditions. It was suggested an extended breakwater at Clump Point could provide safer berthing and mooring conditions, and be a more efficient use of the available project funds.

In response to the concerns raised from their members about the suitability of the jetty, the Mission Beach Boating Association proposed a design they considered could provide the outcomes they sought within the available Project budget.

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A community information session was held on 18 May 2016 to discuss the Project with a range of groups and individuals representing commercial and recreational boating, community and environmental stakeholders. The high-level Project objectives summarised at the meeting were:

- (1) provision of safe boating infrastructure
- (2) facilitation of local economic development
- (3) reduce conflict arising from joint commercial and recreational use
- (4) respect the rich natural environment and cultural heritage of Mission Beach.

DSD confirmed that, in response to the community feedback, the Project would refocus on delivering the improved safer boating facilities at Clump Point. It was agreed however that the Project will not seek to provide a safe haven in cyclonic or major storm events. Work on the boat ramp improvements was postponed until an integrated design was completed for the Clump Point safe boating infrastructure.

1.2 Land tenure and use

The Project is proposed to occur mainly at and adjacent to Clump Point boat ramp, located within Lot 550 on NR7351. Lot 550 is designated as State reserve for 'Boat Harbour' purposes, and is administered by CCRC. The following land parcels may also be affected:

- Lot 540 on NR7350 – state reserve for 'Scenic and Recreation' purposes, administered by CCRC
- Clump Point Road – road reserve, administered by CCRC
- Alexander Road – road reserve, administered by TMR
- Porter Promenade – road reserve, administered by TMR.

The existing configuration of the breakwater, boat ramp and finger pontoon were originally approved through a s86 sanction under the *Harbours Act 1955* (Qld), issued in 1999. The boat ramp and a shorter breakwater were in place prior to this point. The boat ramp and breakwater are presently owned by TMR while the floating walkway and car and trailer parking facilities are owned by CCRC.

1.3 Stakeholders

1.3.1 Reference Group

After the May 2016 community information session, DSD invited key boating, community and conservation groups from Mission Beach to join a Reference Group to provide community input on issues, concerns and values during the preparation of a Development Plan for the Project. The intention by DSD was to bring key groups from Mission Beach together to discuss their views on the Project, to debate any areas of disagreement, to identify areas of agreement and to document the key outcomes of the discussions. Advice from the Reference Group was provided during many meetings in Mission Beach, and documented in an Advice Statement signed by all the involved organisations – attached in Appendix 1 and Appendix 2. The member organisations in the Reference Group are:

- Community for Cassowary and Coastal Conservation (C4)
- Mission Beach Cassowaries Inc (MBC)
- Mission Beach Community Association (MBCA)
- Mission Beach Boating Association (MBBA)
- Cassowary Coast Safe Boating Association (CCSBA)
- Cassowary Coast Regional Council (CCRC)
- Department of Transport and Main Roads (TMR)
- Department of State Development (DSD).

The delegate from the MBC indicated they were representing the Cassowary Coast Alliance part way through the Reference Group process. DSD was provided with details of the membership and governance arrangements for the CCA, which is an alliance of several groups, many of whom are not from Mission Beach and represent much broader environmental interests. One of the member organisations are already represented on the Reference Group and did not want CCA to speak on their behalf.

DSD has indicated they wish to continue to work initially with the local Mission Beach stakeholders while developing the Project. Once the proposed form of the Project has been decided the wider community will have an opportunity to comment on the proposal as part of the Great Barrier Reef Marine Park Authority's (GBRMPA) assessment of the permit application to allow construction to proceed. As such, DSD declined to have the CCA involved in the Reference Group process, but invited MBC to continue to be a member organisation.

1.3.2 Native title and cultural heritage

Clump Point is a significant cultural heritage location for the Djiru people (the local Aboriginal group), and the location of a number of recognised cultural heritage features. A native title claim by the Djiru people was recognised by the Federal Court of Australia in 2011 over the Project area. The Project area is also under the Djiru Cassowary Coast Regional Council Area Indigenous Land Use Agreement (ILUA) entered into with the Cassowary Coast Regional Council in 2010. The Djiru people's consent will be required for the proposed works. DSD consulted with the Djiru People throughout the preparation of the Development Plan, and received valuable advice and feedback on emerging information from ongoing studies and design options. The Djiru People were invited to join the Reference Group but preferred to be consulted separately to provide advice and ultimately consent.

1.3.3 Local, state and federal government stakeholders

The CCRC participated in the Reference Group, and separate detailed discussions also considered ultimate ownership of the land based works and operation of the marine works.

DSD worked closely with TMR throughout the Development Plan preparation. TMR will be the owners of any marine works on behalf of the State of Queensland and are the owners of the existing boat ramps and breakwater.

GBRMPA officers were kept informed and consulted with throughout the process to ensure they were aware of the process and potential project, and that their requirements are addressed.

1.4 Development Plan process

1.4.1 Initial discussions

The Development Plan was created after consultation with the Reference Group and the Djiru people. The first stage of these discussions needed to be supported by marine and terrestrial information on what limitations may be required on the location and scale of any works due to environmental factors. The Reference Group identified several key areas for which further information was required, and reviews of existing information and a number of new surveys were undertaken. The Reference Group members also provided information about a number of issues including the likely size of vessels that should be considered and the desirable facilities to be included in any design, and inspected Clump Point together with the terrestrial vegetation survey team. The information was progressively shared with the Reference Group as it became available.

Table 1-1 Design vessels identified

Vessel name	Type	Length (m)	Beam (m)	Draught (m)	Passengers	Use/Design
<i>Commercial</i>						
<i>Reef Goddess</i>	Monohull	20	5.8	1.75	48-70 +5	Dive & snorkel
<i>Island Spirit</i>	Tri-hull	10.05	3.07	1.5	24	Water taxi
<i>Bigmama</i>	Monohull	18	5.8	2.7	12	Sailing ketch
<i>Island Voyager</i>	Catamaran	12	3.3	1.2	16	Dunk Island ferry
<i>Spiegel</i>	Catamaran	11.4	6.7	1.1	8-12	Sailing
<i>Betty Lou</i>	Monohull	9.1	3	1.5	-	Fishing
<i>Quickcat</i>	Catamaran	24	9.5	2.91	152+	Tourist ferry
<i>Reef Magic II</i>	Catamaran	28.05	11.2	2.7	150+	Tourist ferry
<i>Safety and Barge</i>						
<i>Mary Little (Tully Coast Guard)</i>	Monohull	8.2	2.5	1	8	Coast guard
<i>Jarrah T</i>	Barge	24.48	8.85	2.1	12 +2	Island supply
<i>Recreational</i>						
Game fishing monohull #1	Monohull	12-15	4.5-5	1.9	Various	Recreational
Game fishing monohull #2	Monohull	9-12	2.8-4	1.7	Various	Recreational
Powered catamaran	Catamaran	10-11	5	1.2	Various	Recreational
Sailing catamaran	Catamaran	10-15	6-8	1.2	Various	Recreational
Sailing monohull	Monohull	8-12	2.8-3.8	2.1	Various	Recreational
Centre console monohull	Monohull	8.7-10	2.7-3.1	1.6	Various	Recreational
Walk around cabin monohull	Monohull	8.7-10	2.7-3.1	1.6	Various	Recreational

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1.4.2 Key Studies

The key studies undertaken during that early period are briefly described below. More information is included in the later sections of this Development Plan that examine potential impacts and mitigations and in the separate study reports.

Hydrographic survey

Key activities undertaken included:

- detailed bathymetry for Boat Bay
- identification of bommies and rock outcrops within Boat Bay more than 0.3m above the surrounding seabed
- backscatter imagery to identify transitions between hard and soft substrate features across Boat Bay.

See Appendix 5 for details of the bathymetry study for Boat Bay.

Marine ecology survey and assessment

Key activities undertaken included:

- mapping of key benthic habitats within and adjacent to the Project area
- characteristics of soft marine sediments within the study area
- identification of coral and seagrass habitat within and adjacent to the Project area
- potential marine megafauna species that may utilize visit habitats within and adjacent to the Project area.

Details of this investigation can be found in *Clump Point Boat Ramp: Marine Ecology, Water Quality & Sediment Sampling Report*, BMTWBM (2016a)

Wave, current and marine sediment size survey

Key activities undertaken included:

- collection of data on metocean (wave and current) conditions to inform Project design and marine numerical modelling
- collection of a number of samples and analysis of sediment particle sizes within the Project area to support sediment transport modelling.

Details of this investigation can be found in *Technical Note – Clump Point Boat Ramp Development Plan Sediment Sampling & Analysis*, BMTWBM (2016b)

Terrestrial vegetation survey

Key activities undertaken included:

- vegetation and habitat mapping in areas that may be impacted by the Project, including vegetation condition
- identification and quantification of significant vegetation features including threatened ecological communities, endangered/of concern regional ecosystems, and threatened flora species
- descriptions of terrestrial fauna habitat types and significant habitat features.

Details of this investigation can be found in *Clump Point Development Plan – Terrestrial Ecology Assessment*, BMTWBM (2016c).

1.4.3 Consideration of layouts

The Reference Group considered a range of potential Project layouts including:

- a design option proposed by MBBA
- earlier designs developed by Aurecon
- a design previously proposed by CCSBA
- a number of alternative approaches developed by TMR in response to Reference Group feedback.

These designs all focussed on a breakwater generally extending beyond the existing breakwater at the boat ramp and included a range of berthing and mooring options.

All the designs responded to advice from GBRMPA that any significant change to the Great Barrier Reef Marine Park boundary would require approval from both Commonwealth houses of parliament and hence would be difficult to achieve in a realistic timeframe, if at all. This issue can be addressed by developing any breakwater as a feature within the marine park that is not continuous with the mainland. That is, a detached breakwater separated by a short gap from the existing breakwater.

Once all the information had been assembled in a draft Development Plan, supported by the more detailed study reports as appendices, the Reference Group members reviewed the information and provided their views in an initial Advice statement. The draft Development Plan included three design options to prompt discussion including the MBBA proposed option and two TMR developed options.

1.5 Development Plan design options

1.5.1 General

All three designs proposed a new breakwater generally extending seaward from the existing boat ramp breakwater. All three designs also included a gap between the existing breakwater and the proposed new breakwater to address the Great Barrier Reef Marine Park boundary issue, and to reduce any risk of sediment build-up and the need to avoid dredging.

1.5.2 MBBA proposed option

The MBBA proposed option was designed and costed by Mager Construction Pty Ltd. The proposed design included:

- a new 200m offshore breakwater connected to the existing breakwater by a 20m bridge
- a 3.5m wide concrete road on top of the breakwaters and the bridge, with a vehicle turnaround near the end of the new outer breakwater
- a 20m commercial pontoon with a gangway connected to the existing breakwater, connected by a 3.5m wide road and vehicle turning circle
- commercial trailer and island barge ramp at the commercial pontoon
- 41m recreational pontoon and piles adjacent to the existing boat ramp
- two 30m long commercial pontoons with gangways perpendicular to the new outer breakwater
- power, water and refuelling facilities together with coast guard facilities.

1.5.3 TMR options

TMR provided two options that were informed by the extensive Reference Group discussions and feedback (the MBBA proposal was developed before the Reference Group process).

The TMR options both considered the safety of people using a breakwater for access, the height of the breakwater and the resulting visual impacts, and the size and capacity of development most likely to be successfully approved by GBRMPA. In addition, TMR was mindful of both the ongoing maintenance costs and reconstruction after cyclones.

The two TMR options differed in that the first provided access on top of a new breakwater, while the second provided access via a jetty structure on the landward side of a new detached breakwater.

The advantages of this second TMR option meant that the breakwater would not be generally accessed by people avoiding the risks posed by occasional over-topping waves. A non-accessible breakwater would also allow the breakwater to be of reduced height and hence base width, total rock volume, cost, and visual impact.

This arrangement is dependent on being able to drive piles for a jetty into the sea floor and a geotechnical study was required to confirm acceptable conditions. That information was not available prior to the first Reference Group Advice Statement, but has since been confirmed.

The two TMR options also addressed informal feedback received from GBRMPA about acceptable vessel capacity for the Project, ongoing maintenance costs and reconstruction after cyclones.

Both TMR options at that time included a 120m long breakwater structure, but noted that the final length and design would be based on ecological and regulatory constraints, agreed desirable vessel capacity, pontoon arrangements, outcomes of numerical modelling, and budget constraints.

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The first TMR option assumed access would be via a jetty landward of a detached breakwater with a 5m wide crest, a 1:2 front seaward batter, a 1:1.5 landward back batter, and a height about 2m above the Highest Astronomical Tide (HAT) – which is about 4m above Australian Height Date (AHD), which is close to mean sea level.

The second TMR option assumed access would be along the top of a detached breakwater connected to the existing breakwater via a bridge. The breakwater would have about an 8m wide crest supporting a 3.5m wide road, and the breakwater would be not only wider but significantly higher with the landward crest a similar height to the first option at about 2m above HAT and 4m above AHD while the seaward crest would be up to 5.5m above AHD for road and pedestrian protection.

Both TMR options included:

- five pen berths landward of the proposed breakwater
- a disabled access compliant pontoon landing facility about 50m long, with half for a public landing area and half for a commercial landing area. The pontoon would be removable or sinkable to protect it during a cyclone
- access to the pontoon from a jetty connected either to the existing breakwater or from the road access on the new breakwater and connecting bridge, depending on the option selected
- removal of part of the existing breakwater return to improve ramp access, remove the need to relocate coral bommies and to facilitate self-flushing of silt near the boat ramp
- raising of the existing breakwater with a single land access road constructed to the head for pedestrian and emergency access
- raising of the lower (northern) carpark to avoid flooding during high spring tides, and widening to provide suitable turning circle access to the boat ramp
- widening of the existing boat ramp to three lanes and inclusion of a buffer structure between the eastern side of the ramp and the breakwater
- potential upgrades to the carparks including minor extension of the lower (northern) carpark southward and expansion of the upper (southern) carpark eastward (to the extent of available road reserve)
- provision of informal pull-off bays along Clump Point Road
- development of a composting toilet block at the southern carpark
- mini bus drop-off areas at the upper (southern) carpark
- pedestrian access from the upper (southern) carpark to the boat ramp.

1.5.4 Commercial barge ramp

The MBBA proposed option included a commercial barge ramp. The Reference Group had extensive discussions about this and many other aspects of the proposed development, and invited a number of individuals to attend Reference Group meetings to provide advice on the features to be included and the boating needs for Mission Beach. The Reference Group came to agree on many features including the removal of a commercial boat ramp from the Project, but the boat ramp upgrade could be designed as a heavy duty commercial ramp for occasional access by small-to-medium sized barges at higher tides and for the launching and recovery of larger commercial vessels. The exact operational requirements of the ramp, floating walkways, breakwater, moorings, berths, pontoons, and jetty were still to be developed further, subject to geotechnical investigations, detailed design and cost estimates.

1.6 Initial Reference Group Advice Statement

1.6.1 Preparation

The preparation of the initial Advice Statement was undertaken by initially assembling the views of each Reference Group member organisation. After discussing with each group their initial written views, a draft Advice statement was assembled. The group then collectively reviewed and revised the projected draft together before the agreed final Advice statement was signed by the representative of each member organisation. The final part of that process took a full day and evening due to the extensive discussions and changes that progressively led to a draft everyone could support.

The signed Initial Reference Group Advice Statement is attached in Appendix 1. A summary of the areas agreement and disagreement is set out below, but the full attached copy should be read for a detailed understanding of the position at that time of each of the member groups. The previous notes about Mission Beach Cassowaries Inc. stating they were representing the Cassowary Coast Alliance should be noted – the comments in the Advice statement attributed to CCA were made by the MBC representative.

1.6.2 Summary of the initial Reference Group Advice Statement

The Project will deliver boating facilities at Clump Point, and will not provide safe haven in cyclonic, tsunami or major storm conditions.

Indigenous heritage

The Aboriginal heritage values of Clump Point are recognised and must be protected. The Djiru people need to be consulted, and native title issues will require discussion about all development works including car parking.

Vegetation

Remnant native vegetation on Clump Point is protected by legislation. Revegetation, rehabilitation and the removal of weed species is desirable in all areas directly impacted by the Project, and in other areas on Clump Point where agreement can be reached for any required offsets. Retention of the wilderness character and the diversity of the rainforest species makes this area special. The rainforest atmosphere, especially the canopy, should be retained to the fullest extent possible, including along Clump Point Road.

Access road

Clump Point is a special place and an essential part of the special character of Mission Beach. The low key, heavily vegetated, canopied entrance needs to be protected as does the surrounding remnant vegetation, and the contained Cassowary habitat. The access road should be generally maintained at the current width but informal pull-over areas could be provided using currently non-vegetated existing areas. No parking should be allowed in those sections, and notification signs of passing areas ahead should be provided. The pull-over areas need to contain vehicles with attached boat trailers. Suitable non-vegetated areas are already available but some trimming of lower branches may be needed. The full length of road should be sealed with shoulders and pull-off areas hardened.

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Parking

Parking at Clump Point should be limited and a parking management plan prepared. The approved parking arrangements in the withdrawn DSD tender are generally considered to be the limit of what could be provided on Clump Point. Part of the demand for longer term and overflow parking and any required coast guard storage shed could be provided nearby but not out on Clump Point, and CCRC would be prepared to review possible locations if future demand requires it. The parking area adjacent to the ramps should be raised to reduce wave overtopping effects, the drain to the ramps removed, details revised to allow runoff to adjacent vegetation and infiltration where practical, and native shade trees planted to enhance views in the vegetation strip and adjacent to the upper (southern) carpark. Parking arrangements should be reviewed to ensure adequate turning circle for vehicles near the boat ramps, a mini-bus set down area should be available. Passengers for commercial operations should park away from Clump Point. The parking area adjacent to the existing boat ramps should be extended, particularly the turning area and derigging area, and some parallel parking could be provided from the boat ramp area up towards the existing large carpark on the western side of the road. The upper (southern) carpark boundary is the extent of the council reserve, and any extension would require negotiation with the Djiru people.

Pedestrian access

Safe pedestrian access from the upper (southern) carpark to the boat ramps is required, and the removal of the stormwater drain to the boat ramp shown in the withdrawn tender plans, provides an opportunity for informal parking or pedestrian access. Pedestrian safe access arrangements along Clump Point Road especially from the carparks should be reviewed in detailed design.

Water supply

A mains water supply to Clump Point would need to be in a trench along the road to avoid impacts on surrounding vegetation, and could be used for boat re-supply, boat wash down, firefighting, drinking water bubblers, and within any toilet block. The installation of a water supply is liable to be costly, and there would be a lot of disruption during construction. The provision of a water main should be included in the Project and reviewed in detailed design. MBBA, MBCA and CCSBA consider that a reticulated water supply is essential at Clump Point, while C4 and CCA do not.

Toilet facilities

A toilet block should be located as shown on the plans for the withdrawn Stage 1 tender. A composting toilet is acceptable to most groups if it will provide an acceptable level of amenity, and the final type of toilet should be considered during detailed design informed by costings. If power and water is to be installed the provision of sewerage should be investigated in detailed design. MBCA preferred the provision of sewerage, while CCSBA consider it essential. C4 and CCA consider sewerage is not necessary. CCRC is not opposed to taking ownership of a sewerage system delivered by the Project, but is satisfied that a composting toilet can fulfil the requirements of a toilet facility for a boat ramp and commercial landing.

Electric power

Electric power is highly desirable for lighting to ensure safe access in the dark, to ensure any marine infrastructure is not a navigation hazard, and for public safety. The use of solar and generator backup could be considered, and the provision of electric power using the same trench as the water main should be considered in detailed design, and is seen as an essential service to support commercial operations. C4 and CCA support solar with generator back-up. It was noted that navigation aids are all solar powered.

Booking office, kiosk and store rooms

A booking office, and other commercial activities such as a kiosk or store rooms are not essential, and funds should be preserved for other essential features. MBCA suggested land should be set aside in case they are needed in the future. C4 and CCA think they are not required.

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Safe boat ramps

There is a need for launching facilities at a number of locations in the Mission Beach area, and safe retrieval areas when the weather changes during the day. Enhanced protection at Clump Point would provide a much safer facility under rough conditions. Safe access should be provided to and especially from the water for recreational boating users. Safe recreational access must be incorporated in the larger project and not limited to the \$500k from boating registration fees. The boat ramps should be upgraded with the layout generally consistent with the withdrawn tender plans, but reviewed to ensure protection next to the rock wall and with provision for pontoon or floating walkway access next to each boat ramp lane. The existing breakwater return should be removed to provide a more direct access path and to potentially avoid the need to relocate the coral bommies. The safe navigation channel should be marked, as should the outer end of the new breakwater.

Moorings and berths

There needs to be a balance between capacity and environmental protection. The future demand for berths for larger boats will not be able to be met. An acceptable number of berths should be provided for commercial operators whose operations will have a beneficial impact on the local economy. Short term loading and unloading access should be provided for recreational and commercial users from a public pontoon. The development should not be a 'marina' catering for a large number of boats. Safe haven (but not in a cyclone, tsunami or storm wave conditions) for commercial operators may come from a mixture of permanent berths, swing moorings or pens. It is recommended that commercial access will need to be bid for at regular intervals, possibly with some method of considering the benefits provided by an operator to the local economy. Commercial operators, including fishing, need access for offloading and berthing or mooring. While some commercial operators may want permanent berth access, many could work with loading and unloading access combined with a safe mooring or pen. A margin is needed for under keel clearance of up to 0.3m to 0.7m in normal sea-states (low wave heights). The number of moorings, pontoon berths and pens proposed by each group are set out below. The Reference Group agreed that the total berths, pens and moorings should not exceed 11, although some members suggested this should be discussed with GBRMPA.

Table 1-2: Reference Group Advice Statement - recommended berthing and mooring space

	MBBA	MBCA	CCSBA	C4	CCA	TMR
Recreation user short stay moorings	2 or 3	3	2	2 or 3	6	3
Commercial user multi-year lease mooring	2 or 3	4	3	2 or 3	5	3
Recreational user loading pontoon boat spaces*	2	2	1	2?	2	2
Commercial user loading pontoon boat spaces*	4	2	4	2?	2	2
Pontoon berths – commercial lease	0	4	0	0	0	0
Pen berths – commercial lease	6	0	6	5?	0	5

Introduction

Boat clearway

On-water access space is needed to allow ramp, berth and mooring movements without conflicts. A new breakwater will create a safer area for all boats to wait for access to ramps or landings, and this area needs to be kept clear of permanent moorings and anchored boats.

Commercial ramp

Medium sized commercial barges could occasionally use the boat ramps at higher tides if approach angles were improved by either removing coral bommies or removing part of the return of the existing breakwater. Barge ramp use would require a greater thickness of concrete than what is currently in place on the two existing boat ramp lanes, which could be included in a new third ramp lane. MBBA accepts that the commercial boat ramp shown on their proposal will not proceed. C4 think no separate ramp for barge or commercial operations should be provided but very occasional barge use could be considered of a suitably constructed third boat ramp lane. CCA wants no commercial barge access. CCRC noted barge use at this facility is problematic in that it needs to coexist with recreational users.

Fuel supply

Safe fuel delivery is essential, and fuel supply can occur at the Perry Harvey jetty during calm weather. CCRC has issues with authorising and managing a fuel installation. They would prefer to licence one or more fuelling tanker operators, who would be required to sign off on strict protocols. MBBA and MBCA do not support fuelling at the jetty, and prefer a fixed fuel line at Clump Point. CCSBA have serious concerns about pedestrian safety if fuel trucks back down the jetty. C4 recommends no fixed fuel lines, with all fuel delivery through removable hoses controlled by fuel delivery contractor. CCA strongly disagree with any fuel supply at Clump Point. CCRC and TMR do not want to manage refuelling facilities, and CCRC would prefer to licence one or more fuelling tanker operators, who would be required to sign off on strict protocols.

Breakwater

The Reference Group agreed that barging rock needs to be looked at in terms of cost and local impact. Tidal ducts within the breakwater should be further investigated. The method of breakwater construction will be decided during detailed design, with barging supported even if it is acceptably more expensive compared to delivery through Clump Point by truck. The breakwater construction approach should be selected during detailed design, depending on cost and impacts. The concept of a lower breakwater protecting an adjacent jetty access has merit and is worth comparing with access via a breakwater.

2 Proposed project

2.1 Project considerations

The Reference Group agreed that further studies were required to determine if piling could be carried out at an acceptable cost, if the proposed breakwater would result in acceptable sediment deposition in the sheltered land ward area so maintenance dredging could be avoided, and the optimal gap to be provided between the proposed new breakwater and the existing breakwater at the boat ramps to allow sediment flushing to occur while providing acceptable wave protect landward of the new breakwater.

DSD committed to working with TMR to develop a Project design that considered the finding of these further investigations and the previous studies, and the advice provided by the Reference Group. DSD also committed to include the design in a revised Development Plan to be provided to the Reference Group for a further Advice Statement before making a final decision on how to proceed with the Project.

The Reference Group advice had generally focussed on the provision 5 or 6 commercial pens berths but with some opposition to any commercial berths by one of the environmental groups, and recreational and commercial pontoon loading and unloading facilities. DSD reflected on the advice from the Reference Group and developed the following policy position.

DSD supports the provision of limited commercial activities within the Project with the following specific aims and reasons:

- the provision of safe reliable public access to the Great Barrier Reef Marine Park – unless a member of the public owns or has access to a boat the only other option to dive, sight see or stay in the GBRMP is through a commercial operator
- public access to the GBRMP will build public awareness and support for this global asset
- many visitors coming to Mission Beach will want a unique experience visiting the GBRMP directly from tropical rainforest with its own unique values
- limited commercial providers can provide this public access, and would be carefully managed to ensure the other Project objectives are achieved
- those commercial operations will have strong and desirable economic benefits to the local economy, both through direct income and through increasing visitors to Mission Beach throughout the year
- support for a limited number of local commercial fishing enterprises will increase opportunities to ensure they are undertaking sustainable practices, and support the local economy through employment and the supply of local fish
- safety for commercial operators is a concern for the whole community, including families and rescue services.

DSD supports an appropriately sized limited development that is consistent with the Project objectives, but would not support any proposals for further expansion of the marine infrastructure facilities. DSD and TMR then agreed on the approach to several other issues. It was agreed that there should be some form of separation between commercial and recreational loading and unloading facilities to prevent conflicts, and the commercial access pontoon should have *Disability Discrimination Act 1992* (DDA) compliant access. It was also agreed that the commercial pontoon should be located in deeper water to provide for a wider range of vessel access, and any pontoons should be able to be removed or temporarily sunk to protect them during cyclonic conditions.

2.2 Project investigations

DSD and TMR then explored different design options. Further investigations as agreed with the Reference Group were also undertaken during this design refinement, as set out below.

- Geotechnical investigations
 - identification of any potential geotechnical risks to the Project
 - characterisation of subsurface conditions to inform design
 - geotechnical data required to further design.
- Marine modelling studies.
- Hydrodynamic and Sediment Transport Modelling to assess the effect of:
 - different lengths for the proposed breakwater on the leeward wave conditions, and changes to sediment transport and deposition
 - different gap widths between the proposed breakwater and the existing breakwater at the ramp, but with the existing return on the breakwater removed.

The preferred approach was to provide access via a jetty protected by a breakwater that was generally not accessible by the public. This approach would avoid the risks from occasional waves that overtop the breakwater to property and people. A non-accessible breakwater would also allow the breakwater to be lower in the water with reduced height and hence base width, total rock volume, cost, and visual impacts.

The geotechnical investigations demonstrated that marine conditions are suitable for piling without the need for any rock drilling. Initial estimates confirmed there would be significantly lower costs for a lower non-accessible breakwater with access provided via a jetty and this arrangement is now the approach preferred and proposed by DSD in conjunction with TMR.

Modelling was undertaken of the proposed breakwater with gap widths (breakwater crest to crest) of 20m, 30m and 45m. The outcome of the gap modelling showed that the 20m and 30m gap options provided virtually the same wave protection and siltation trends. Both these options provided suitable wave climate protection and very small siltation rates in the order of 80cu.m per year, suggesting both these options would meet the protect objectives and would not require maintenance dredging over the design life. The 45m gap allowed a lot more wave energy through the gap, creating less than optimal wave protection and caused significant morphological changes and increased siltation trends (although siltation trends were still relatively low).

There is some potential for a 20m gap to dry completely during extreme low tides, so a gap of approximately 25m (crest to crest) will be included and will create a mid-gap lower level of approximately -2m AHD which is 0.2m below LAT. Such a level ensures that the gap remains submerged during all tidal conditions and is at the level of coral bommie features in the area which should encourage further habitat development.

Breakwater construction will require access from the land. Temporary access during construction will maintain the Marine Park boundary and allow the ocean to flow through the gap. This will be achieved using one or more concrete culverts or a temporary bridge (based on the experience and equipment available to the contractor).

2.3 Proposed design

As shown below, the key features of the proposed design include separate commercial and recreational access pontoons, 5 or 6 pen berths, and a non-accessible breakwater. A list of standards used in the development of the proposed design is contained in Appendix 4.

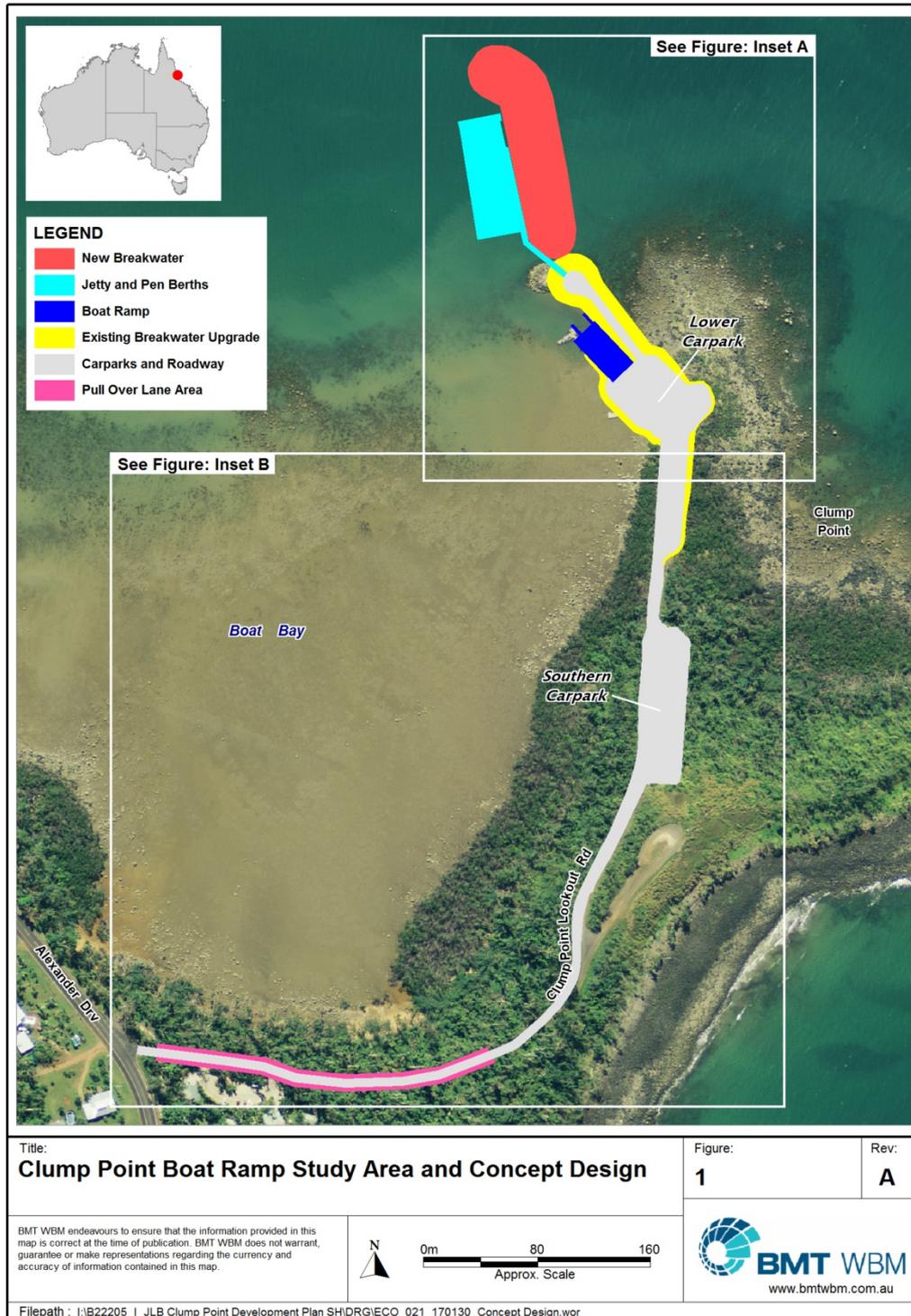


Figure 2-1: Proposed concept design

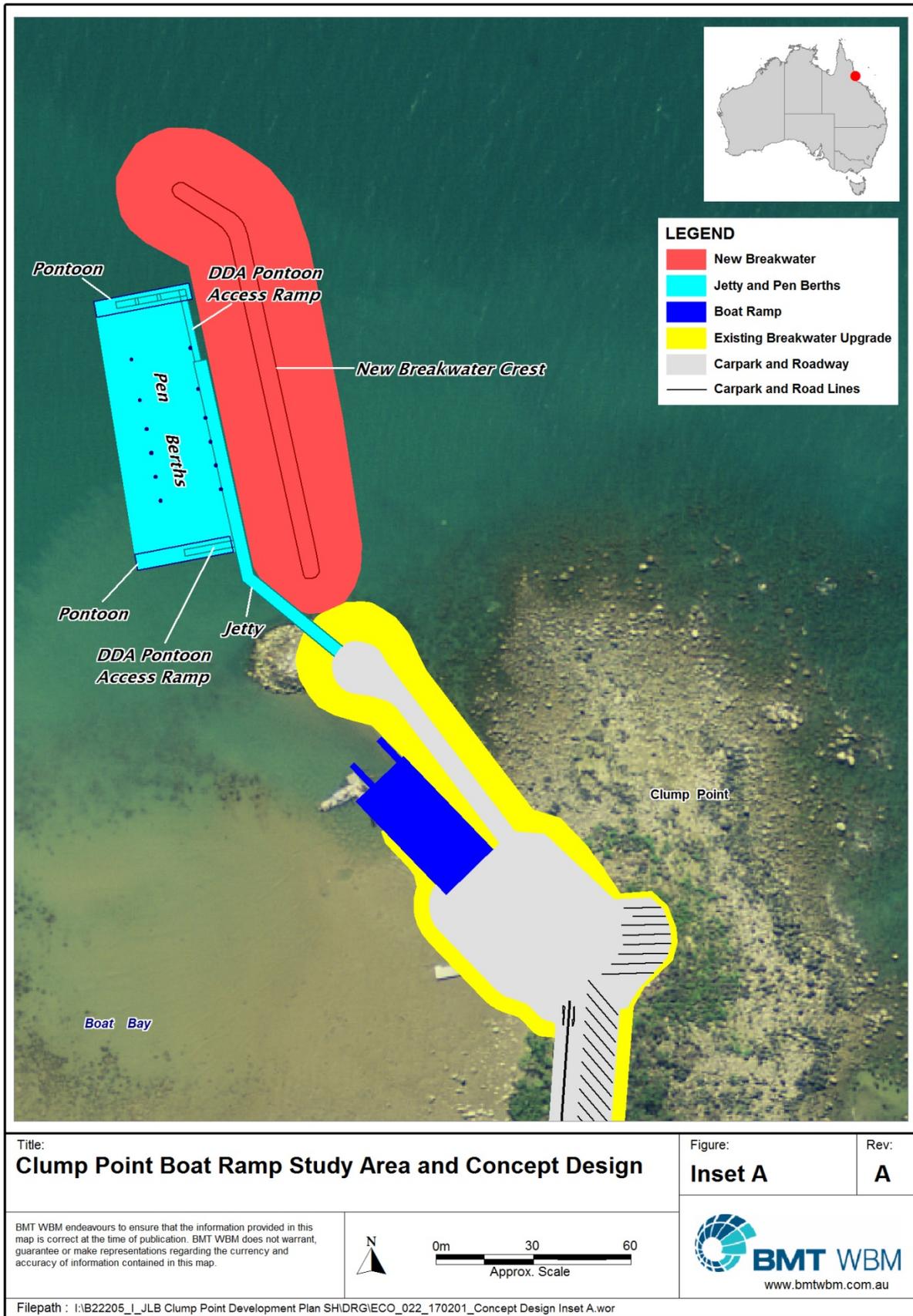


Figure 2-2: Proposed concept design (inset A)

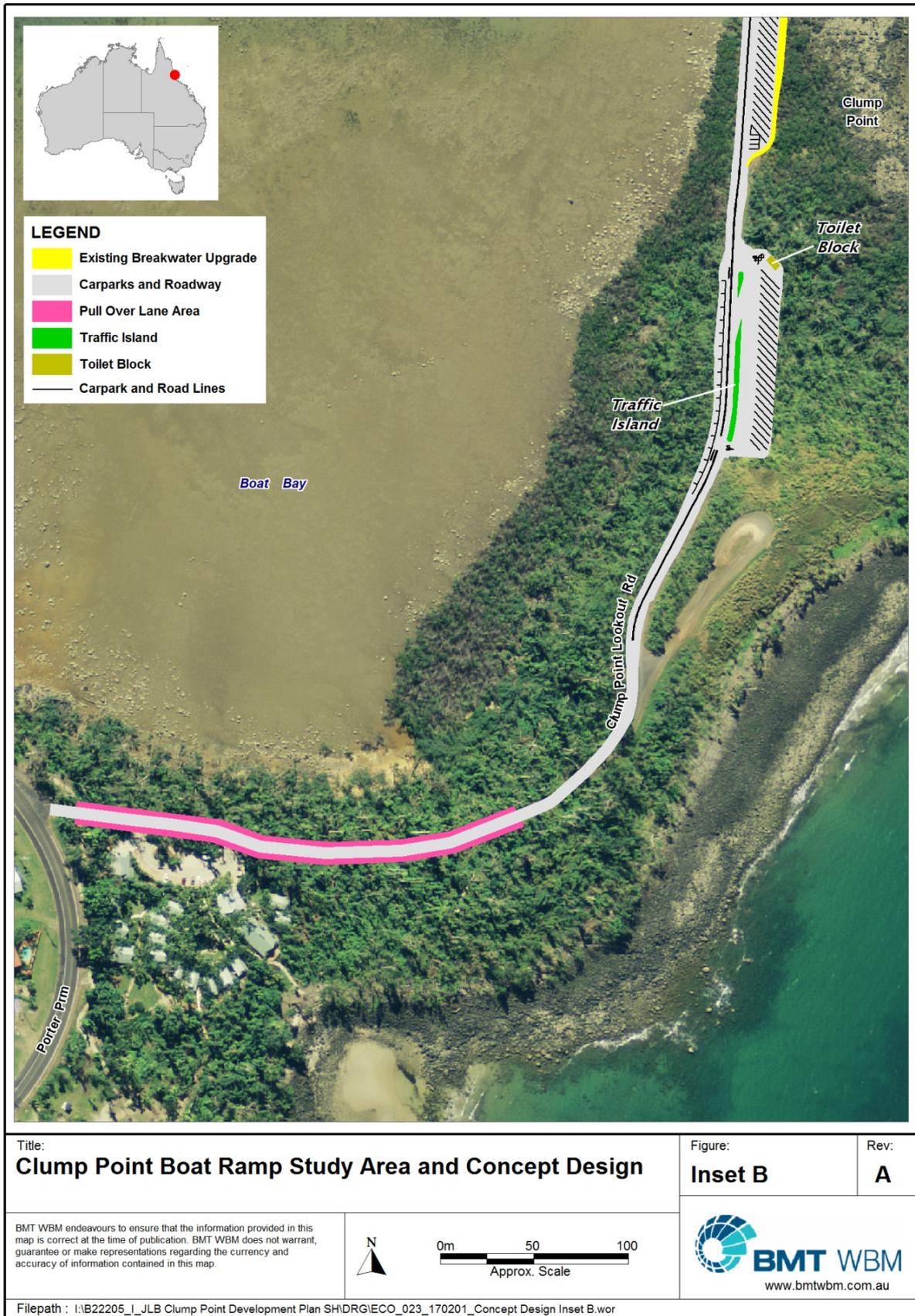


Figure 2-3: Proposed concept design (inset B)

2.4 Proposed design elements

The proposed extent of development for Clump Point based on consultation and site constraints is as follows:

New detached breakwater

A detached breakwater makes up the primary marine element of the development proposal to provide suitable protection to the proposed berthing and mooring facilities. The structure will not provide safe passenger access or vessel mooring protection during extreme storms or cyclone events. Preliminary design calculations and hydrographic modelling indicate that this structure will need to be approximately 140m in length and have a crest height of approximately 2m above Highest Astronomical Tide (HAT) in order to provide protection from the typical wave conditions outlined in Aurecon (2014b). Final dimensions will need to be confirmed during detailed design.

It is important to note that several elements must be considered during detailed design to determine the final design crest height, including:

- the provision of adequate protection for all conditions where marine operations are expected to occur
- the provision of adequate protection for moored vessels up to a design storm condition (i.e. the point where evacuation of the structure will be required)
- the sustaining of minimum damage under the design cyclone event.

Physical modelling will be required to assess the most efficient design to meet these three criteria.

Modelling was undertaken (BMTWBM 2017) of the proposed breakwater with gap widths (breakwater crest to crest) of 20m, 30m and 45m from the existing breakwater. The outcome of the gap modelling showed that the 20m and 30m gap options provided virtually the same wave protection and siltation trends. Both these options provided suitable wave climate protection and very small siltation rates in the lee of the structure, in the order of 80cu.m per year, indicating both these options would meet the Project objectives and would not require maintenance dredging over the design life of the facility. The 45m gap allowed a lot more wave energy through the gap, creating less than optimal wave protection and caused significant morphological changes and increased siltation trends (although siltation trends were still relatively low).

The primary outcome of the modelling is that the GBRMP boundary will be maintained through a 20m (crest to crest) gap however there is some potential for a 20m gap to dry completely during extreme low tides, so a gap of approximately 25m (crest to crest) is proposed and will create a mid-gap lower level of approximately -2m AHD which is 0.2m below LAT. Such a level ensures that the gap remains submerged during all tidal conditions and is at the level of coral bommie features in the area which should encourage further habitat development. However the final gap width will be subject to GBRMPA advice.

The scale and location of the new breakwater avoids direct impacts on identified coral communities, however some coral communities exist nearby and protection strategies will be implemented to avoid impact to these high value areas as part of the Environmental Management Plan (EMP) for the works.

The breakwater construction presents the highest cost risk to this Project, given the need to source relatively large volumes of good quality rock and significant volumes of larger armour rock. These materials may need to come from multiple quarries at different travelling distances from Clump Point which will impact significantly on the final cost.

An independent estimate comparing barge and truck-based breakwater construction methods indicates that barge-based construction will be about 163% of equivalent truck-based construction methods. On this basis it is likely barge based construction will be cost prohibitive. For this reason the Project proposal will progress under the assumption that temporary land access will be required for the breakwater construction works. Despite this advice TMR has no reason to exclude barge-based construction during the tender process and will consider any proposal on its merits.

Proposed project

Temporary access during construction will maintain the marine park boundary and allow tidal flows through the gap. This will be achieved using one or more temporary concrete culverts or a temporary bridge (based on the experience and equipment available to the successful contractor).

Tidal ducts in the breakwater design were considered and based on the field investigations and modelling outcomes, insufficient tidal flows exist in the Clump Point area for tidal ducts to be effective. In addition modelled siltation rates behind the proposed breakwater were very low which eliminated the need for additional features to clear siltation.

Upgraded breakwater

The existing breakwater is to be raised to approximately 2m above HAT (subject to detailed design), widened east to provide a single-lane 4m road and turning area to provide the required pedestrian and authorised vehicle access to the outer marine infrastructure. The upgraded design is to include the removal of the existing breakwater return to improve the navigational access to the boat ramp facilities. Modelling outcomes (BMTWBM 2017) show that the construction of the new breakwater and removal of the existing breakwater return reduce existing siltation trends at the boat ramp. Also, by removing the breakwater return, a suitable clear navigational access may be provided without the need to remove identified coral bommies.

Upgraded lower carpark

In accordance with reference group input and further investigations it is proposed to raise the lower carpark by approximately 0.5m to a level of approximately 2.5m above AHD to avoid high spring tide inundation with an allowance for sea level rise. In addition TMR has undertaken preliminary turning circle analysis of the lower carpark and on this basis it is proposed to expand the lower carpark east as indicated in figure 2-2 to provide sufficient area for the new facility to be operationally functional. The western carpark footprint will remain to the extent of the previously approved carpark expansion and hence will not encroach on the fish trap.

Upgraded boat launching facility

The upgraded boat launching facility will include a three-lane boat ramp with two floating walkways to provide access to vessels on all three boat ramps. The upgrade will also include an inner breakwater treatment to bind the armour and protect the new floating walkway against the breakwater. Subject to funding, the additional boat ramp lane is proposed to be 6m wide and designed as a heavy-duty ramp. This will allow infrequent small/medium barge access and larger commercial vessel launching.

Jetty structure

The jetty structure is, at a minimum, to provide pedestrian and goods trolley access to pontoons and pen berths, and must be designed to resist the design cyclonic wave forces (in accordance with the breakwater design outcomes). Subject to funding, the jetty will be designed to provide vehicle access. The jetty structure will be approximately 110m long and 3 to 5m wide.

DDA berthing pontoon – sinking

The proposal is to include a 30m x 5m custom-built berthing pontoon, which can facilitate berthing on either of two long faces, or end berthing by a power catamaran. This pontoon is to be placed at the outer end of the breakwater to provide the maximum water depth for berthing. This pontoon is to include a Disability Discrimination Act (DDA) compliant access gangway to provide optimum/compliant access for commercial and recreational users. The structure is to be designed to be sunk behind the breakwater prior to a cyclone or large storm wave event to protect it from damage during such events.

Pen berths

The proposal includes 5 or 6 pen berths located between the pontoon structures for commercial lease. The current configuration in figure 2-4 includes 5 berths, 1 to fit a large catamaran approximate beam of 11m, 1 for a 8m beam vessel and 3 for vessels of 6m beam.

Second berthing pontoon – sinking

The proposal includes a second custom built pontoon 30m x 5m with a direct gangway-access closer to the existing breakwater. This pontoon will provide better separation between uses, and provide a suitable number of berths for visiting recreational uses and commercial use during peak periods. As with the DDA berthing pontoon the structure will be designed to be sunk.

Southern carpark upgrade

The upgrade to the upper (southern) carpark is generally in accordance with the design which gained environmental approvals in 2016. The minor exceptions to this are the following: The drainage is to be re-designed to be surface drainage where possible to adjacent vegetated areas. The nature strip landscaping is to include some large canopy trees. Consideration is to be given to the inclusion of a mini-bus drop off area.

Composting toilet

Costings to date indicate that sewerage connection to Clump Point is cost prohibitive and given a sewerred toilet exists a very short drive away, this cost cannot be justified given the limited budget available. For this reason the proposal is to install a composting toilet in accordance with the design which gained environmental approvals in 2016.

Solar navigational lighting

Solar navigational lighting will be provided in accordance with the Regional Harbour Master's advice

Solar public access lighting

Solar public access lighting will be provided at the carpark, jetty, pontoons and breakwaters in accordance with Australian Standards and advice from the Regional Harbour Master. Lighting will be designed to minimise impacts to marine fauna.

Proposed project

Access road improvements

It was identified that while the access road had visual character and significant environmental value, there was a need to improve the access via formalisation of pull-over bays and signage, which has been included in the scope of works. See the pink-shaded area shown in figure 2-3

Reticulated water supply

Interviews with commercial operators and some recreational users indicated that access to mains freshwater was essential for the facility. In addition to this, early advice on the sinking pontoon design is that the use of freshwater would significantly reduce the construction costs and subsequent maintenance costs. On this basis, reticulated water supply is considered essential if funding permits.

Design consideration of non-fixed fuelling at Clump Point

The detailed design for the Project will consider the practicalities of refuelling vessels at Clump Point from the proposed infrastructure. However, fixed fuelling infrastructure will not be included in the scope and commercial fuel suppliers will be responsible for gaining the required permits if they wish to refuel vessels at the new facility.

Moorings behind structure

A small number of seagrass-friendly screw moorings (known commercially as environmentally friendly moorings – EFM's) are to be installed in the lee of the new marine infrastructure with the final number being subject to detailed design (protected area available). It is intended that there may be 6 in total with likely 4 being permanently leased to commercial operators and 2 being casual occupation (on-line booking) and intended mainly for larger visiting recreational vessels.

Mains power to marine infrastructure

The installation of mains power will be considered in detailed design. However, given the very high cost of installation and the fact the majority of commercial vessels have on board generators, this service is not considered essential but is desirable should funding permit.

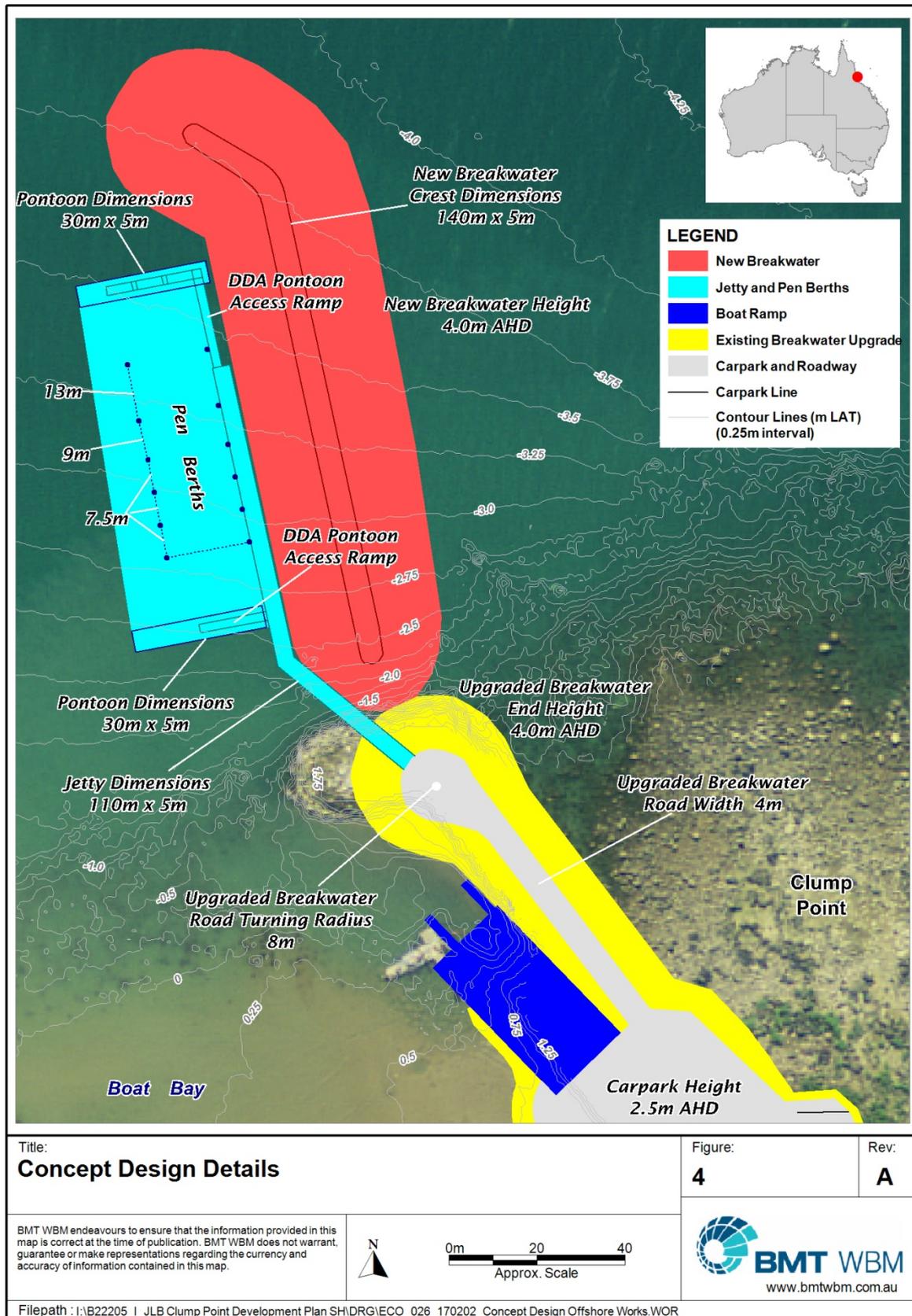


Figure 2-4: Proposed preliminary marine elements

Proposed project

2.5 Rating of proposed elements

Table 2-1 below outlines the rating of proposed elements, with items either being essential, highly desirable or desirable to the Project.

Elements will be ultimately included in the construction of the Project depending on what can be included in the Project budget.

Table 2-1: Development proposal elements

No.	Element Name	Description	Rating
1	Detached breakwater	New breakwater to provide protection to new marine infrastructure from non-cyclone wave conditions. Preliminary design calculations indicate a structure of approximately 140m in length and a crest height of approximately 4m AHD is required. However final dimensions will be subject to detailed design outcomes.	Essential
2	Access jetty - pedestrian and trolley access	Access Jetty 3 to 5m wide and approximately 110m in length, providing access to pontoons and pen berths (will require design to resist design cyclone and storm waves, and at minimum rated to carry supply trolleys to service passenger luggage and resupply of vessels).	Essential
3	DDA-access sinkable pontoon	A sinkable pontoon 30m x 5m providing two alongside berthing faces, This structure will have an access ramp structure (gangway) in accordance with TMR's previous Disability Access facilities. This pontoon will be designed to be sunk behind the breakwater on approach of a cyclone and hence protect it from significant cyclone or storm wave damage.	Essential
4	Existing breakwater upgrade	Remove the existing breakwater return, raise the existing breakwater to finish at approximately 4m above AHD and widen it slightly east to provide a single-lane 4m road access and 16m turning area where the jetty structure starts. Removal of the return will provide a wider boat ramp access clear of navigational hazards and intended to avoid having to remove existing high conservation value bommies that currently impact on navigation.	Essential
5	Lower (northern) carpark raising 0.5m	Raise the lower (northern) carpark to 2.5m AHD (0.56m above HAT) to avoid non-cyclone inundation and provide suitable freeboard against sea level rise.	Essential
6	Lower (northern) carpark expansion	Expand the lower carpark eastward to provide sufficient turning radii for effective use of all three ramp lanes and provide the space required for the breakwater access. No changes are proposed to the reclamation west (already approved). Final layout will be subject to detailed design.	Essential

Proposed project

No.	Element Name	Description	Rating
7	Boat ramp upgrade	Upgrade to include third heavy-duty boat ramp 6m wide outside existing floating walkway, installation of new floating walkway against the breakwater, breakwater treatment of inside face to bind armour to stop rocks being transported onto new floating walkway and ramp, install a navigation mark on bommies marking western extent of channel, removal of existing floating walkway head once remaining Project complete.	Essential
8	Upper (southern) carpark upgrade (as per stage 1)	Upper (southern) carpark upgrade as per previously approved scope – to extent of available road reserve – with consideration of the following additional elements – minibus set-down to be considered near new toilet, larger canopy trees to be considered for incorporation in traffic islands, carpark drainage redesign to be surface drainage, pedestrian access from this carpark to the lower carpark facility to be considered in design (formal or informal), landscaping to be consistent with surrounding habitat.	Essential
9	Composting toilet at southern carpark	Same scope as previously approved	Essential
10	Solar navigational lighting	Navigational lighting as required by the Regional Harbour Master	Essential
11	Solar carpark, breakwater, jetty, and pontoon lighting	Lighting required for public access and in accordance with Regional Harbour Masters requirements, lighting design to minimise impact on marine fauna	Essential
12	Access road improvement via signage and pull-over lanes	Install signage (at each end of canopied section) and formalise vehicle with car-trailer-sized pull-over bays in non-vegetated areas, to improve access for CTU's and cars while maintaining remnant rainforest and cassowary habitat.	Essential
13	Reticulated water supply to the new facility	Provide water supply to the new facility from the existing supply; required for commercial vessel resupply, required for pontoon sinking system and convenient for recreational boating users.	Highly desirable
14	Facility design allows for fuelling from the head of the upgrade breakwater	The detailed design is to consider feasibility of fuelling via a fuel truck/vehicle to stop at the breakwater head and refuel vessels via its own pipe system under its own approvals (no fixed infrastructure planned)	Highly desirable
15	Commercial pen berths behind new breakwater	Pen berths and ladder access from the jetty, pen berth configuration allowing 5 to 6 pen berths, current configuration is one large catamaran berth for a vessel up to 11m beam, 1 berth for an up to 8m beam vessel and 3 for vessels up to 6m beam.	Highly desirable
16	Second sinkable pontoon	A second sinkable pontoon 30m x 5m providing two berthing faces, will facilitate separation between users	Highly desirable

Proposed project

No.	Element Name	Description	Rating
17	Access jetty - vehicle access	Design the jetty for vehicle access	Highly desirable
18	Install screw moorings behind breakwater	Install seagrass-friendly screw moorings in accordance with space available and Harbour Masters advice, likely 5 or 6	Highly desirable
19	Mains power to marine infrastructure	Provide mains power to the marine infrastructure - lights and pen berths	Desirable
20	New pedestrian track from existing toilet and parking area to Clump Point	Investigate options to improve pedestrian access to Clump Point given significant limitations on parking	Desirable
21	Formalisation of a wash-down area at existing toilet site outside Clump Point on Porter Promenade	Investigate alternative wash-down options given insufficient space is available at Clump Point	Desirable

2.6 Operational management plan

Operational management arrangements are not finalised at the time of drafting this development plan.

Table 2-2 below outlines the likely arrangements for the upgraded infrastructure. Primary elements of importance are:

- Given the constraints of the Clump Point site, particularly associated with the finite availability of parking, it is important to minimise non-essential vehicle access to the site. Given this, the commercial use of the facility will be conditional on customers being transferred from outside Clump Point.
- The facility will not provide a vessel haven during cyclone or severe storm events. It is to be designed to provide protection during non-cyclone non-storm-wave conditions. The facility is designed to be shut down during cyclones and northerly storms to minimise damage.

Table 2-2: Draft operational framework

Ref No.	Item	Likely operational arrangement
1	Ownership of marine infrastructure	TMR will own all marine infrastructure (subject to item 2)
2	Management of marine infrastructure	<i>To be inserted after discussions with CCRC are completed</i>
3	Ownership and management of land-based infrastructure	<i>To be inserted after discussions with CCRC are completed</i>
4	Lease arrangements for pen berths and moorings	Lease bidding process to be defined based on contribution to Mission Beach economy. <i>Management of the leases to be inserted after discussions with CCRC are completed</i>
		Longer term leases are considered to be appropriate for the pen berths and 3-4 moorings with 2 casual moorings for visiting vessels
5	Vessel fuelling	Detailed design will consider feasible options for vessel refuelling at Clump Point directly from truck, however permanent fuelling infrastructure will not be included. As is currently the case, commercial operators will need to consider their most feasible alternatives and ensure appropriate approvals for fuel suppliers are in place.
6	Use of the pontoon berthing facilities	Commercial operators will require a permit to use the pontoon berths. Permit conditions will require that their customers are bused in from a location outside Clump Point to ensure only essential vehicle usage occurs of the limited available parking at the site.
		The intent is that at least 1 berth is available for public use at all times - e.g. have one berth face which has a 1 hour berthing limit for recreational use

Proposed project

Ref No.	Item	Likely operational arrangement
7	Cyclone management procedures	<p>The facility will not provide a vessel haven during cyclone or severe storm wave events. For this reason vessels must evacuate prior to the approach of a cyclone or northerly severe storm. Conditions requiring evacuation will be defined during detailed design.</p> <p>The sinking process for the pontoons will be automated as much as possible in the design however it will need to be instigated from the jetty to ensure the pontoons are clear of vessels. A protocol and responsible party for this process (CCRC, TMR, a contractor or a lessee) should be finalised by during detailed design.</p>

2.7 Proposed delivery strategy

To maximise value gained by the Project budget, TMR’s proposed delivery strategy is as follows:

- submit environmental approvals based on existing preliminary design
- tender for and undertake detailed design works for the breakwater, boat ramp and carpark works
- complete environmental approval process
- tender for and undertake construction.

3 Marine environment

3.1 Coastal environment and geomorphology

Clump Point is a coastal promontory comprised of Cainozoic basalts. Clump Point forms a shallow, north-facing coastal embayment known as Boat Bay. Due to its shallow depths and the plentiful supply of fine terrigenous sediments from rivers in the wider region, wind and tidal currents regularly result in re-suspension of sediments and high turbidity within Boat Bay and adjacent coastal waters. These features and processes exert a significant influence on the water quality (see Section 3.2) and biodiversity values of the study area (see Section 3.3).

Clump Point and Boat Bay are part of the 'Kurramine to Cowley Beach Coastal Sector' described by Holmes and Jones (1993). While there is a general trend of sand movement south to north along the coast, sand is not known to pass around Clump Point (BMT WBM 2016 – see Figure 3-1:). As a result, there is no active source of sand supply to the study area. Holmes and Jones (1993) identified Liverpool Creek as the major source of sand for the Kurramine to Cowley Beach coastal sector, with an estimated annual average supply rate of 25,000m³ per year. This supply is supplemented by sediment from Maria Creek which is located approximately 6km to the north of Clump Point.

Seabed sediment grab sampling within Boat Bay and associated particle size distribution (PSD) analysis was undertaken during July 2016 and is detailed in report *Clump Point Boat Ramp: Marine Ecology, Water Quality & Sediment Sampling Report, BMT WBM (2016a)*. The majority of samples were silty-sand material, with in excess of 70% sand size fraction (0.06–2.00 mm). The proportion of silt/clay fines was generally less than 30%, except for two samples adjacent to the existing Clump Point boat ramp breakwater, which had fines proportions exceeding 55%.

A state government storm tide monitoring station has been operating at Clump Point since 1976. Tidal planes for Clump Point (MSQ, 2012) are summarised in Table 3-1.

Table 3-1: Clump Point Tidal Planes (MSQ, 2012)

Tidal Planes	Water Levels (m AHD)
Highest Astronomical Tide (HAT)	1.94
Mean High Water Springs (MHWS)	1.04
Mean High Water Neaps (MHWN)	0.33
Mean Sea Level (MSL)	0.05
Australian Height Datum (AHD)	0.00
Mean Low Water Neaps (MLWN)	-0.19
Mean Low Water Springs (MLWS)	-0.89
Lowest Astronomical Tide (LAT)	-1.68

Marine environment

Current measurements from a metocean data collection campaign described in the report *Technical Note, Clump Point Boat Ramp Development Plan, Metocean Data Collection, BMT WBM (2016d)* indicate prevailing current speeds in the vicinity of Clump Point are typically in the range of 0.0–0.3 m/s. In open lagoon waters flood tide currents flow towards the south and ebb tide currents towards the north. Current speeds and directions are influenced by tidal range and stage as well as by the local wind conditions. The highest current speeds occur in spring tide periods and also during strong onshore wind conditions.

The prevailing winds at Clump Point are south-easterly trade winds, strongest in May to October, with generally lighter variable winds for the remainder of the year, and occasional high wind events associated with low pressure systems and tropical cyclones.

Wave data was collected during a 14 day instrument deployed during July 2016 to the north east of Clump Point, in approximately 6 m depth *Technical Note, Clump Point Boat Ramp Development Plan, Metocean Data Collection, BMT WBM (2016d)*. The deployment period included periods of south-easterly winds with speeds exceeding 30 km/h, as measured at the Lucinda AWS. Under these conditions, significant wave heights exceeding 0.9 m were measured.

Clump Point provides a moderate level of protection to Boat Bay from the prevailing south-easterly winds and waves (Aurecon, 2014a). However, there is little natural protection from waves generated by north-easterly or northerly winds. The 1 year Average Recurrence Interval (ARI) significant wave height at the Perry Harvey jetty is 1.3m (in the absence of cyclonic conditions) while the median significant wave height (50th percentile) is 0.21m (Aurecon, 2014b).

The entire foreshore within the study area is within the erosion prone area, as mapped under the *Coastal Protection and Management Act 1994*. This includes the area 40m from highest astronomical tide (HAT) and the area likely to be inundated by a sea level rise of 0.8m by 2100. In addition, the foreshore is within the future climate storm tide inundation area, based on a 1% Annual Exceedance Probability (AEP) storm event in the year 2100.

Modelling undertaken by BMT WBM as part of the CCRC Coastal Hazard Assessments (BMTWBM, 2015) indicates a current climate 1% AEP (equivalent to the 100 year ARI) design water level of 2.7 m AHD at Clump Point (not including the influence of waves). The design water level statistics derived by BMT WBM considered the influence of both non-cyclonic and cyclonic events. Overtopping of the carpark at the Clump Point boat ramp already occurs during storm events as most of this area is just above HAT.

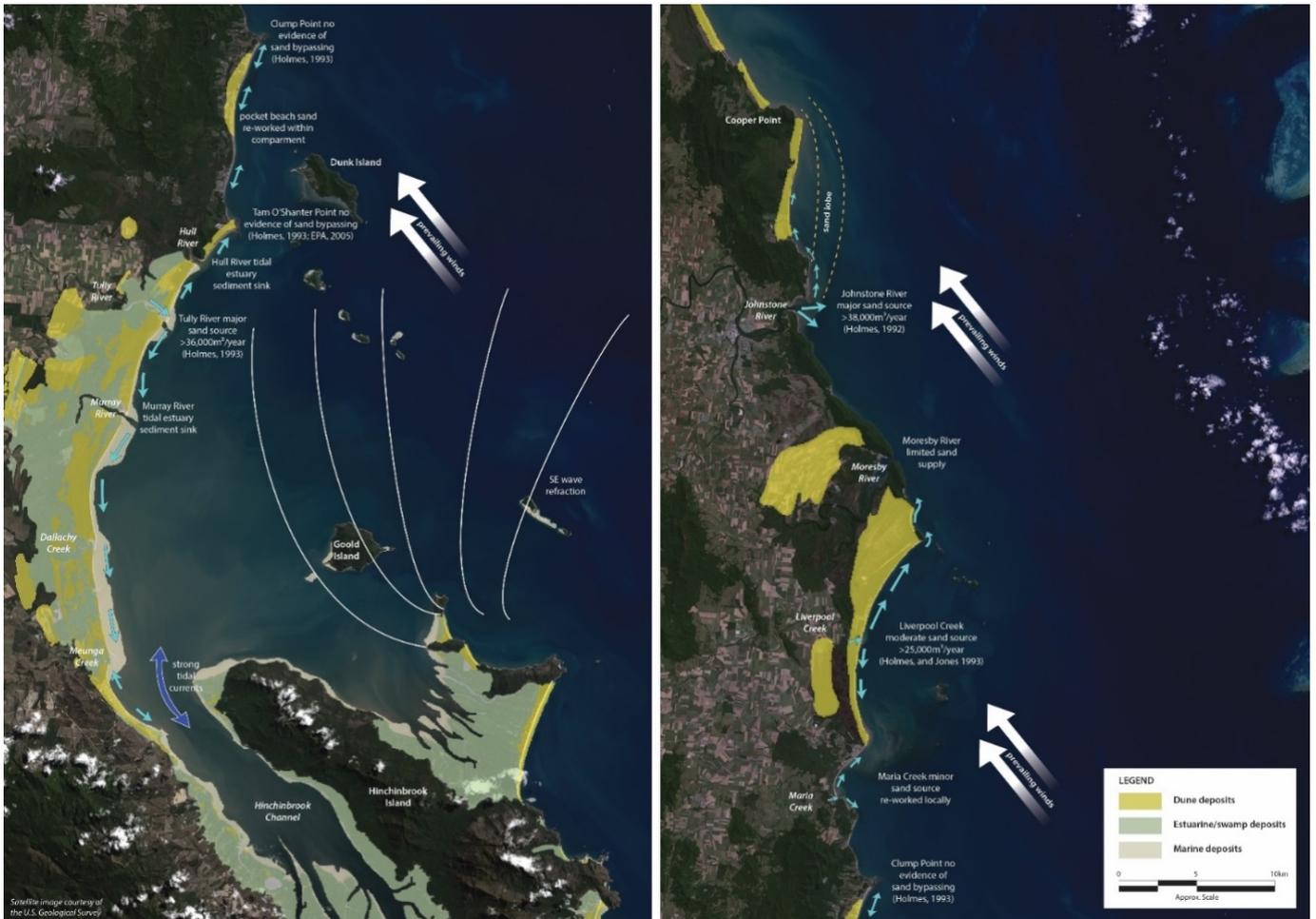


Figure 3-1: Conceptual model of sand movements at study area (and surrounds)

The Project works would have localised impacts on waves, currents and sediment transport processes in the vicinity of the proposed new breakwater. The design selected considered the following factors:

- wave climate in mooring and berthing zones
- wave impacts due to both sheltering and reflection
- impacts on currents and flushing behind breakwater
- potential for siltation behind breakwater
- construction phase impacts
- operational vessel wake and propeller wash impacts.

The modelling investigation was commissioned to compare breakwater development options specifically looking at performance with respect to assessing the following:

- leeward wave protection provided by specific options for operational wave conditions
- likely siltation trends associated with specific options
- different breakwater gap widths and how these influence coastal processes.

Marine environment

The development options modelled included a 70m breakwater, 120m breakwater and a 200m breakwater, and investigated breakwater GAP widths of 20m, 30m and 45m. The detailed modelling report can be found in *Clump Point Boat Ramp Development Plan – Coastal Process Modelling Study, BMTWBM (2017)*. In summary the significant outcomes were:

- as expected the area of wave protection was proportional to the length of the breakwater (i.e. the longer the breakwater the more protected area was provided). See Figure 3-2 below for a sample of the wave protection provided by the 120m breakwater. The figure on the right shows the area of improved leeward protection.
- the siltation predicted behind the structure was very low for all options investigated (see
-
- Table 3-2), to the extent that no maintenance dredging should be required over the design life of the facility. There could however be a need for maintenance works following a severe tropical cyclone event. Figure 3-3 shows the siltation trends in mm per year for the 120m development breakwater case
- the removal of the existing breakwater return with a 20m or 30m gap between the breakwaters is expected to reduce the current siltation trends at the recreational boat ramp. This is shown by the blue area in the far right pane of Figure 3-3
- the breakwater gap investigation found that all gap widths investigated would be self-flushing and hence maintain the Great Barrier Reef Marine Park between the structures without maintenance
- the gap investigation found that the 45m gap allowed significant wave energy through which reduced the leeward protection area and caused significant morphological changes to the existing conditions including scouring and siltation. On this basis the breakwater gap is recommended to be a maximum of 30m
- the modelling indicated that minor changes to breakwater orientation should be considered during detailed design to improve design outcomes.

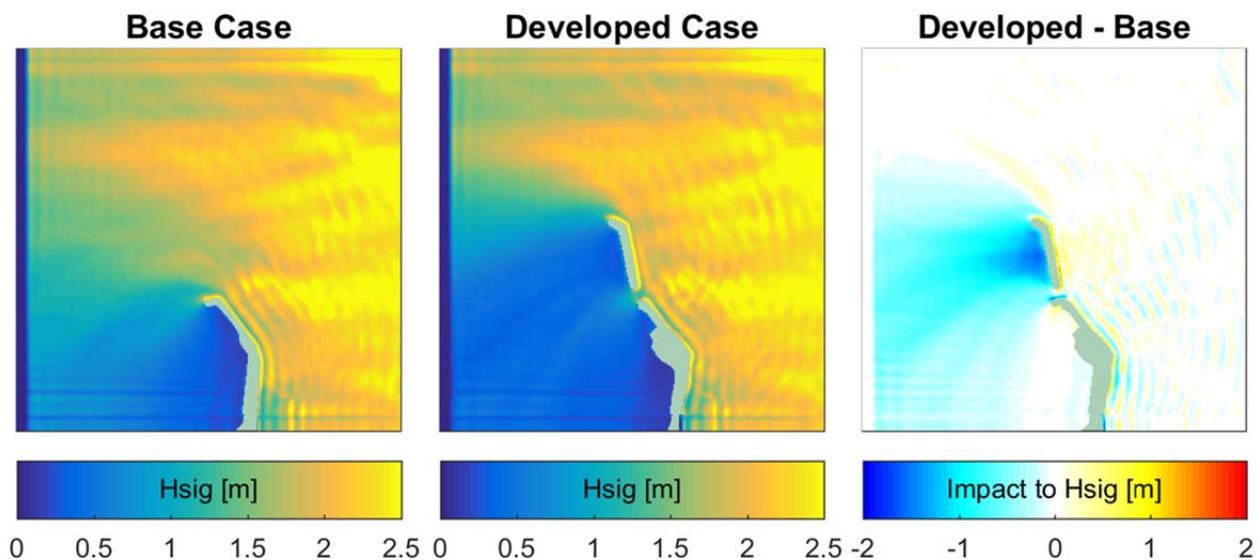
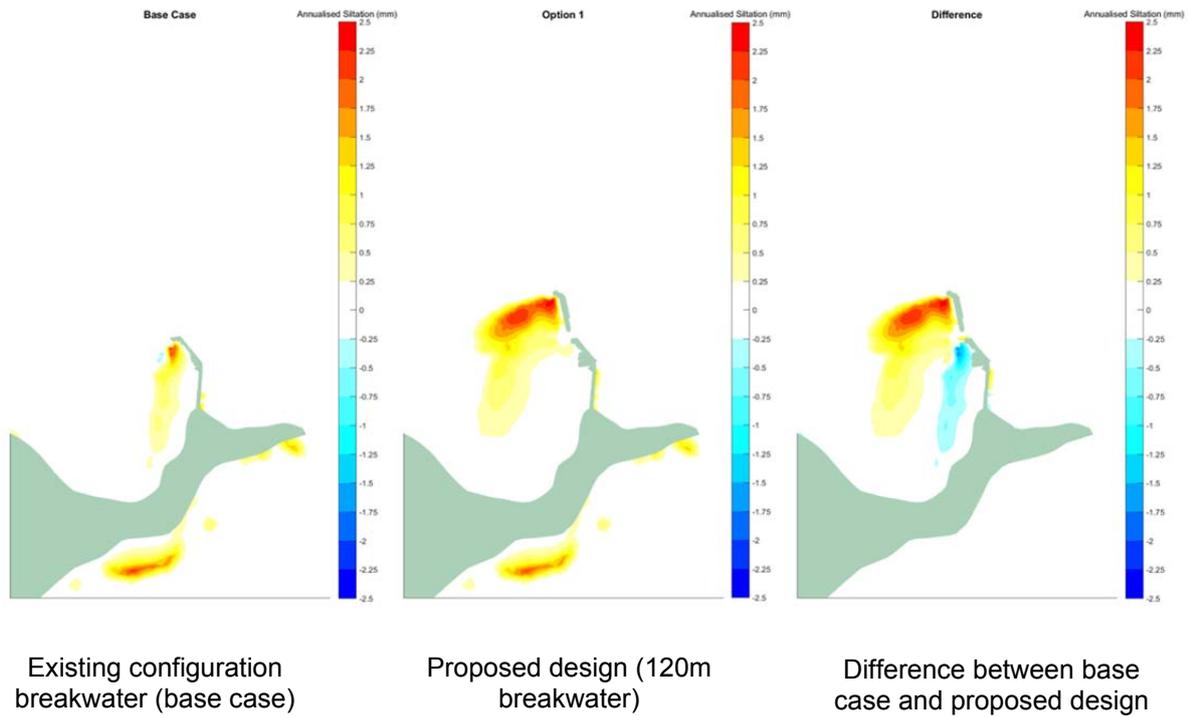


Figure 3-2: Modelled wave conditions in lee of the 120m developed breakwater case



Existing configuration breakwater (base case)

Proposed design (120m breakwater)

Difference between base case and proposed design

Figure 3-3: Siltation Trends modelling

Table 3-2: Annual Siltation Volumes calculated for all configurations modelled

Modelled Siltation Volumes Scenario	Total Siltation (m ³ /y)
Existing (base)	26
Option 1 (30m gap)	80
Option 2	84
Option 1 (20m gap)	78
Option 1 (45m gap)	173
Option 1 (70m breakwater)	58

3.2 Marine water quality

The waters of the study area are within the Tully River basin. Environmental values (EVs) and water quality objectives (WQOs) have been scheduled for this area under the *Environmental Protection (Water) Policy 2009* water quality guidelines. Specifically, the waters of the area are mapped as:

- Boat Bay – enclosed coastal waters/lower estuary
- waters east of Clump Point and north of Boat Bay – open coastal waters.

Environmental Values (EVs) for these waters include aquatic ecosystems, human consumption, primary, secondary and visual recreation, and cultural and spiritual values. WQOs for aquatic ecosystem EVs include the parameters listed in Table 3-3 below.

Table 3-3: WQOs for study area aquatic ecosystem EVs

Parameter	WQOs for Boat Bay*	WQOs for open coastal waters*
Dissolved oxygen	85-105% saturation	95-100-105% saturation
pH	6.5-7.3-8.4	8.1-8.3-8.4
Ammonia nitrogen	<15 µg/L	1-3-7 µg/L
Oxidised nitrogen	nd	0-0-1 µg/L
Particulate nitrogen	nd	≤20 µg/L
Organic nitrogen	135 µg/L	nd
Total nitrogen	160 µg/L	76-105-140 µg/L
Filterable reactive phosphorus	5 µg/L	0-2-3 µg/L
Particulate phosphorus	nd	≤2.8 µg/L
Total phosphorus	20 µg/L	8-14-22 µg/L
Chlorophyll-a	2.0 µg/L	<0.45 µg/L
Turbidity	10 NTU	0.6-0.9-1.8 NTU
Secchi depth	1.0m	≥10m
Total suspended sediment (TSS)	nd	≤2 mg/L

*where three WQOs are provided, this represents the 20th, 50th and 80th percentiles

Marine environment

There is limited site-specific water and sediment quality data in Boat Bay, the exception being two snap-shot surveys undertaken by Aurecon (2014d) during dry season 2013, and wet season 2014.¹ These surveys identified the following:

- Higher turbidity and TSS during dry season (0.6 to 5.3 NTU; 14-16 mg/L) comparative to wet season (0.6 to 1.8 NTU; <5 mg/L). Turbidity and TSS increased with depth, likely as a result of resuspension of bed sediments at depth. In both seasons turbidity was less than the WQO of 10 NTU. Turbidity can show great variability over time, and these results would not capture the range of natural variability. Wind driven resuspension of sediments is a key driver of turbidity in nearshore environments of the broader region, and turbidity would likely significantly exceed the WQO for periods measured in days to weeks during windy periods. Álvarez-Romero et al. (2013) mapped exposure gradients to flood plume water in the Wet Tropics region, and found the study area is only infrequently affected by secondary flood plumes (<33% of wet season days). Major flood events from the Tully River and small local coastal drainages would periodically affect turbidity (as well as salinity and nutrient concentration) in the study area.
- pH between 8.07 and 8.14 and salinity ~35-36ppt, with no major differences between survey events. These pH and salinity values are typical of nearshore marine waters during non-flood events. It is expected that during flood events salinity and pH would decline, depending on discharge volumes.
- Nutrient concentrations during the dry season sampling event were less than laboratory detection limits for total nitrogen and nitrogen species, however detection limits were above WQOs and therefore cannot be assessed. Total phosphorus (0.08-0.1 mg/l) exceeded the WQO of 0.014 mg/l during the dry season. Detection limits for nutrients in wet season samples were again above WQOs, so it is not possible to determine compliance.

In relation to water-borne contaminants, Aurecon (2014d) found that concentrations of most dissolved metals/metalloid in water samples were below toxicant trigger values (TTV) for 95% protection of species, as set out in the ANZECC/ARMCANZ (2000) guidelines. The exception was for arsenic concentrations which exceeded the TTV. In addition, analysis of sediment detected a number of contaminants but all below relevant guideline levels.²

Construction activities may temporarily increase suspended sediment concentrations in marine waters. Key sediment sources will include resuspension of sediments during rock placement, soil or rock fill, and general earthworks at the construction site. Construction activities also have the potential to effect water quality as a result of accidental spills and exposure of acid sulfate soils. These potential impacts will be managed through the preparation and implementation of a Construction Environmental Management Plan

There is also potential for water quality to be impacted during the operational life of the boat ramp and facilities. This includes impacts from runoff/erosion (see Section 4.1) as well as from spills and pollutant discharge from vessels and vehicles.

These potential risks will be managed by:

- Design infrastructure to withstand relevant storm events without the discharge of pollutants to the environment
- Ensure refuelling guidelines are approved by GBRMPA
- Ensure vessels depart and seek safety elsewhere during extreme weather events)
- Development and implementation of spill/pollutant discharge contingency plans for both construction and operational phases.

¹ Results obtained from these sampling indicate some cross-contamination of samples during sampling/analysis as well as some breach of holding times for parameters. As a consequence, the results for nutrient and metal parameters should be treated with caution.

² This analysis was undertaken on a single sediment sample and therefore provides limited indication of sediment quality in the study area.

3.3 Marine ecology

Boat Bay consists of a gently sloping tidal flat with (<1 m LAT). An area of slightly deeper water (-0.5 m LAT) occurs at the existing boat ramp. A band of complex terrain (boulder field – see below) extends along most of the northern perimeter of the bay to a depth of approximately -1.2 m LAT. The shoreline east of Clump Point boat ramp is fringed by a topographically complex intertidal rocky shore and subtidal reef system, which extends down to approximately -4.2 m LAT, but in places only extends to approximately -2 to -3 m LAT. Beyond the reef/boulder field the seabed was gently sloping and largely featureless, except for occasional reef patches, small scale features (bommies) and a wreck located near the boulder field at the entrance to Boat Bay.

3.3.1 Benthic primary producer habitat

Seagrass, mangroves, saltmarsh, benthic algae, together with corals, represent benthic primary producer habitat (BPPH). BPPH play an important role in maintaining coastal ecosystems and associated ecological services, including the provision of food and habitat resources for species of fisheries and conservation significance. BPPH is also sensitive to disturbance and in the case of seagrass and algae, water quality degradation, particularly light limitation due to high turbidity.

The key BPPH in the study area consists of seagrass, mangroves, saltmarsh, benthic algae and corals. The distribution and extent of benthic habitats (including BPPH and 'unvegetated' soft sediment habitat) is provided in Figure 3-4 (seagrass, soft and hard habitats) and Figure 3-7 (mangroves), and summarised below. A more detailed description of marine habitats, communities and species in the study area is provided in report *Clump Point Boat Ramp: Marine Ecology, Water Quality & Sediment Sampling Report, BMT WBM (2016a)*.

3.3.2 Seagrass

Surveys conducted in July 2016 recorded one seagrass species: *Halodule uninervis*. Two mono-specific meadows were recorded:

- Meadow 1 was located on the seaward edge of the basalt boulder field on the northern edge of Boat Bay, at approximately -1 to -1.7 m below lowest astronomical tide (LAT). This meadow had a total area of 0.34 ha and had sparse (<1%) cover
- Meadow 2 was located immediately landward edge of the basalt boulder field on the northern edge of Boat Bay, at approximately -0.2 m below lowest astronomical tide (LAT). This meadow had a total area of 0.12 ha and had sparse (<1%) cover.

Surveys by Aurecon in 2014 on transects located directly adjacent to the boat ramp during dry season (November 2013) and wet season (February 2014) recorded only small (<2m²) sparse patches of *Halodule* sp. (most likely *H. uninervis*) and *Halophila* sp. on transects. These patches did not occur in the same place on both sampling occasions, suggesting patches were ephemeral. Aurecon (2014d) did not survey areas where larger seagrass meadows were mapped by Roder et al. (1998).

Roder et al. (1998) undertook an assessment of benthic habitats, including seagrass, at Clump Point and Boat Bay in December 1997. Five seagrass species were recorded: *Cymodocea serrulata*, *Enhalus acoroides*, *Halodule uninervis*, *Halophila decipiens* and *Halophila ovalis*, but patterns in species dominance and community structure were not described. Most seagrass occurred on the outer edge of Boat Bay in the same location as Meadow 1, with smaller patches occurring near Meadow 2, and on the fringing reef east of the breakwater. Approximately 2.8 ha of seagrass in eight separate meadows were recorded.

Major declines in seagrass meadow distribution and extent occurred in the Wet Tropics as a result of disturbance by tropical cyclones Larry (2006) and Yasi (2011) (Rasheed et al. 2014). In time, it is expected that seagrass will continue to recover, potentially occupying similar areas as observed by Roder et al. (1998).

Seagrasses represent a key sensitive ecological receptor due to their sensitivity to changes in light climate/turbidity and hydrodynamic conditions. Seagrasses also have high ecological value as a food resource to threatened species such as dugongs and green turtles, and species of fisheries significance (particularly prawns but also a range of finfish species).

As can be seen in Figure 3-5 below the proposed breakwater and jetty will not impact on any existing seagrass meadows, and while the breakwater partially cover an area of historical seagrass that is no longer present, the historical changes suggest that while seagrass meadows may be strongly impacted by cyclonic events re-establishment occurs relatively quickly afterwards. It is possible that the proposed breakwater may create more sheltered areas that provides protection to seagrass meadows that establish after construction is completed.

The boat ramp upgrade footprint area occurs directly adjacent to seagrass meadows (historical and existing), but boat wake from vessel traffic is not expected to be significantly different from the existing conditions.

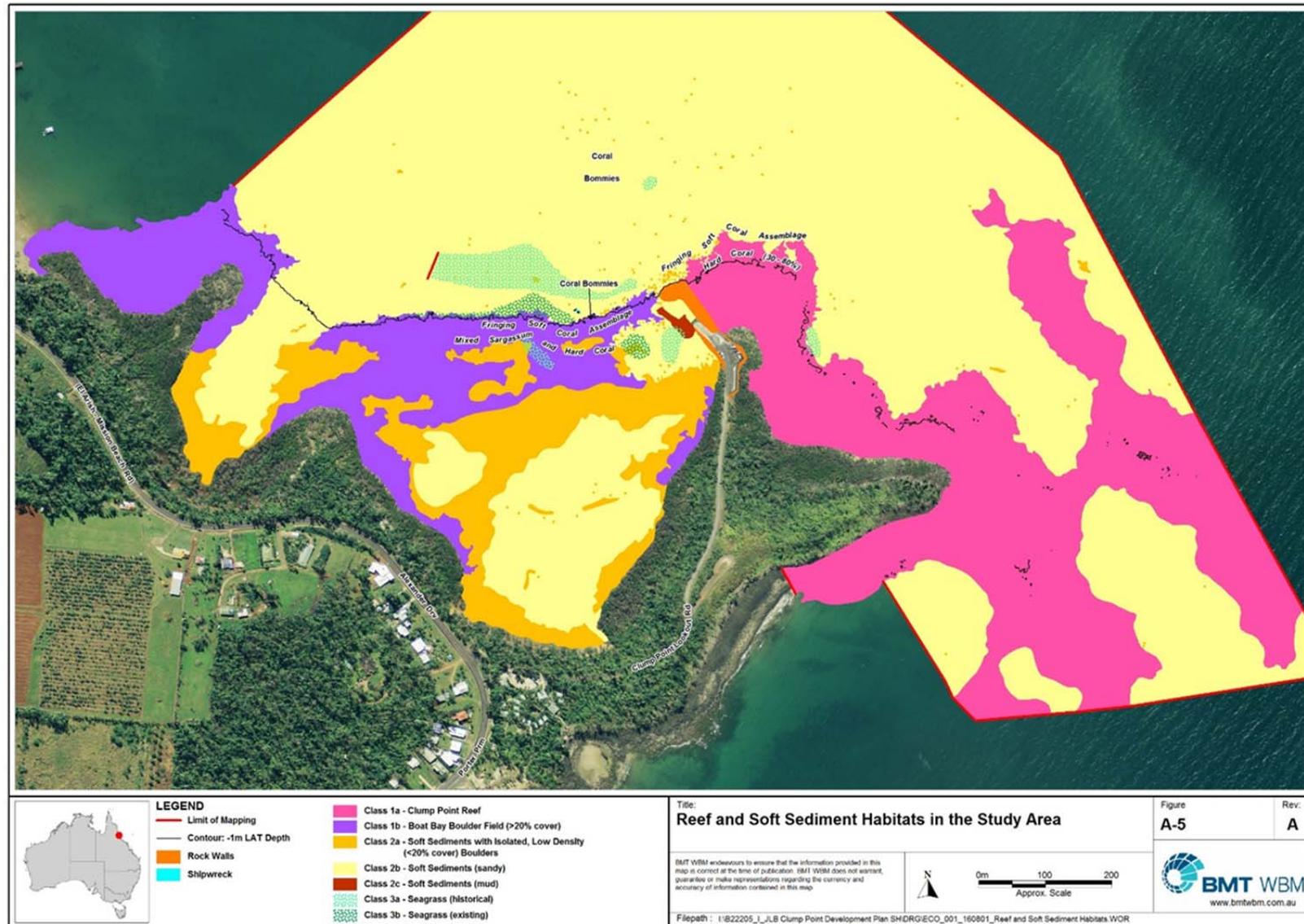


Figure 3-4: Benthic habitats of the study area

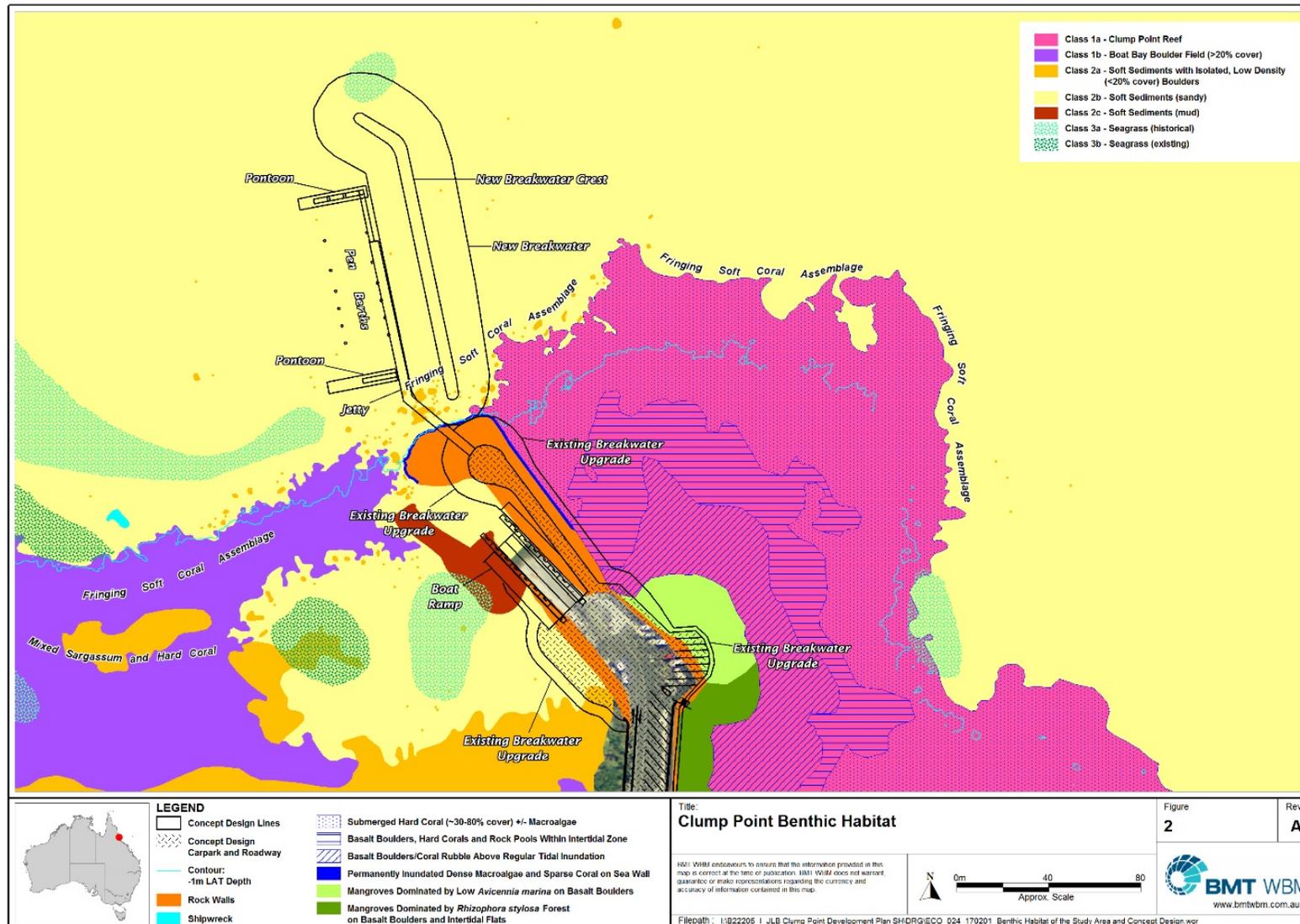


Figure 3-5: Benthic habitats impacted by the prosed marine infrastructure

3.3.3 Soft Sediments and Rubble within and offshore of Boat Bay

Most of Boat Bay consists of broad intertidal/shallow subtidal sand/mud flat, with mud content reportedly decreasing and shell grit and rubble increasing with increasing distance seaward (Roder et al. 1998). A narrow sandy beach occurs directly adjacent to mangroves within the southern section of Boat Bay but is not well represented elsewhere.

Assemblages on shallow sand/mud flats consist of yabbies (Callinassidae), fiddler crabs (*Uca* spp.), cockles (*Gafrarium* sp.), moon snail (*Nassarius dorsatus*), soldier crab (*Mictyris longicarpus*), bivalve (*Placuna placenta*), horn snails (*Cerithidea* sp.), sea skater (*Halobates* sp.) and mudskippers (*Periophthalmus* sp.) (Clayton et al., in Aurecon, 2014d). The mid-littoral zone of intertidal/shallow subtidal sand/mud flats has high burrow densities (probably Callinassidae) and a variety of hermit crabs (Paguridae) and swimming crabs (Portunidae) (Clayton et al. 2014). These species would provide food resources for fish and marine megafauna species.

Large sand flats occurred seaward of the basaltic boulder zone at the entrance to Boat Bay (see also Roder et al. 1998). Bathymetry survey data identifies several isolated high features, but otherwise this area was flat and featureless, and epibenthic assemblages were sparse.

The proposed Project is not expected to have any significant impacts on the marine soft sediments and rubble, which can be seen in Figure 3-5. The sediment modelling, as noted in Section 3.1, suggests that the proposed Project may in fact reduce sediment build up and possibly even reduce sediment in the area landwards of the existing breakwater. This may be in part due to the proposed removal of the existing breakwater return, and also due to changed flows resulting from the proposed breakwater and the dimensions of the gap between the existing breakwater and the proposed breakwater.

The boat ramp footprint contains both soft sediment (muds, sands) and breakwater habitats within Boat Bay. The marine environments in this area are in a modified condition as a result of the operation of the existing boat ramp, and do not support high ecological values (e.g. high quality habitat for threatened or migratory marine species).

3.3.4 Reefs and Rocky Shores

A contiguous fringe of basaltic cobble and boulders occurs along the shoreline of Boat Bay and Clump Point (Figure 3-4). A contiguous fringe of basaltic boulders also extended across the entrance to Boat Bay to the northern tip of Clump Point. Surveys in the present study and Aurecon (2014d) indicated a high cover of brown algae (*Sargassum* spp. and *Padina* spp.) on the boulder field at the entrance to Boat Bay, with a lower cover in deeper sections. A wide range of hard corals (*Turbinaria*, *Euphyllia ancora*, *Porites* and *Acropora*), soft coral (*Sarcophyton*), hydroids, sponges, oysters and other common reef benthos taxa were recorded.

Large isolated submerged basaltic boulders (bommies) occur throughout the study area, supporting a range of macroalgae (particularly the green algae *Bryopsis* and a range of brown, red and other green algae species) and epibenthic fauna including hard corals (*Porites*, *Favia*, *Acropora*, *Montipora*) and other taxa (*Xenia*, colonial zooanthids, bryozoans etc.). Large living coral bommies (*Pavona frondifera*, *Porites*) were recorded near a ship wreck located seaward of the boulder field.

Benthic habitats located immediately north of the existing breakwater (in the potential Project footprint and immediate surrounds) consisted of isolated, patchy low profile boulders and rubble on soft (sandy) sediment. The boulders contained mixed assemblages of hard and soft corals, as well as encrusting reef fauna. While these boulders contained a diverse range of biota, they did not contain large, complex hard and soft coral assemblages as occurs on the adjacent Clump Point fringing reef.

Clump Point to the east of the existing boat ramp and breakwater contains a broad fringing reef of approximately 1.8 ha. Hard corals (*Acropora*, *Porites*, *Goniopora*) were recorded along the reef and isolated bommies within this area, consistent with Roder et al. (1998). Benthic assemblage structure varied with depth and across the reef, but generally consisted of the following:

- In the lower intertidal and upper photic zone of subtidal (~2-3m below MSL), the reef supported a high cover of *Sargassum flavicans* and other macroalgae, including *Padina* spp., *Halimeda opuntia*, *Galaxaura* spp., *Codium* sp. (cf *Codium geppii*) and geniculate red coralline algae), intermingled with occasional hard coral colonies (mostly *Goniastrea*, *Turbinaria*, and small *Acropora*) and soft corals (*Sarcophyton*, *Lobophytum*, and *Sinularia*).
- Below approximately -3m MSL, macroalgae cover was lower and benthic assemblages were numerically dominated by hard corals and turfing algae. The outer reef margin had high (approximately 40% to 80% cover) cover of hard corals. Most of the hard coral was observed growing directly on boulders or dead coral skeletons. Most coral colonies were 0.2 to 0.3 m diameter, although large coral colonies (approximately 0.5 to 1 m in diameter) were also present but in moderate abundance. Few massive hard coral (e.g. *Porites*) bommies greater than 1 m in diameter were recorded.
- The hard coral genera recorded in the study area typically dominate on nearshore coastal reef systems in the region (e.g. Thompson et al. 2013). Corals, macroalgae and other reef taxa found in nearshore coastal environments have adaptations that allow them to survive periodic high turbidity conditions, but are sensitive to longer term increases in turbidity.
- Coral was observed to be in good health with no evidence of extensive bleaching or significant disease. This is in contrast to other parts of north Queensland (particularly north of Port Douglas), where extensive coral bleaching and mortality occurred during the summer of 2015-16, as a result of heat stress from ocean warming and a major El Niño event. Anchor chains were observed to result in localised damage to coral colonies, and fishing lines were also observed around some coral heads, particularly those within casting distance from the breakwater.

Marine environment

The boulders within the footprint of the marine facilities had a low cover of soft coral and isolated small hard coral colonies, and were less diverse and abundant than reef communities to the east on Clump Point Reef. The proposed breakwater is located in subtidal waters over predominantly soft sediment, with occasional isolated boulders/bommies near the existing breakwater. Figure 3-6 below show the breakwater footprint in relation to existing benthic habitat communities.

As a result, the works will cause the loss of some benthic habitats and associated ecological values, the proposed detached breakwater and jetty will have limited impacts on the small area of corals within and immediately adjacent to the proposed works area.

The proposed breakwater rock walls are expected to be colonised by reef-associated benthos and fish following completion of works. Similar types of communities as found on the existing breakwater are expected to establish (i.e. turfing algae, Sargassum, other macroalgae and oysters in the intertidal and shallow subtidal; soft coral and small encrusting hard coral colonies, hydroids, and other filter-feeding taxa in deeper waters). The works will attract reef-associated fish and crayfish.

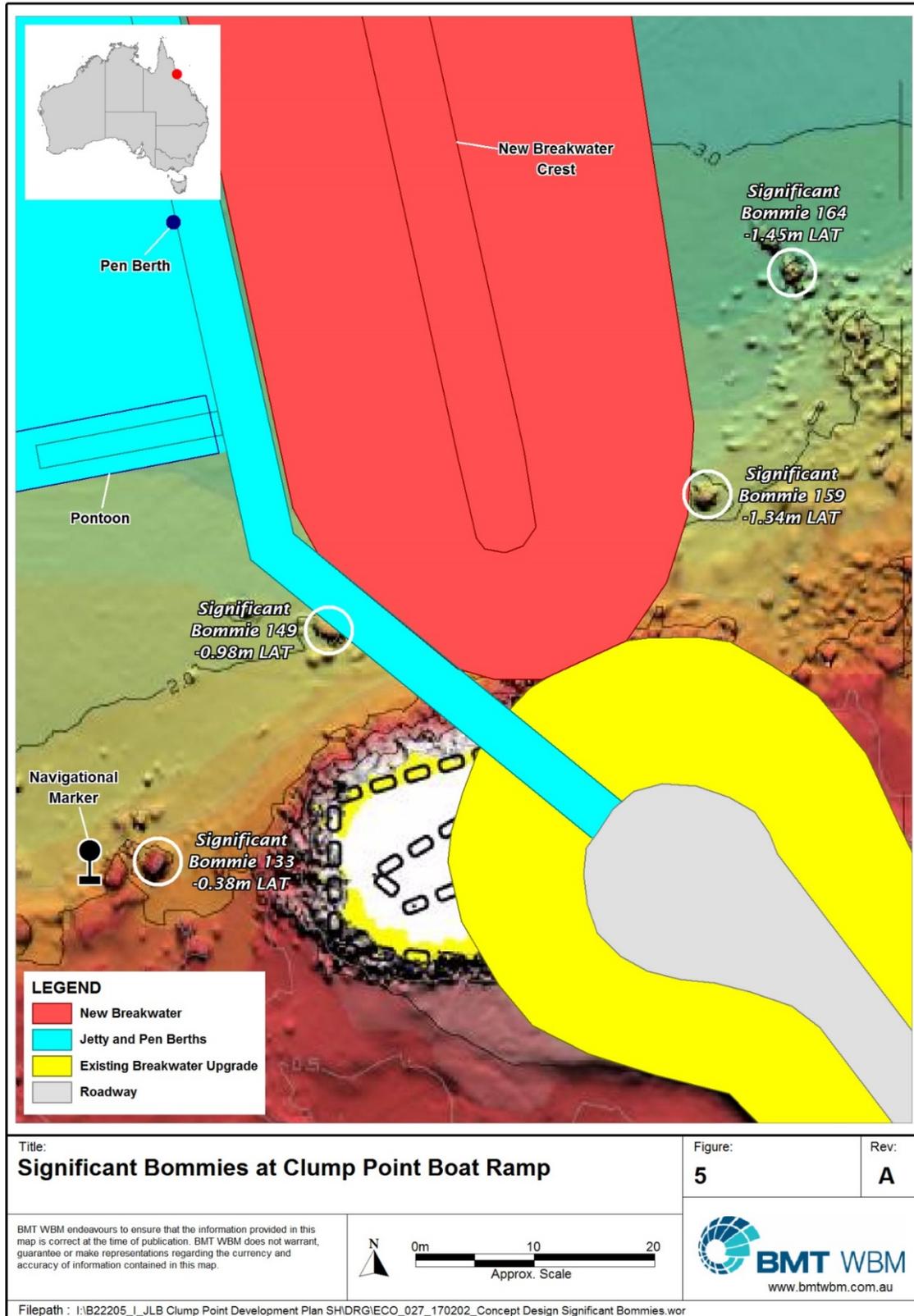


Figure 3-6 Proposed design and adjacent bommies

3.3.5 Mangroves, Saltmarsh and Saltpan

Mangrove communities in the study area are mapped as Regional Ecosystem 7.1.1, *Mangrove closed scrub to open forest of areas subject to regular tidal inundation*. Based on this mapping (V9.0 of the Vegetation Management Supporting Map) there are 9.0 ha of mangrove forest within the study area. This includes 7.2 ha of *Rhizophora* spp. mangroves and 0.15 ha of *Avicennia marina* mangroves. These areas are shown in Figure 3-7

The western and eastern shorelines of Boat Bay and the eastern shoreline of Clump Point had a narrow (averaging 20-60 m wide) fringe of mangrove forest occurring landward of sand/mud shoals and boulder fields. The mangrove forest on the western shoreline of Boat Bay was numerically dominated by *Rhizophora stylosa*, *Avicennia marina* was sub-dominant, and *Aegiceras corniculatum* formed an under-storey canopy in places. *Rhizophora apiculata* was more abundant in the mangrove forest on the eastern shoreline of Boat Bay, and the landward margin of this forest also contained *Osbornia octodonta*, *Ceriops tagal* and *Aegiceras corniculatum*. Only isolated mangroves, dominated by *A. marina*, occurred directly adjacent to the existing boat ramp (refer Figure 3-7). No saltmarsh or saltpan have been recorded in the study area.

The structure of mangrove forests (i.e. dominant species, forest structure, zonation patterns) in the study area is considered generally representative of those in north-facing coastal embayments within the wider region.

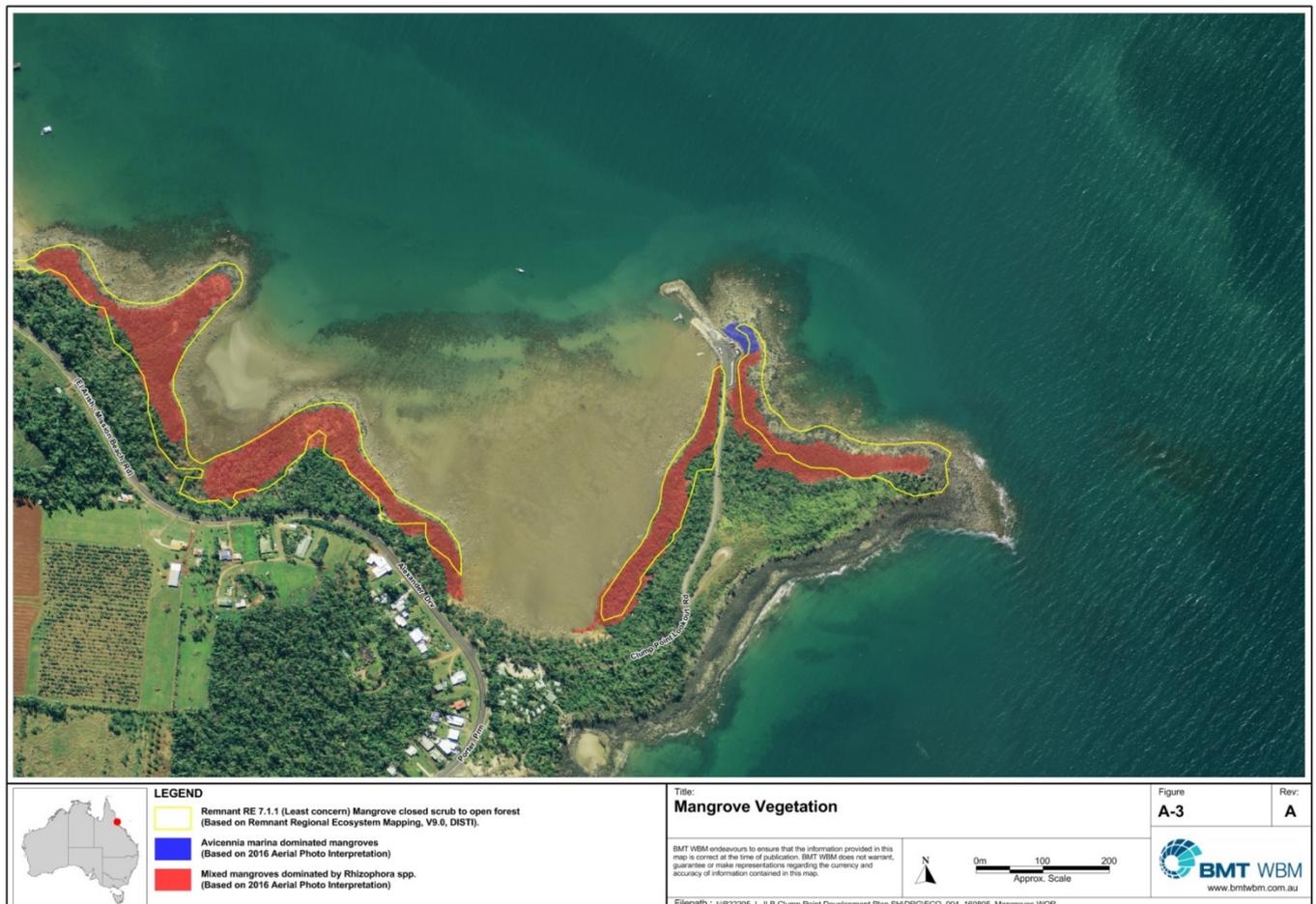


Figure 3-7 : Mangrove habitats of the study area

Marine environment

The proposed Project is not expected to have significant impacts on mangroves except a small area of existing mangroves (see Figure 3-8) which is unavoidable in order to create a functional facility and the detailed design intends to minimise this impact as far as possible.

The footprint of the terrestrial facilities (carpark, turning area and road) includes terrestrial lands, as well as intertidal/shallow subtidal rocky shore and remnant mangrove forest on the east side of Clump Point. The marine habitats within the footprints are in good condition and are broadly representative of intertidal/shallow subtidal habitats elsewhere on Clump Point, but not likely to support high quality habitat for threatened or migratory marine species. Stormwater runoff from the carpark will also need to be managed to minimise impacts to marine water quality and ecological values in adjacent marine environments.

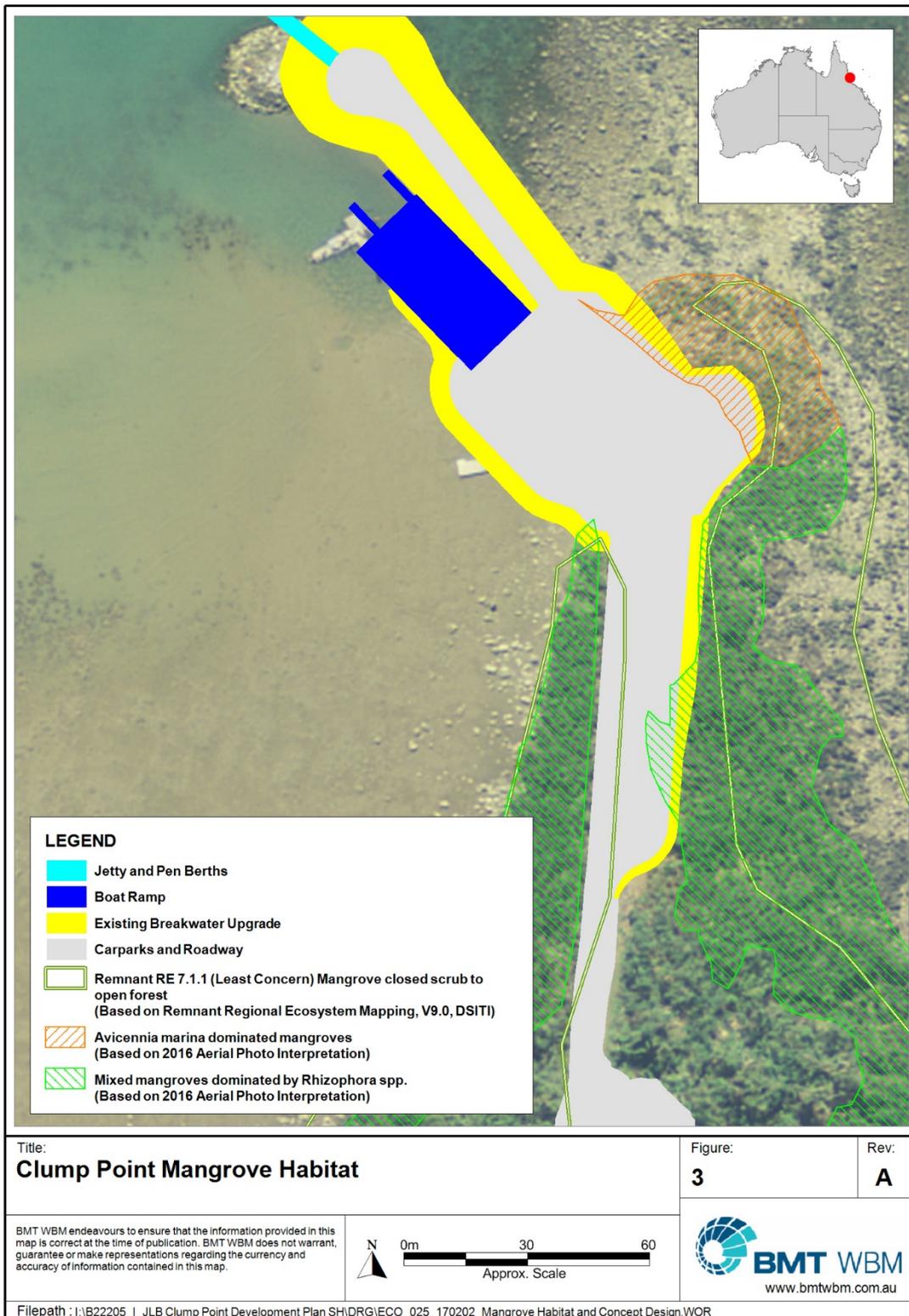


Figure 3-8 : Proposal overlaid mangrove habitat

3.4 Threatened marine species

In addition to the above habitat values, the study area is expected to support a number of threatened and migratory marine megafauna species, as follows:

- Turtles - Five marine turtle species occur or could occur for the study area and surrounds: green turtle (*Chelonia mydas*), loggerhead turtle (*Caretta caretta*), hawksbill turtle (*Eretmochelys imbricata*), flatback turtle (*Natator depressus*) and olive Ridley turtle (*Lepidochelys olivacea*). Feeding habitat for many of these turtle species (particularly green turtle) is expected to be provided on the fringing reef on the eastern side of Clump Point and the boulder fields at entrance to Boat Bay. There are no turtle nesting beaches in the study area, but sandy beaches located to the north and south of the study area (>1 km from the existing boat ramp) would provide suitable turtle nesting habitat. All marine turtle species are listed as threatened under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and Queensland Nature Conservation Act 1992 (NC Act).
- Crocodile - The saltwater crocodile (*Crocodylus porosus*), which is a listed Vulnerable species under NC Act, is likely to occur in the study area and surrounds. This species typically prefers mangrove lined estuaries, but may occur across a range of aquatic habitat types, including coastal embayments such as those found in the study area.
- Dolphins – two near-threatened dolphin species, the snubfin dolphin (*Orcaella heinsohni*) and Indo-Pacific humpback dolphin (*Sousa chinensis*), may occasionally feed or transit the study area. Habitat suitability is considered low due to shallow water depths (in Boat Bay) and absence of preferred river mouth habitats.
- Other threatened marine megafauna, such as dwarf sawfish (*Pristis clavata*), green sawfish (*Pristis zijsron*), dugong (*Dugong dugon*) and humpback whale (*Megaptera novaeangliae*) are less likely to occur in the area.

While turtles may occasionally feed in this area, reef environments to the east support higher quality feeding habitats (i.e. high cover of macroalgae and reef benthic fauna). Other threatened or migratory species are less likely to regularly use this area. The proposed Project is not expected to have an adverse impact on turtle feeding habitat, and all four of the above marine megafauna species are mobile, and while they may occasionally visit the Project area, there are not expected to be any adverse impacts.

There is the potential for noise and vibration and vessel (i.e. barge movements) to cause impacts to marine megafauna and other marine species during the construction phase. In addition, upgrades to the boat ramp are expected to increase vessel traffic in this area, increasing the existing risk of vessel strike and noise impacts on fauna species.

Marine environment

The following management approaches will be included in the Construction Environmental Management Plan (CEMP):

- All marine works that could potentially harm protected marine species will be limited to daylight hours when there is surface visibility of up to 1 km (360°)
- Pre-start and ongoing regular visual inspections of the works area will be conducted during rock placement and piling activities. If marine megafauna are sighted within the works area, potentially harmful marine activities will be stopped until animals have moved away from the construction area.
- An exclusion zone (i.e. observation/shut-down zone) of 550m will be established for marine megafauna during pile driving (and underwater excavation) activities. If marine megafauna are sighted within this zone during pile driving (or underwater excavation) works, works will be delayed until they have been observed to move away outside the zone or, if they are no longer observable, ten minutes after the last sighting within the zone.
- Construction activities will be planned and executed to minimise and avoid interactions between with marine mammals and turtles, including
 - Construction vessel operational buffers of 100m from large cetaceans and 50m from dolphins
 - No-wash speed limits within 100m of whales or 50m from dolphins
 - ‘Go-slow’ zones for small construction vessels
- Water-based noise activities (e.g. pile driving, underwater excavation) will be commenced gradually to provide warning to nearby marine megafauna
- Any sightings of marine megafauna in the works area or adjacent environments during construction will be reported. Reports will be stored in a central database developed and maintained by the contractor, and any incident of harm reported to the DEHP Hotline (1300 130 372).

Impacts from increased vessel traffic during the operational life of the boat ramp will be controlled through site-based arrangements developed as part of the approvals process. This will include speed limits and limitations/registration requirements for permanent moorings, as well as any provisions with an updated set of the GBRMPA Clump Point Site Management Arrangements.

Lighting systems, including from construction equipment and operational marine facilities (e.g. navigation markers, carpark/boat ramp lighting) will generate light emissions to the marine environment. These impacts cannot be avoided due to the need for lighting to avoid navigational hazards.

Artificial lighting is not considered to have a major effect on foraging patterns of turtles, dolphins and dugongs (Mustoe, 2008) which may occur in the area. Lighting can impact on marine turtle nesting and hatching (which occurs November to April), however turtle nesting is not known from the study area. Despite this, the following measures will be implemented to minimise any potential impact from artificial lighting:

- Where possible light sources will be shielded, and redirected away from adjacent beach environments.
- Directional fixtures that point down will be used wherever possible.
- The lowest wattage possible lighting will be used with the source selected to avoid environmental impacts
 - e.g. low-pressure sodium vapour lighting and ‘bug’ lights.

Construction vessel lighting will meet security and safety requirements, and then adhere to the above approaches if possible. Navigational lighting is not expected to be a key emission source and will comply with relevant requirements set out by Maritime Safety Queensland and relevant standards.

3.5 Great Barrier Reef and significant wetlands

The waters and intertidal zone of the Project area is part of the GBR. This is formally recognised in the form of the GBR World Heritage Area and National Heritage Property (all waters up to HAT), the GBR Marine Park (all waters up to MLLW), the GBR Coast Marine Park (all waters up to HAT), and the GBR Nationally Important Wetland. The key values of the GBR within the study area are described above in relation to water quality and marine ecology. The legislative arrangements for these areas are described further in Appendix 3.

The GBR Marine Park and GBR Coast Marine Park (Commonwealth and State marine parks, respectively) are divided into different zones. All waters of the study area are within the Habitat Protection Zone of the marine park. In addition to the GBR, the waters and intertidal area of the site are also mapped as high ecological significance (HES) wetlands under the Queensland State Planning Policy (SPP). This mapping corresponds with the GBR within the state jurisdiction.

4 Terrestrial environment

4.1 Terrestrial soil, geology and water quality

Investigations and surveys were undertaken on a broader study area than the proposed Project footprint. The study area occurs within the wet tropical coast regional setting. The topography of this area ranges from precipitous mountains to gently sloping basalt flow surfaces and depositional plains. Depositional surfaces range from piedmont fans to riverine and marine plains and extensive beach ridge systems.

Within this context, Clump Point is unique as one of the only basalt points within the Wet Tropics area (BMT WBM, 2015a). This is recognised as a stratigraphic unit on Geoscience Australia's database (4192). The eastern and northern margins of Clump Point comprise mainly basalt rock and weathered boulders. Soils within the study area are of basaltic origins. These soils have been mapped as follows:

- Eubenangee series soils, under the CSIRO Soils of the Tully-Innisfail Area, North Queensland (Murtha, 1986). These soils are considered red ferrosols or dermosols under the Australia Soil classification, which are typically friable non-cracking clay or clay loam gradational soils.
- A1, as mapped on the Agricultural Land Suitable of the Cardwell-Innisfail Area (DPI, 1992). This soil is suitable for sugarcane, bananas, papaws and improved pastures.
- 'High' probability of occurrence of acid sulfate soils (ASS) along north-west facing edge of Clump Point, and 'Extremely Low' probability for south-east facing edge.

Geotechnical investigations undertaken by Aurecon (2014b) sampled soils within the vicinity of the Clump Point boat ramp. This investigation identified the top 3.5m of soil as consisting of a silty clay with high plasticity and very soft to soft consistency. Clay content increased with depth but increased in consistency from stiff to hard clays 6-19m deep (Aurecon, 2014b).

No rivers or creeks are mapped within the study area with the exception of a small channel to the north-west, draining adjacent agricultural land. It is expected that all runoff at Clump Point sheet flows directly into the ocean.

Excavation, clearing and construction activities required for the Project will expose soil to surface water runoff and potential erosion and sedimentation issues. It is noted that most required clearing has already taken place. Works will be undertaken to preserve topsoil and other soil materials for re-use to help with the rehabilitation and vegetation regrowth in construction areas, as well as avoiding temporary water quality impacts. Given the sensitivity of the receiving marine environment, any sedimentation within nearby waters could cause impact to both water quality and sensitive receptors.

As there is potential for acid sulfate soils in the study area, excavation of material may cause the exposure of these soils. Disturbance of acid sulfate soils can lead to acid generation which can have an impact on soil or water pH and on the terrestrial and marine environments. Testing of all potential acid sulfate soils will be undertaken before any excavation is undertaken and either disturbance avoided or treatment or appropriate disposal undertaken of any excavated acid sulfate soils.

Terrestrial environment

Surface water drainage will be designed and managed to avoid erosion due to rainfall, wave action and storm tides. Actions to address erosion risks will include:

- drainage design and materials for roadside batters, carpark batters and boat ramp edges will be selected to avoid the risk of erosion
- a construction-phase sediment and erosion control plan (ESCP) will be included in the Construction Environmental Management Plan (CEMP). This will include measures such as the following:
 - installation and maintenance of sediment fencing and/or bunding where appropriate
 - use of water for dust suppression
 - scheduling of works within the intertidal zone to occur during low tide where possible
 - staging of works to minimise the need for overnight stockpiles of rock and soil material.
 - protection of any stockpiles
- identification of any acid sulfate soils are likely to be present, and if acid sulfate soils are present an acid sulfate soil management plan (ASSMP) will be prepared and implemented as part of the CEMP
- a visual turbidity monitoring program will be prepared and implemented as part of the CEMP including triggers to modify or temporarily stop relevant works if a visual turbid plume occurs.

4.2 Terrestrial ecology

4.2.1 Vegetation communities

Figure 4-1 shows the type and extent of vegetation community mapped in the study area based on the ecological assessment survey and 2016 aerial imagery. The following section provides broad descriptions of terrestrial vegetation communities within the study area based on the survey.

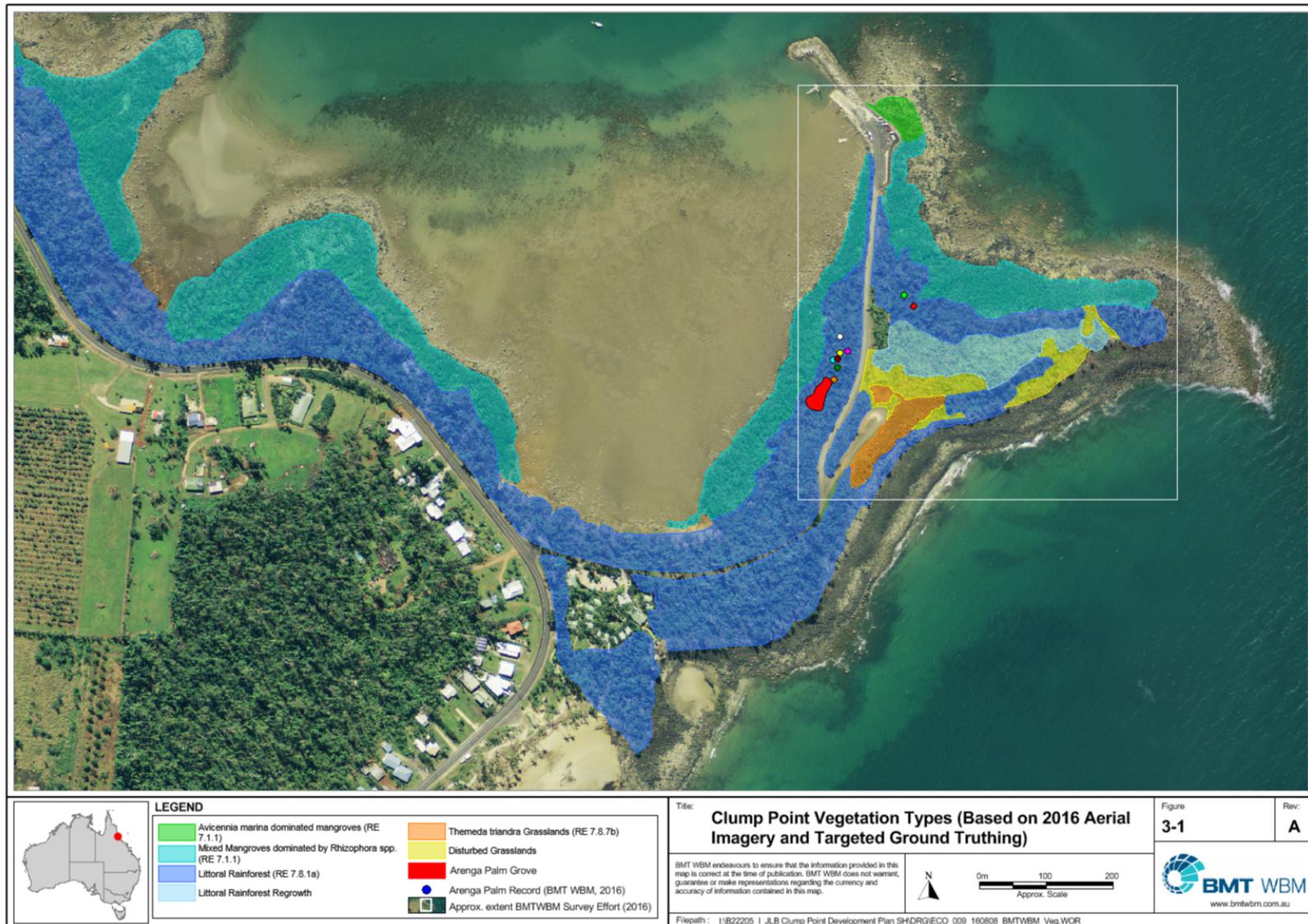


Figure 4-1: Vegetation communities of the Project area

Terrestrial environment

Vegetation and habitat mapping

The Regulated Vegetation Map for the study area (see *Clump Point Development Plan -*

Terrestrial Ecology Assessment, BMT WBM (2016c) and the 2013 RE mapping indicate the study area is dominated by remnant vegetation comprising the following communities (based on current Regional Ecosystem Description Database):

- RE 7.1.1 (VMA Status Least concern: Biodiversity Status No concern at present): Mangrove closed scrub to open forest. Sheltered coastlines, estuaries, and deep swales between dunes, on fine anaerobic silts, inundated with saline water at high tide.
- RE 7.8.1a (VMA Status Least concern: Biodiversity Status Endangered): Complex mesophyll vine forest. Lowlands and foothills on basalt, of the very wet and wet rainfall zone.
- RE 7.8.7b (VMA Status Of concern; Biodiversity Status Endangered): Themeda triandra tussock grassland. Basalt uplands and highlands, and minor areas on coastal headlands. A rare ecosystem threatened by weed invasion.

Whilst these RE types were confirmed for the study area, the site survey identified errors of both commission and omission on the current RE and Regulated vegetation mapping. This is largely due to the 1:100,000 scale of the RE mapping which the Regulated Vegetation Mapping is based on.

Littoral rainforest directly south of the boat ramp carpark and to the east of Clump Point Road, and roadside vegetation to the west of the lookout, is currently mapped as Category X under the Regulated Vegetation Map. However, ground truthing confirmed this vegetation does conform to remnant RE 7.8.1a and provides an important buffer to adjacent littoral rainforest or mangrove communities and threatened flora. In addition, areas of (disturbed) narrow rainforest between Clump Point Lookout Road and the cleared lookout support mature species representative of littoral rainforest, but are too small (<2ha) to map at a 1:100,000 mapping scale.

Under the Vegetation Management Report, Essential Habitat for *Arenga australasica* has been mapped in the study area associated with remnant RE 7.8.1a. Several *A. australasica* were identified in littoral rainforest throughout the study area. Essential Habitat for *Casuarium casuarium johnsonii* (Southern Cassowary) has also been mapped in the study area associated with remnant RE 7.8.1a and RE 7.8.7b (see below).

Significant vegetation communities

The basalt headland of Clump Point is dominated by remnant rainforest comprising RE 7.8.1a. The most seaward littoral rainforest fringe was generally narrow in extent (typically up to 10 m in width) with an open forest canopy of small trees and shrubs ranging from 5 to 12 m in height depending on level of exposure. Typical species noted included *Hibiscus tiliaceus*, *Terminalia* spp., *Thespesia populnea*, *Milletia pinnata*, *Macaranga* spp, *Mallotus philippinensis* and *Vitex trifolia* with *Pandanus tectorius* also occurring on the coast in the south of the study area. This littoral rainforest also corresponds to the threatened ecological community (TEC) Littoral Rainforest and Coastal Vine Thicket of Eastern Australia. This is a critically endangered TEC under the EPBC Act.

The more landward and protected foothills and upper slopes of the basalt headland supported more complex mesophyll vine forest. Typical canopy species observed included *Morinda citrifolia*, *Ficus* spp., *Myrticium globosa*, *Pittosporum ferrigenium*, *Rhus taitensis*, *Schefflera actinophylla*, *Archidendron lucyi* and emergent *Intsia bijuga*. Disturbed and regenerating littoral rainforest in the south-east of the study area comprised a sparse canopy of mixed species such as *Morinda citrifolia*, *Glochidion* sp., *Melia azedarach* and *Macaranga* spp. averaging 10 m in height over a dense groundcover of *Megathyrus maximums**

The southern slopes of the headland have been cleared in the past and supported native *Themeda triandra* grasslands. Other native species recorded included *Imperata cylindrica* and *Dianella* spp. These native grasslands are vulnerable to *Megathyrus maximums** invasion which dominate the upper slopes north of the lookout. Other weeds recorded in the disturbed grasslands included *Ageratum*

Terrestrial environment

*houstonianum**, *Stachytarpheta cayennensis**, *Passiflora* spp.*, *Chloris gayana**, *Cynodon dactylon**, *Conyza bonariensis**, *Mimosa pudica**, *Crotalaria* sp.* and *Macroptilium atropurpureum**.

Protected Species

It is well established that Clump Point supports populations of *Arenga australasica* (Arenga palm) which is listed as Vulnerable under the *Nature Conservation Act 1992*. Aurecon (2014) recorded 88 *A. australasica* to the south-west of the study area³. The current survey recorded a further 80-100 Arenga palm in littoral rainforest of the study area.

In addition to Arenga palm, the following protected species may also occur in the study area (see *Clump Point Development Plan -Terrestrial Ecology Assessment, BMT WBM (2016c)*):

- *Carronia pedicellata* – Endangered (Cth)
- *Chingia australis* – Endangered (Cth)
- *Dendrobium bigibbum* – Vulnerable (Cth)
- *Phaius pictus* – Vulnerable (Qld and Cth)
- *Vappodes Phalaenopsis* – Vulnerable (Cth).

Other locally significant species in the study area include *Kleinhovia hospita*, *Archidendron lucyi*, *Intsia bijuga*, *Syzygium alliligneum*, *Dysoxylum gaudichaudianum*, *Ficus racemosa*, *Castanospermum australe*, *Erythrina fusca*, *Pleomele angustifolia*, *Alstonia scholaris* and *Polycias nodosa*.

The Project works have the potential to impact on terrestrial ecology directly through clearing and ground disturbance and indirectly through runoff and spills. Clearing has the potential to impact on protected vegetation communities and species, as well as disturbing existing habitat values. Significant impacts on terrestrial ecology will be avoided by:

- No clearing of areas containing of concern RE 7.8.7b or Arenga palms
- While no clearing of littoral rainforest and vine thicket areas is expected, if any minor clearing is required for features such as the toilet block or stormwater drainage it will be kept as small as possible and limited to areas adjacent to existing clearings.
- Any minor vegetation clearing will be offset through the rehabilitation of disturbed rainforest areas on the eastern side of Clump Point
- Pre-clearance surveys will be undertaken to ensure no clearing of protected species occurs
- Weed management will be undertaken during construction to ensure new weeds are not introduced to the area

Wherever possible, clearing will be avoided and rehabilitation undertaken to preserve and enhance terrestrial ecology values.

³ Note the Arenga Palm locations recorded by Aurecon (2014) were not ground truthed in this assessment.
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4.2.2 Terrestrial habitat and fauna

Habitat characteristics

There are four principal habitat types in the study area: littoral rainforest, littoral rainforest regrowth, *Themeda triandra* grassland and disturbed grassland. Some of the more significant fauna habitat observations made during the survey are:

- The study area supports diverse, contiguous and extensive rainforest habitat in close proximity to mangrove communities, in good condition, with high native species diversity and habitat complexity, and a high likelihood to support a number of species of conservation value
- The study area supports rare native grassland communities in variable condition. Fauna habitat potential of these communities is poorly understood
- Disturbance associated with habitat clearing is restricted to Clump Point Lookout Road and in the south-east of the study area
- Local fauna may experience high levels of disturbance associated with large volumes of vehicles and high speed along Clump Point Lookout Road
- Very high diversity of microhabitat features across the study area i.e. high abundance of large logs, rocks, stones, coral rubble, leaf litter which would promote very high fauna diversity and values
- High abundance of hollow bearing trees, fruit and plant resources to support a high number and diversity of arboreal mammals and hollow nesting birds
- Overall the study area has very high habitat value for local and threatened fauna.

Due to its high habitat diversity and complexity the fauna assemblage of the study area is expected to be of high diversity and abundance. Birds are expected to be the dominant vertebrate group present whilst the number of mammals is also expected to be high. Arboreal mammals are expected to be common due to the high quality of rainforest habitat and the abundance of large hollow bearing trees and plant resources, particularly fruits.

Reptile numbers and diversity are also expected to be high due to high microhabitat complexity (particularly boulders, rocks, logs, litter). High rainfall and microhabitat features are also likely to promote high numbers and diversity of frogs. The intertidal mudflats to the west of the headland are also likely to support a range of waders including migratory taxa.

Terrestrial environment

Protected species

Key threatened fauna known or likely to occur in the study area are listed below. Species marked with an asterisk (*) are known to occur in the study area, based on previous sightings.

- Southern cassowary (*Casuarius casuarius johnsonii*) – Endangered (Qld and Cth)*
- Beach stone curlew (*Esacus magnirostris*) – Vulnerable (Qld)*
- Red goshawk (*Erythrotriorchis radiatus*) – Vulnerable (Cth)
- Bar-tailed godwit (*Limosa lapponica baueri*) – Vulnerable (Cth)*
- Northern Siberian bar-tailed godwit (*Limosa lapponica menzibieri*) – Critically Endangered (Cth)
- Masked owl (*Tyto novaehollandiae kimberli*) – Vulnerable (Cth)
- Macleay's fig-parrot (*Cyclopsitta diophthalma macleayana*) – Vulnerable (Qld)*
- Australian laceid (*Litoria dayi*) – Endangered (Cth)
- Northern quoll (*Dasyurus hallucatus*) – Endangered (Cth)
- Spot-tailed quoll (*Dasyurus maculatus gracilis*) – Endangered (Cth)
- Semon's leaf-nosed bat (*Hipposideros semoni*) – Endangered (Cth)
- Ghost bat (*Macroderma gigas*) – Vulnerable (Cth)
- Spectacled flying-fox (*Pteropus conspicillatus*) – Vulnerable (Qld and Cth)
- Bare-rumped sheath-tail bat (*Saccolaimus saccolaimus nudicluniatu*) – Critically Endangered (Cth)

In addition, a number of listed migratory bird species also are likely to occur in the study area. This consists predominantly of waders and shorebirds.

Pre-clearance surveys will be undertaken to ensure any fauna in works areas have been relocated.

Road speeds will be managed through signage to prevent strikes of cassowaries that may cross between habitat areas.

5 Indigenous and non-indigenous cultural heritage

Clump Point is a significant cultural heritage location for the Djiru people (the local Aboriginal group). It represents a key basalt formation along the coastline of the Wet Tropics that is unique to the Clump Point region and therefore of environmental and research significance for the Djiru people. Clump Point is also the location of a number of recognised cultural heritage features/sites.

Sites registered on the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) register in the study area are listed below. This was based on a search conducted on 18 July 2016.

- FM:B33 – earthen arrangements/ceremony ground, located on Lot 115/NPW502
- FM:B42 – weir/fish trap, located in intertidal area south of the ‘elbow’ of the Clump Point boat ramp
- FM:B43 – isolated find (likely a stone alignment), located in Alexander Drive road reserve, near junction with Clump Point Road
- FM:B44 – weir/fish trap, located in intertidal area south of Clump Point Lookout Road.

All sites and measures to protect them have been discussed by DSD and the Djiru People.

In a study undertaken by the Girrigun Aboriginal Corporation in 2007 (GAC, 2007), the following cultural heritage values were noted for the study area:

The Djiru people’s sense of identity as ‘rainforest people’ is very strong and is demonstrated by their relations with their rainforest neighbours and their affinity with the rainforest environment.

Clump Point is universally seen by the Djiru people, both young and old, as a core place in their homeland, a hub of traditional life in pre-European times and a place today that they enjoy for its beauty, for its natural benefits and for the sense of connection to tradition and country that it brings to them.

The cultural components within Clump Point area are seen as tangible expressions of connection. The fish traps on either side of Clump Point and the ceremony ground are seen to be very significant as they invoke potent images of traditional life. Shell and artefact scatters recorded in the area are seen as lesser though still significant evidence of connection. These oral history and material items have significant value to researchers.

The natural estate of the Mission Beach area is extremely significant to the Djiru people.

There is a unique affinity between the people and the rainforest that provided food, shelter and spiritual regeneration to their people. An integral part of this relationship is the highly visibly and ubiquitous gunduy (cassowary) which is important to the health of both the people and the rainforest.

The Clump Point coastal basalt formations and their ecosystems are unique to the Wet Tropics Bioregion of North Queensland and are of extreme significant to the Djiru people as land managers and to researchers.

Table 5-1 presents and assessment of all cultural values of the Clump Point area, based on the *Girrigun Aboriginal Corporation study (GAC, 2007)* and the *Cassowary Coast Foreshore Management Plan (BMT WBM, 2015a)*.

Table 5-1: Assessment of cultural values in the study area

Cultural item	Significance assessment	
	Indigenous	Scientific
<i>Cultural values</i>		
Djiru – part of unique rainforest culture	High significance	High significance

Indigenous and non-indigenous cultural heritage

Clump Point area	Very high significance	Medium significance
Clump Point fish traps (FM:B42 & B44)	High significance	High significance
Clump Point ceremony grounds (FM:B43)	Very high significance	High significance
Shell and artefact scatters	Medium significance	Medium significance
<i>Natural values</i>		
Clump Point basalt formations	High significance	Very high significance
Cassowary	Very high significance	Very high significance
Rainforest precinct	Very high significance	Very high significance
Seagrass	Very high significance	Very high significance

The Cutten Brothers walking track, which passes through the study area at the junction of Alexander Driver and Clump Point Lookout Road, is also of indigenous and local cultural heritage significance. This track reflects on historical development transition in the area.

In addition, marine ecology surveys in July 2016 report *Clump Point Boat Ramp: Marine Ecology, Water Quality & Sediment Sampling Report, BMTWBM (20016a)*, identified a shipwreck within Boat Bay. This wreck has not been identified on the national shipwreck database but is still an item of historical heritage significance for the area.

Aside from these features, and the GBR World Heritage Area (see Section 7), there are no areas of non-indigenous cultural heritage in the study area. Clump Point boat ramp is understood to have local significance as the 'gateway' to the GBR and Dunk Island and thereby has local maritime importance. This is not formally recognised, however, under any heritage register.

The fish trap due south of the existing boat ramp (FM:B42) would be impacted by any realignment or relocation of the boat ramp or breakwater southward. To protect this feature, the Project should not involve realignment or relocation of any structures into this area, other than the extent already approved.

FM:B43 occurs along Clump Point Road. This feature could be impacted if pull-off bays were development within this area. In order to avoid these impacts, it is recommended that pull-off bays are not constructed within this area. This may require a pre-clearing survey to identify the exact location of the feature within the context of proposed passing areas.

In addition to these features, less specific heritage values within the study area include the Clump Point basalt formations, the rainforest, seagrass, cassowaries, and the GBR World Heritage Area. It is important that works are designed as far as possible to avoid impacts on these features. Some inevitable impacts are expected, however. To manage this process, it is recommended that works progress only subsequent to consultation with the Djiru people and subject to an approved Cultural Heritage Management Plan. This should also cover chance finds of artefacts and other items of cultural heritage significance that have not yet been recorded for the study area.

See Section 7 in relation to the GBR World Heritage Area.

6 Traffic and parking

Access to the Clump Point boat ramp is *via* Clump Point Road. This is a narrow low standard partly sealed road which connects to Alexander Drive near the Mission Beach Eco Village. The narrow road is generally of poor geometric standard with insufficient width to permit the safe passing of two vehicles in opposing directions. The unsealed section of the road combined with the local wet season often results in a poor running surface condition with potholing and undulations which enforces low speed movement of vehicles.

Alexander Drive is the north/south route between Mission Beach and Bingil Bay. The intersection configuration is not ideal, having a poor standard of site distance to the south along Porter Promenade. This is a result of the acute angle of approach of Clump Point Road and vegetation growing up to the edge of Porter Promenade. This intersection will be further assessed and may warrant upgrade to service the future usage of the site

The boat ramp facility is predominantly utilised by recreational fishers living and holidaying in the Mission Beach area and fishing charter operators. As a result, the majority of vehicles utilising the facility are large passenger vehicles towing trailer boats up to 9m in length. There is occasional movement of larger commercial vehicles with larger boats and maintenance vehicles use to conducted maintenance of the facility. Given tidal access to the boat ramp dictates timing for access and egress, and assuming up to 50 vehicles/trailers can park at the facility, it is estimated that 50-75 vehicles and boats could be turned over each day in peak periods.

The boat ramp does not currently service the Dunk Island ferry or related high volume tourist transport operations and hence the facility is not accessed by tourist coaches or buses. It is likely access will be required occasionally by smaller buses or taxis for those patrons meeting with charter boat operators.

The boat ramp facility is serviced with a carpark (the northern or lower carpark) situated at the boat ramp site, and an overflow carpark (the southern or upper carpark). The northern carpark caters for four single car parking bays and 15 car and trailer unit bays. The southern (upper) car park is less formalised with no marked bays and unsealed surfaces, catering for approximately 10-15 car and trailer units. Due to the distance of the southern (upper) carpark from the boat ramp, it is observed that users tend to park along the Clump Point Road verge in preference to the southern (upper) carpark. Hence at busy periods, the section of Clump Point Road between the carparks is often congested and difficult to manoeuvre in, particularly when towing a trailer boat.

A turnaround area is provided to cater for 'U-turning' and manoeuvring of boat trailers onto the boat ramp. The turnaround is expected to be adequate to meet the needs of small to medium trailer boat users. However it would be problematic for larger commercial operators launching boats as the turnaround is offset from the centre of the boat ramp and would require sharp turning of trailers to reverse into the ramp. The turnaround also serves a function as a staging area for set up and securing of trailers and boats prior to and after launching.

The upgrading of the existing facilities at Clump Point is expected to generate an expectation amongst users that associated transport/traffic facilities will improve, and as a result will likely draw further patronage to the area. This will increase the demand on traffic and transport infrastructure in the area. This raises the importance of pull-off bays along Clump Point Road to ensure safe access. This could potentially be augmented with other safety features, such as selective signage and mirrors.

Traffic and parking

Parking on the verge of Clump Point Road is likely to both reduce capacity of vehicles to manoeuvre (especially when towing boats and trailers) and impact on safety. In addition, this will also discourage the use of the southern (upper) carpark. Measures may need to be implemented to discourage parking in these areas outside of peak times. In addition, pedestrian access from the southern (upper) carpark should be considered in the design to avoid the need for pedestrians walking on the road or road verge.

Increased levels of vessel traffic within the study area, concentrated at Clump Point, are also expected as part of the Project. This increases the risk of vessel collision on the water. This will need to be managed through operational controls at Clump Point, including updates to the Clump Point Site Management Arrangements and Maritime Safety Queensland controls.

Increased traffic use in the area may also require upgrades at Porter Promenade to improve visibility for vehicles accessing the site or exiting Clump Point Road.

Following preliminary turning circle design works the proposed upgrade includes a small expansion of the lower carpark north east to provide sufficient functional space for safe turning circle access to the three boat ramp lanes and breakwater access

7 Matters of Environmental Significance

Matters of State Environmental Significance (MSES) and Matters of National Environmental Significance (MNES) are listed environmental features of statutory importance at a State and Commonwealth level, respectively. These matters represent the key environmental values of the study area.

Table 7-1 describes the MSES and MNES values known or likely to occur in the study area, based on the investigations described in Section 2.2. In addition, this table also lists other features of significance that are not otherwise captured within the MSES/MNES system.

Table 7-1: Summary of matters of national and state environmental significance of known or possible relevance to the study area

Level	Feature
Commonwealth (MNES)	<u>World Heritage Area</u> GBR – confirmed within study area
	<u>National Heritage Property</u> GBR – confirmed within study area
	<u>Marine Park</u> GBR Marine Park – Habitat Protection Zone ⁴ – confirmed within study area
	<u>Threatened ecological community</u> Littoral rainforest and coastal vine thickets of Eastern Australia– confirmed within study area *This also has cultural heritage significance
	<u>Threatened species</u> <ul style="list-style-type: none"> • Southern cassowary (known to occur) • Red goshawk • Bar-tailed godwit (known to occur) • Northern Siberian bar-tailed godwit • Masked owl • Australian lacelid • Northern quoll • Spot-tailed quoll • Semon’s leaf-nosed bat • Ghost bat • Spectacled flying-fox • Bare-rumped sheath-tail bat • Green turtle • Loggerhead turtle • Hawksbill turtle • Flatback turtle • Olive Ridley turtle • <i>Carronia pedicellata</i> • <i>Chingia australis</i> • <i>Dendrobium bigibbum</i> • <i>Phaius pictus</i> • <i>Vappodes phalaenopsis</i>
	<u>Migratory species</u> <ul style="list-style-type: none"> • Various migratory shorebirds and waders • Green turtle • Loggerhead turtle • Hawksbill turtle • Flatback turtle • Olive Ridley turtle • Saltwater crocodile • Snubfin dolphin • Indo-Pacific humpback dolphin

⁴ Note that a State Marine Park is also present but is not listed as MSES
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Matters of Environmental Significance

Level	Feature
State (MSES)	<u>Threatened species– where essential habitat has been mapped</u> <ul style="list-style-type: none"> Southern cassowary *This also has cultural heritage significance <i>Arenga australasica</i>
	<u>Threatened species – where no essential habitat has been mapped</u> <ul style="list-style-type: none"> Macleay’s fig-parrot (known to occur) Beach stone-curlew (known to occur) Spectacled flying-fox Green turtle Loggerhead turtle Hawksbill turtle Flatback turtle Olive Ridley turtle Phaius pictus
	<u>High ecological significance wetlands</u> Boat Bay - confirmed within study area (corresponds to GBR values)
	<u>Of concern regional ecosystem</u> RE 7.8.7b - confirmed within study area
	<u>Indigenous cultural heritage sites and artefacts (FM:B33, B42, B43, B44)</u> Confirmed within study area
Other values	<u>Marine plants (mangroves and seagrass)</u> Confirmed within study area
	<u>Coral reefs</u> Confirmed within study area
	<u>Basalt formations at Clump Point</u> Confirmed within study area
	Confirmed within study area

Confirmed/known to occur = recorded in study area; if no status is listed, feature is of moderate to high potential to occur in the study area

The Project will avoid causing a significant impact to any MNES or MSES values. The Project will not:

- require the excavation/dredging of coral reef
- seek a change in the boundary of the GBR World Heritage Area and Marine Park (i.e. connection of breakwater to land)
- clear substantial areas of littoral rainforest/vine thickets, including any clearing that would fragment existing patches.
- clear vegetation within area mapped as RE 7.8.7b
- clear vegetation associated with a southern cassowary nest.

Environmental offsets are not expected to be formally required to offset environmental impacts, with the possible exception of the area of mangroves impacted. However offset and enhancement opportunities will be pursued regardless of formal requirements for the Project generally however. Offset opportunities in the study area include rehabilitation (and replanting) of degraded vegetation areas on the east of Clump Point, and rehabilitating mangrove areas.

The management of impacts to other significant values are discussed in the sections above.

8 Conclusion

The proposed Project has been designed to provide conditions which allow the safe transfer of passengers and goods in non-extreme wave conditions. The design supports the provision of boating infrastructure that will ultimately:

- provide limited commercial infrastructure to support economic benefits to the local community
- reduce conflict arising from joint commercial and recreational use
- respect the rich natural environment and cultural heritage of Mission Beach.

The design has been based on numerous sources of information including:

- information contained in many environmental studies, such as including marine ecology, water quality, sediment sampling and terrestrial ecology
- site investigations such as geotechnical, marine modelling, and hydrodynamic and sediment transport modelling
- consultation with local Mission Beach community stakeholders including the Djiru people
- relevant design standards.

The Project has the potential to cause impacts on the environment. These environmental impacts will be avoided or managed through environmentally sensitive design, management of construction (including oversight of contractors) and operational phase activities, and contingency planning. The most sensitive environments include benthic habitat communities (i.e. coral reef, seagrass), littoral rainforest and vine thicket communities and associated habitat values for the southern cassowary and Arenga palm, and cultural heritage values and features.

Key considerations in managing these impacts during the design phase as well as through environmental management plans and approvals for construction and operational phases are listed below:

- potential for marine infrastructure to impact on important benthic habitat communities, such as seagrass and coral reef areas, and associated impacts on the GBR
- potential for terrestrial infrastructure to cause the loss or degradation of important vegetation communities, including littoral rainforest and vine thickets, and impacts to protected flora and fauna species (e.g. Arenga palm, southern cassowary)
- impacts of marine infrastructure on coastal processes, including sediment transport (and siltation) and waves and currents
- the desires of the Djiru people in regards to management of specific cultural heritage sites (e.g. fish traps) as well as the land of Clump Point more generally
- ongoing operational arrangements for the boat ramp, including approval regimes with relevant authorities.

Conclusion

Based on the potential impacts from the Project works, key approaches during the design, construction and operational phases include:

- design of marine infrastructure in accordance with *Fisheries Guidelines for Fish-Friendly Structures (Derbyshire, 2006)*
- incorporation of risk-management into the detailed design phase, considering potential for spills and pollutant discharge from Project infrastructure to the environment, including stormwater runoff
- preparation and implementation of a Construction Environmental Management Plan during the construction phase, including measures for erosion and sediment control, marine megafauna noise and vessel strike management, acid sulfate soils management, spill/pollutant discharge contingency response, pre-clearing surveys and rehabilitation
- preparation of operational documentation related to management of lighting, traffic/parking, spill/pollutant discharge, refuelling (if relevant), and vessel movements and mooring, including through the amendment of the Clump Point Site Management Arrangements
- ongoing discussions with the Djiru people regarding impacts to cultural heritage
- offsetting of impacts to sensitive vegetation, marine plants and coral areas, in accordance with relevant government and council guidelines.

These approaches will be followed during detailed design, be commitments in the approvals process and be diligently followed during and after construction.

9 References

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Appendix 1 Initial Reference Group Advice Statement

1 Background

A community information session was held on 18 May 2016 to discuss the project with a range of groups and individuals representing commercial and recreational boating, community and environmental stakeholders. The high level project objectives were summarised at the meeting as:

1. Provision of safe boating infrastructure
2. Facilitation of local economic development
3. Reduce conflict arising from joint commercial and recreational use
4. Respect the rich natural environment and cultural heritage of Mission Beach

The Department of State Development (DSD) confirmed that, in response to the feedback from a number of community groups, the project scope had been reviewed and the focus was now on delivering boating facilities at Clump Point, as opposed to Perry Harvey jetty. The majority of those present considered that the priority for the project should be the delivery of a breakwater extension that provided safe overnight mooring and would facilitate expansion of the tourist industry. It was accepted that the project may not provide safe haven in cyclonic or major storm events. Representatives from conservation and environmental groups raised concerns however about the impact of intensifying use at Clump Point.

To advance the project DSD invited key boating, community and conservation groups to join a Reference Group to provide community input on issues, concerns and values during the preparation of a Development Plan for the Clump Point project. Reference Group deliberations have been informed by new bathymetry, marine ecology survey and terrestrial surveys, and previous studies.

The Reference Group agreed responsibilities are:

- The Reference Group is to provide community input on a range of matters
- The Reference Group will provide an advisory role on issues, concerns and values
- The Reference Group is not a decision-making body

The Reference Group agreed Charter is to:

- Receive and discuss information
- Provide advice during the preparation of a Development Plan for the Clump Point project
- Monitor and represent community views regarding issues, impacts and benefits
- Provide information about the project to other community members

The Reference Group has considered planning and legislative matters, environmental and cultural heritage issues, and the requirements of the Council, DTMR and DSD. Discussions have been held about the desired features to determine core elements to be delivered with existing funding including appropriate contingency allowance, and options to be included if existing and future funding permit.

The Reference Group has progressively considered issues at a sequence of meetings, and been provided with a draft copy of the proposed Development Plan. This Advice statement sets out the Reference Group views on key issues and includes points of agreement and any points of disagreement ordered by the organisation represented.

The draft Development Plan may be updated to address issues raised in this Advice. That version of the Development Plan and this Advice will then be considered by the Cassowary Coast Regional Council (CCRC), the Department of State Development (DSD) and the Department of Transport and Main Roads (DTMR). The Department of Transport and Main Roads will then consider the views of the other two agencies before deciding whether the project is viable and should proceed

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to the next phase. If it does the project will be transferred from DSD to DTMR for detailed design, approvals, and then tendering and construction.

The detailed design will address a number of issues and the Development Plan may need to be updated to reflect design refinements.

The member organisations in the Reference Group are:

- Mission Beach Boating Association (MBBA)
- Mission Beach Community Association (MBCA)
- Cassowary Coast Alliance (CCA)
- Community for Cassowary and Coastal Conservation (C4)
- Department of State Development (DSD)
- Cassowary Coast Regional Council (CCRC)
- Department of Transport and Main Roads (DTMR)
- Cassowary Coast Safe Boating Association (CCSBA)

Appendix A sets out the individuals who participated in the Reference group process.

2 Clump Point issues

2.1 Indigenous Heritage

Clump Point holds very high significance and cultural, social and spiritual value for the Djiru people.

Points of agreement

- The Aboriginal heritage values of Clump Point are recognised and must be protected. (RGM1).
- Native title land is an important point and requires follow-through regarding all development works including car parking.
- Basalt boulders to the north-east and east of the current parking area (next to the boat ramp) should not be covered over but kept as a site feature. They should remain in the area and be visible, to contrast with imported granite. The Djiru people need to be consulted (RGM3).

Points of disagreement

- None

2.2 Vegetation

Remnant native vegetation on Clump Point is protected under the provisions of the *Vegetation Management Act 1999* (Qld) and EPBC federal act.

Points of agreement

- Revegetation, rehabilitation and the removal of weed species is desirable in all areas directly impacted by the project, and in other areas on Clump Point where agreement can be reached for any required offsets.

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Clump Point
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- Retention of the wilderness character and the diversity of the rainforest species makes this area special.
- The rainforest atmosphere, especially the canopy, should be retained to the fullest extent possible.

Points of disagreement

MBBA none

MBCA none

CCSBA none

C4 none

CCA Agree with points above.

Studies have identified the shortcomings of protection under current VMA legislation. Advice from local ecologists should be sought to inform any offsetting or vegetation management on the Clump Point headland.

2.3 Mission Beach Area Boating Management Plan

It was suggested that a Management Plan for the larger area should be prepared that could include Clump Point, the Perry Harvey jetty, and interactions with the surrounding area. (RGM1).

Points of agreement

- The Reference Group focussed on matters directly related to the Project (RGM1).
- Broader planning issues are a matter for the Cassowary Coast Regional Council (CCRC) and possibly the Queensland Government depending on the issues to be addressed (RGM1).
- The CCRC and the Queensland Government will be informed about any issues arising from the Reference Group deliberations relevant to those broader planning processes (RGM1).

Points of disagreement

MBBA none

MBCA none

CCSBA none

C4 C4 recommends that a management plan is prepared.

CCA Acknowledgement of the importance of World Heritage status of the land and sea environments to the Mission Beach economy should be included in the Development Plan.

A plan for the whole area that includes the Perry Harvey jetty is recommended, and the Development Plan should include the jetty as part of the safe boating infrastructure.

There is a limited capacity for development of the Clump Point headland.

The MBSBI project should be seen as THE limit with no room for future expansion.


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2.4 Clump Point integrated management plan

It was suggested that an Integrated Management Plan for the full Clump Point area is desirable (RGM3).

Points of agreement

- Broader planning issues are a matter for the Cassowary Coast Regional Council (CCRC) and possibly the Queensland Government depending on the issues to be addressed (RGM1).
- The CCRC and the Queensland Government will be informed about any issues arising from the Reference Group deliberations relevant to those broader planning processes (RGM1).

Points of disagreement

MBBA none

MBCA none

CCSBA none

C4 Environmental and cultural values and available space significantly limits possible development on Clump Point, and a detailed plan for the whole of Clump Point should be prepared to guide all development and future use including matters addressed by the Development Plan.

CCA Environmental and cultural values and available space significantly limits possible development on Clump Point, and a detailed plan for the whole of Clump Point should be prepared to guide all development and future use including matters addressed by the Development Plan.

2.5 Perry Harvey jetty

The jetty is owned by CCRC and does not form part of this project. A number of group members wanted to make observations about the jetty and the advice below will be passed on to the CCRC for its consideration.

Points of agreement

- D-rubber fenders would improve access to Perry Harvey jetty.
- Could put a head on the end of the jetty to extend it.
- Could put staged landings on the northern side.

Points of disagreement

MBBA none

MBCA The jetty should not be included in planning and should not be improved as it is a waste of CCRC finances. There is nothing to be gained in continuing to try to justify the existence of the Perry Harvey jetty. Fuel and water may be able to be provided from there but not without spending a lot on berthing improvements. Even then it would be inconvenient for operators to use at all times, and unsafe when winds exceed 10-12 knots.

CCSBA none

C4 Consider that the jetty should be included in planning for the whole Boat Bay area and the jetty should be improved to make it usable (RGM3).

Handwritten signatures and notes at the bottom of the page. A central note reads: "D. R. A. CR. PRIEST TMR 16/8/16". Other signatures include "DR", "Gle", and "DB".

This Advice document should include the comment that 'because of physical, cultural and environmental constraints on Clump Point, the Perry Harvey jetty will need to be included in future plans for marine infrastructure in Mission Beach.

CCA Tourism and private boat operators who currently use the jetty, or may wish to in the future, should be consulted about necessary enhancements to increase the use of this valuable asset.

The Perry Harvey jetty is safe to use a lot of the time and should be included in this project with some of the MBSBI funds allocated for the above points of agreement and it would take the pressure off the limited capacity of Clump Point.

3 Land infrastructure issues

3.1 Access road

Clump Point is accessed from Alexander Drive and Porter Promenade via Clump Point Road. The first part of that road (heading towards Clump Point) is narrow and surrounded by remnant native vegetation which provides a canopy effect. The surrounding vegetation is Cassowary habitat. About half way along the road it becomes wider and passes by recently cleared car parks.

Points of agreement

- Clump Point is a special place and an essential part of the special character of Mission Beach (RGM1).
- The low key, heavily vegetated, canopied entrance needs to be protected as does the surrounding remnant vegetation, and the contained Cassowary habitat (RGM1).
- The access road should be generally maintained at the current width but pull-over areas could be informally provided with no parking allowed in those sections (RGM1).
- The informal pull-over areas should be clearly signed and notification signs of passing areas ahead should be provided (RGM1).
- The pull-over areas need to be able to contain vehicles with attached boat trailers (RGM1).
- Suitable non-vegetated areas are already available but some trimming of lower branches may be needed in those pull-over areas (RGM3).
- The access road should generally remain as it is with some widening in non-vegetated existing areas to create informal pull-over zones.
- The full length of road should be sealed (CCRC) with shoulders and pull-off areas hardened.

Points of disagreement

MBBA none

MBCA none

CCSBA none

C4 Agree with most.

Complete section of road through forest should be 'No Parking' with signage at beginning and end only.

CCA All signage (including non-parking for the distance of the canopied approach road) should be placed at each end of the narrow road section rather than at each passing area.

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TMM
16/8/16*

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DTMR Access road - the community understands and supports that the environmental and cultural heritage values of Clump Point significantly constrain the access. Because of these constraints the site needs to be developed and managed under an operational management plan to avoid unnecessary traffic. This will involve bussing most commercial passengers.

CCRC none

3.2 Parking

Parking arrangements were addressed in plans for the recently withdrawn tender works. Those works have already been approved.

Points of agreement

- Parking at Clump Point should be limited to protect the special environment to avoid acting as an attractor of users that may exceed the available capacity (RGM 1). A parking management plan is required as part of the overall operational management plan.
- The existing parking as included in the works already approved is generally considered to be the limit of what parking could be provided on Clump Point (RGM1).
- Part of the demand for longer term and overflow parking and any required coast guard storage shed could be provided nearby but not out on Clump Point. (RGM 2).
- CCRC would be prepared to review possible locations for longer term and overflow parking, close to but not on Clump Point, if future demand requires it (RGM3).
- The parking area adjacent to the existing ramps needs to be raised to reduce wave overtopping and the associated damage to the parking surface (RGM 2).
- The parking area adjacent to the existing ramps should be reviewed to ensure adequate turning circle for vehicles (RGM3).
- The existing and planned parking areas should be reviewed to ensure optimal use of the area available (RGM 2).
- Parking areas should drain to adjacent areas to support vegetation with 'soft edges' and where possible permeable surfaces provided (RGM 2).
- Parking designs should be reviewed to identify opportunities for the planting of native shade trees that also enhance the current habitat and views on Clump Point (RGM 2).
- The highest astronomical tide (HAT) causes significant inundation of the lower road and car park with resulting damage to the road surface and it should be raised.
- Eastern side of the lower car park be extended, particularly turning area and derigging area (RGM3).
- Some parallel parking could be provided from the boat ramp area up towards the existing large car park on the western side of the road (RGM3).
- Single vehicle parking for clients of commercial operators should be such that the commercial operator needs to transfer clients, or advise them to park remotely (RGM3).
- A mini-bus set down area is required. There is potential for areas under trees in the nature strip in the current design to potentially facilitate this. Other suitable locations closer to the marine facilities could be considered in the design stage (RGM3)
- The southern carpark boundary is the extent of the council reserve, so any extension would require negotiation with the Djiru people (RGM3).

R. Priest
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- The parking areas should generally be consistent with the details shown on the withdrawn tender plans, except that the parking area adjacent to the ramps should be raised, the drain to the ramps removed, details revised to allow runoff to adjacent vegetation and infiltration where practical, and native shade trees planted to enhance views in the vegetation strip and adjacent to the southern car park.
- Parking arrangements should be reviewed to ensure adequate turning circle for vehicles near the ramps, a mini-bus set down area is available and passengers for commercial operations park away from Clump Point.

Points of disagreement

MBBA none

MBCA Dot point 2. Existing parking is not considered to be the limit of what parking could be provided.

Dot Point 11. The lower carpark should be extended south to the accepted boundary of the littoral rainforest as discussed during our walk around. Sufficient space needs to be provided wherever possible for turning areas and derigging areas. Average trailer-boat owners are generally inexperienced and need plenty of room to manoeuvre.

MBCA supports maximising the number of carparks taking into consideration all reasonable limiting factors including vegetation protection and other environmental factors and abiding by agreements negotiated between CCRC and the Djiru people.

CCSBA Supports seeking a moderate increase in parking to that shown in the tender plans.

C4 Agree with most as indicated above, except some concerns. Raising the height of the carpark will already have extended the footprint eastward by the amount recognised on the field-trip inspection.

Wherever water flow is concentrated due to heavy rain, erosion will occur. Some control measures will be necessary to deal with surface run-off from hard surfaces such as roads even when some permeable surfaces are included. Some storm-water drainage will be necessary. See Section 3.3 point 2.

CCA Rehabilitation should be consistent with the current vegetation RE and advice should be sought from local ecologists.

In regards to the suggestion that 'eastern side of the lower car park be extended' parking should not be extended into the intertidal rock pools or any further into the bay, and the requirements for the turning circle and car park raising will probably be the limit of what can be achieved in this area.

Raising of the car park should only be of a height to avoid inundation at those rare times during the highest spring tides. This area cannot continue to be raised to mitigate anticipated rising sea levels as a result of global warming. Perhaps raising walls should be considered against raising whole carpark to reduce rock wall footprint now and in the future.

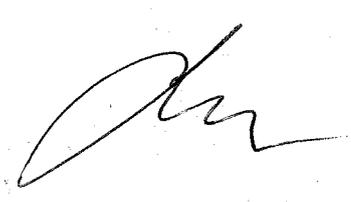
CCRC Point 8 - Formal parallel car-parking would need to meet current design standards.

Point 10 - A formal mini-bus set down area should not reduce the number of carparks.

DTMR Parking - the community understands and supports that the environmental and cultural heritage values of Clump Point significantly constrain parking at the site. Because of these constraints the site needs to be developed and managed under an operational management plan to avoid unnecessary traffic. This will involve bussing most commercial passengers.



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3.3 Pedestrian access

Current pedestrian access is informal along the road.

Points of agreement

- Safe pedestrian access from the southern carpark to the boat ramps is required.
- The removal of the stormwater drain to the boat ramp, as described in the withdrawn tender plans, provides an opportunity for informal parking or pedestrian access.
- Pedestrian safe access arrangements along Clump Point Road especially from the car parks should be reviewed in detailed design.

Points of disagreement

MBBA none

MBCA none

CCSBA none

C4 Width of pedestrian access should not compromise parking or road width, or require expansion of overall footprint. Some storm-water drainage will be necessary and may be best combined with pedestrian access. Otherwise agree.

CCA Pedestrian access should be kept as informal as possible and consistent with the wilderness character of the headland.

DTMR none

CCRC none

3.4 Water supply

There is currently no mains water supply to Clump Point and if installed a water main would need to be provided along the road to avoid impacts on surrounding vegetation. A mains water supply could be used for boat re-supply, boat wash down, firefighting, drinking water bubblers, and within any toilet block. Water is available on the Perry Harvey jetty. CCRC have advised any water supply line would be trenched up the centre of the road, and CCRC has no budget in the current F/Y for contribution to a Clump Point water supply. If a water main is provided at Clump Point, CCRC would not charge for use of water but would need to look at appropriate management techniques.

Points of agreement

- Liable to be a costly installation. A lot of disruption during construction (RGM3).
- The provision of a water main should be included in the project and reviewed in detailed design.

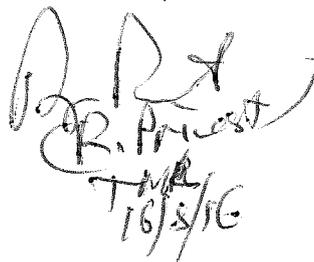
Points of disagreement

MBBA A reticulated water supply is essential at Clump Point.

MBCA Regards mains water supply as an 'essential' and thinks it should be funded from the project budget and not left to CCRC. Does not believe it is a costly installation and its construction does not need to be disruptive if directional boring is utilised.

Please refer to Mager's all inclusive quote of \$101,000.

CCSBA A reticulated water supply is essential at Clump Point.



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- C4 Mains water is not essential; there is potential for considerable usage/wastage of potable water (cost to rate-payers for private benefit); boat and trailer wash-down liable to lead to congestion of traffic in de-rigging area.
Alternatives – water available at PHJ for boat re-supply. CCRC wash-down on Porter Promenade (check current status). Note that water is not acceptable for fighting fuel or electrical fires which are common boat fires (apart from the fact that all commercial vessels and most recreational ones are required to have fire extinguishers).
If included, trench required by CCRC must be along middle of road to minimise effect on vegetation.
- CCA A tank supplied from the roof of the toilet block is appropriate, and water is available at the jetty. Recreational boating needs can be addressed before arriving at the boat ramp.
The provision of water will act as an attractor of users, including campers, that may exceed the available capacity and increase congestion.
Water is available at the Perry Harvey Jetty. Introducing a fence for any purpose on the approach road is not supported.
- CCRC Running a water main along the back of a low fence is not supported, and any water main would need to be placed underground.
- DTMR none

3.5 Toilet facilities

There are currently no toilet facilities near the boat ramps at Clump Point. The nearest public toilets are provided by the CCRC on Porter Promenade about 1km away. A sewerage connection to the end of the Clump Point Road would require trenching and power for a pump station, as well as a water main. CCRC have advised any sewer line would be trenched up the centre of the road, and CCRC has no budget in the current F/Y for contribution to a Clump Point sewerage facility.

Points of agreement

- A toilet block is needed close to the boat ramp area (RGM2).
- The toilet block should be located as shown on the plans for the withdrawn Stage 1 tender.
- A composting toilet is acceptable to most groups.
- The final type of toilet should be considered during detailed design informed by costings (RGM3).
- If power and water is to be installed the provision of sewerage should be investigated in detailed design.
- While a toilet block serviced by a sewer is preferred by many members, a composting toilet is acceptable if costings in detailed design show the sewer is unaffordable and the composting toilet will provide an acceptable level of amenity.

Points of disagreement

MBBA none

MBCA The provision of sewerage would be preferred. Other possibilities, a composting system or a holding tank and pump out system as costed in the MBBA/Mager tender would be acceptable if sewerage is unaffordable.

CCSBA A toilet block served by mains water and a sewer, and hence power is essential.

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- C4 Sewerage is not necessary on Clump Point – too disruptive in installation. Potentially problematic if it fails (power outage to pump, pump failure, broken or blocked pipes). Composting toilets are more contained. A sewerer toilet is about 400m away on the northern end of Mission Beach and another is at PHJ.
- CCA A compost toilet is appropriate, in the location shown on the withdrawn tender plans.
- DTMR none
- CCRC CCRC suggested that the toilet block should not be in the boat ramp area as this would expose the building to wave action in a large event and take up car parks close to the boat ramp.

 CCRC is not opposed to taking ownership of a sewerage system delivered by the project, but is satisfied that a composting toilet can fulfil the requirements of a boat ramp toilet facility.

3.6 Electric power

Electric power is highly desirable for lighting and navigation aids to ensure safe access in the dark, to ensure any marine infrastructure is not a navigation hazard, and for public safety.

Points of agreement

- The use of solar and generator backup could be considered (RGM2).
- If a water main is to be installed the inclusion of power, and sewerage in the trench could be considered, or at least conduits considered for future services.
- The provision of electric power using the same trench as the water main should be considered in detailed design, and is seen as an essential service to support commercial operations.

Points of disagreement

- MBBA none
- MBCA none
- CCSBA none
- C4 Mains power is not needed to run the relatively limited power requirements. Solar is adequate for LED lighting and navigation hazard marking.

 Lighting should not be excessive (some could be movement activated). Lights require shading to limit light pollution away from carpark/ramp area.

 Minimise number of trenches – would greatly prefer none, but if included, one may be acceptable along middle of access road.
- CCA Support solar with generator back-up.

 The development plan for MBSBI should be considered the limit of the capacity of Clump Point (see 2.3).

 Introduction of extra amenities will increase demand and cause congestion. (See comments on 3.4)
- CCRC none
- DTMR none

Handwritten signatures and notes at the bottom of the page include:

- Initials "PR" and "SM" on the left.
- A signature "R. Porrest" with the date "16/8/16" in the center.
- A large signature on the right.
- Initials "IB" at the bottom right.

3.7 Booking office, kiosk and store rooms

It is understood that some commercial operators would like to have these facilities available for their use near the boat ramps and the potential future marine infrastructure.

Points of agreement

- A booking office, and other commercial activities such as a kiosk or store rooms are not essential (RGM2).
- These facilities should not be included to preserve funds for other essential features.
- If these facilities are considered essential in future years due to tourist numbers they could be provided by commercial operators as relocatable small buildings.

Points of disagreement

MBBA none

MBCA Agree in principle. But if these facilities are to be provided in the future, should not a space allowance be made for same in the design? Any such buildings need to remain out of sight as much as possible when the site is viewed from the ocean.

CCSBA none

C4 Not required. Will impose on limited space available. Previously available at jetty and could be easily replaced there.

CCA Not needed as commercial operators should be transporting passengers from elsewhere to avoid parking congestion, as previously agreed by the RG.

CCRC none

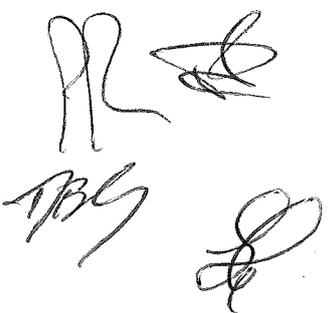
DTMR none

4 Marine infrastructure issues

4.1 Safe boat ramps

Points of agreement

- There is a need for launching facilities at a number of locations (RGM1).
- There is a need for safe retrieval areas when the weather changes during the day (RGM1).
- Enhanced protection at Clump Point would provide a much safer facility under rough conditions (RGM1).
- Safe access should be provided to and especially from the water for recreational boating users (RGM1).
- Removing return/toe off existing breakwater would improve access and remove the need to relocate coral bommies (RGM3).
- Safe recreational access must be incorporated in the larger project and not limited to the \$500k from boating registration fees (RGM3).
- The boat ramps should be upgraded with the layout generally consistent with the withdrawn tender plans, but reviewed to ensure protection next to the rock wall and with provision for pontoon or floating walkway access next to each boat ramp lane. The existing breakwater return should be removed to provide a more direct access path and to avoid the need to relocate the coral bommies. The safe navigation channel should be marked.



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Points of disagreement

- MBBA none
- MBCA Relocation preferred or at least mark bommies with navigational markers if that will suffice.
- CCSBA none
- C4 none
- CCA none
- CCRC none
- DTMR none

4.2 Moorings and berths

Berth options could be any one of – (1) isolated pile pen berths – (2) jetty with pen berths – (3) jetty with gangways and pontoons (which would be towed away under a contract in the event of a cyclone threatening or sunk) (RGM3). Moorings are likely to be swing moorings.

Points of agreement

- There needs to be a balance between capacity and environmental protection (RGM 2).
- The future demand for access for berths for larger boats will not be able to be met (RGM 2).
- An acceptable number of berths should be provided for commercial operators who will have a beneficial impact on the local economy (RGM 2).
- Short term loading and unloading access should be provided for recreational and commercial users (RGM 2).
- The development should not be a 'marina' catering for a large number of boats (RGM 2).
- Safe haven (but not in a cyclone) for commercial operators may be from a mixture of permanent berths, swing moorings and possibly pens (RGM 2).
- Given that the demand for commercial access may exceed the available capacity it is recommended that access will need to be bid for at regular intervals, possibly with some method of also considering the benefits provided by a user to the local economy (RGM 2).
- Safe haven should be provided for 7 boats, as assumed in the MBBA design (RGM 2).
- Commercial operators, including fishing, need access for offloading and berthing or mooring. While some commercial operators may want permanent berth access, many could work with loading and unloading access combined with a safe mooring or pen (RGM 2).
- It was suggested that between 4 and 6 moorings may be required, with an upper maximum of 10 also discussed (RGM 2). Subsequently GBRMPA indicated at a meeting that they would consider 11 moorings or berths in the area.
- Pen berths could be considered (RGM3 - but not full support).
- A margin is needed for under keel clearance of up to 0.3m to 0.7m in normal sea-states (low wave heights) (RGM3).
- Berthing load/unload for a public pontoon is supported (RGM3).

Points of disagreement

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	MBBA	MBCA	CCSBA	C4	CCA	DTMR
Recreation user short stay moorings	2 or 3	3	2	2 or 3	6	3
Commercial user multi-year lease mooring	2 or 3	4	3	2 or 3	5	3
Recreational user loading pontoon boat spaces*	2	2	1	2?	2	2
Commercial user loading pontoon boat spaces*	4	2	4	2?	2	2
Pontoon berths – commercial lease	0	4	0	0	0	0
Pen berths – commercial lease	6	0	6	5?	0	5
	11 max?	11 min	11 max	11 max	11 max	

- * loading facility

Comments:

MBBA Total capacity needs to be negotiated with GBRMPA.

Permanent berths/pens are needed.

MBCA GBRMPA's allowance for 11 permanent moorings or berths is considered satisfactory.

MBCA requests DTMR to consider an amalgam of the three existing design options that have been put forward for consideration.

Delete the commercial/barge ramp as designated in the MBBA/Mager Community Plan. Delete the road on the new breakwater and restructure the breakwater to support only a pedestrian pathway which would also support an electric buggy that could tow a trailer. The bridge as well as the breakwater could then be of considerably lighter construction. This would save an estimated \$3 million.

Upgrade the existing breakwater as suggested by DTMR, delete most of the existing return and provide a single lane concrete road with a turnaround at the return, as suggested. This would be the staging point for fuel and supplies trucks and emergency services.

The Community Plan suggests that the new breakwater should extend approximately 170m [including the length of the bridge] from the centre line/high tide mark of the existing breakwater.

It is accepted that a final on-water design still requires a lot of professional input before a preferred option could be agreed upon. It is requested that the best possible advantage must be made out of the deeper water at the NW extremity of the breakwater.

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 16/8/11

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All non-trailerable commercial vessels require access to a walkway at all times for cleaning, provisioning, and maintenance. All vessels require a floating platform to load and unload passengers regardless of their being commercial or private.

The basic DTMR design with the 5 holding pens was not looked upon favourably by anyone at the recent MBCA general meeting.

Tully Coast Guard should be further consulted re their requirements.

CCSBA none

C4 Pontoon loading/unloading spaces need to be shared. Set times for commercial operation (preferential use). The 50m pontoon (assumed length from diagrams showing Options 1A and 1B) could take 2 larger boats at a time or three smaller vessels.

There should not be any permanently occupied berths at the pontoon (implies safety from storms).

The GBRMPA-suggested total of 11 would be distributed as swing moorings through Boat Bay, not all clustered behind the proposed breakwater. We could consider a small number of piled moorings closer to the breakwater.

C4 advocates that a provisional set of operating procedures is developed in conjunction with the design in order to adequately achieve safe boating objectives.

Pen berths – commercial lease - 0, but could consider up to 5 maximum if not connected to land.

Commented [P1]: Pen moorings – no land access

Detailed design would need to consider how dinghies are stored or left unattended.

CCA 'Safe haven' needs to be further clarified. (See 2.3)

No permanent berths should be provided.

Finger pontoons should not be allowed for berth access.

The development should not be a marina, that is, any permanent berths including pen berths.

Moorings numbers should be determined by permit application to GBRMPA.

CCRC none

DTMR none

4.3 Boat clearway

Points of agreement

- On-water access space is needed to allow ramp, berth and mooring movements without conflicts (RGM 2).
- A new breakwater will create a safer area for all boats to wait for access to ramps or landings, and this area needs to be kept clear of permanent moorings and anchored boats.

Points of disagreement

None

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- Signature: R Priest
- Date: 16/8/16
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- Signature: [illegible]

4.4 Commercial ramp

The MBBA proposal included a heavy duty commercial ramp for small to mid-size barge access and the launching and recovery of larger commercial vessels (RGM 2).

Points of agreement

- Barge access needs clear approach and departure lines, and possibly piles for pivot movements depending on the required approach angles (RGM 2).
- Medium sized commercial barges could occasionally use the existing boat ramps at higher tides if approach angles were improved. (RGM 2).
- Ongoing occasional medium barge ramp use would require a greater thickness of concrete on than that currently in place on the two existing ramps which could be included in a new third ramp lane (RGM 2).
- Dual use of the current and planned third ramp lane could be further considered to provide the occasional commercial requirements for a medium weight barge (RGM 2).
- Occasional medium barge ramp use would require improvements to the approach angles by either removing coral bommies or part of the return of the existing breakwater (RGM 2).

Points of disagreement

MBBA MBBA accepts that the commercial boat ramp shown on the MBBA proposal will not proceed.

MBCA none

CCSBA none

C4 No separate ramp for barge or commercial operations (no demonstrated need). The western ramp may be suitable for very occasional barge use (extraordinary occasions), so may need strengthening, piles and improved approach lines by removing the return of the existing breakwater (as previously agreed). Note – on the Options diagrams, the return is not fully removed as it is being used as a turning-circle.

CCA No commercial barge access should be provided.

There is limited space in this location for barge operations, and there would be considerable conflict with recreational usage.

Removal of bommies is different to relocation of bommies and should be clarified.

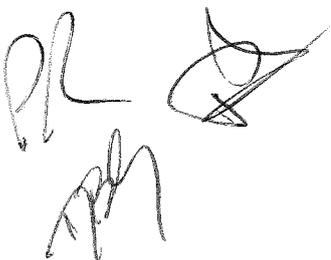
Commercial barge operations would place additional impacts on Clump Point and community usage.

CCRC Barge use at this facility is problematic in that it needs to coexist with recreational users.

DTMR DTMR wishes to note that upgrading the proposed third boat ramp lane to small barge capacity can be considered in detailed design, however this will require an upgrade to the adjacent floating walkway to prevent damage by barge impact to the light duty existing walkway.

4.5 Fuel supply

There is currently no permanent on-water fuel service at Mission Beach. Safe refuelling is an important issue for non-trailer boats, the majority of which are expected to be commercially operated. At some other locations fuel supply lines are built into pontoons with feed-in points provided at a safe tanker discharge point. The connecting fuel lines include automatic shut off



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16/8/16



connectors. There may be a requirement for a GBRMPA permit for any fuelling facility. Environmental values and safety are paramount to CCRC management of fuelling facilities. Perry Harvey jetty can be used for supply from a fuel truck direct to a boat. This method is the preferred CCRC option at either Perry Harvey jetty or Clump Point. However, if the selected configuration requires a fixed fuel line, then it may be expensive and require significant approvals and management protocols. Permits can be issued for fuelling from Perry Harvey jetty, if applied for. GBRMPA has sanctioned this. No permits have been issued yet. CCRC has issues with authorising and managing a fuel installation. They would prefer to licence one or more fuelling tanker operators, who would be required to sign off on strict protocols. (RGM3)

Points of agreement

- Safe fuel delivery is essential (RGM2)
- Fuel supply can occur at the Perry Harvey Jetty during calm weather

Points of disagreement

- MBBA Forget the jetty as previously mentioned. A fixed fuel line appears to be the most appropriate.
- MBCA Forget the jetty as previously mentioned. A fixed fuel line appears to be the most appropriate.
- CCSBA The management of fuel trucks backing down the jetty is a serious concern – especially for pedestrians on the jetty.
- C4 No fixed fuel lines. All fuel delivery through removable hoses controlled by fuel delivery contractor. Fixed line refuelling ('bunkering') is a high risk activity requiring multiple skilled personnel in attendance.
- CCA Strongly disagree with any fuel supply at Clump Point – existing arrangements are in place at the jetty.
- CCRC Do not want to manage refuelling facilities and would prefer to licence one or more fuelling tanker operators, who would be required to sign off on strict protocols.
- DTMR Do not want to manage refuelling facilities.

4.6 Breakwater

Points of agreement

- Barging rock needs to be looked at in terms of cost and local impact (RGM3).
- Tidal ducts should be further investigated and supported – within the breakwater (RGM3).
- The method of breakwater construction will be decided during detailed design, with barging supported even if it is acceptably more expensive than delivery through Clump Point by truck.
- The breakwater design approach should be selected during detailed design, depending on cost and impacts. The concept of a lower breakwater protecting an adjacent pier access has merit and is worth comparing with access via the breakwater.

Points of disagreement

- MBBA none
- MBCA Refer to comments above regarding the breakwater. MBCA would like DTMR to adopt the best final design plan even if it is [acceptably] more expensive than an alternative. Rarely is the cheapest the smartest way to go.

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CCSBA

C4 Lower breakwater has smaller footprint on sea-floor as well as for scenic values. Removal of pen moorings would allow shorter length of breakwater.

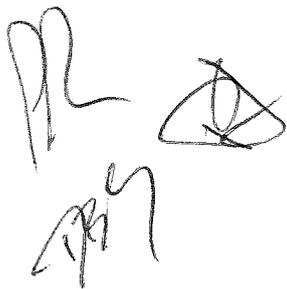
Agree that tidal ducts may be beneficial (though unproven in our conditions), but modelling of coastal processes needs to be undertaken.

Placement of rock is important irrespective of cost (as is size of rocks). While car-park may be built up using material carried by trucks, the offshore breakwater should be constructed from material carried by barge. Need to discuss details of construction methods.

CCA If a breakwater is to be built it should have the smallest possible footprint to support safe loading and unloading. In this regard the lower breakwater is preferred.

CCRC none

DTMR none



R. Priest
16/8/16



Appendix A

Meeting attendance

Organisation	Member	Meeting		
		1 22/06/16	2 20/07/16	3 03/08/16
Mission Beach Boating Association (MBBA)	Alan Jago	✓	✓	✓
	Danny Dade	✓	✓	x
	Richard Giuliani	x	x	✓
Mission Beach Community Association (MBBA)	Glen Murray	✓	✓	x
	Peter Heywood	x	✓	✓
Community for Cassowary and Coastal Conservation (C4)	Peter Rowles	✓	✓	✓
	Dr Helen Larson	x	✓	✓
Cassowary Coast Alliance (CCA)	Liz Gallie	✓	✓	✓
Cassowary Coast Regional Council (CCRC)	David Goodman	✓	✓	✓
Cassowary Coast Safe Boating Association	Stephen Chillcott	x	x	x
	Glen White	x	✓	x
Department of State Development	Ian McKirdy	✓	✓	✓
Department of Transport and Main Roads	Chris Voisey	x	✓	✓
	Roger Priest	x	✓	✓
Reference Group facilitator	Simon McNeillage	✓	✓	✓
Advisor - commercial vessel operator	Jason Shearer	x	x	✓
Advisor - barge master Dunk Island Landing Barge	Justin McCallum	x	x	✓

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 (R. Priest)
 T.M.R.
 16/8/16

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IN TRUST & WITH RESERVATION

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Appendix A - Meeting attendance

It was agreed at the end of Meeting 4 on 16 August 2016 that the signed meeting attendance list on the previous page would be updated to include the final meeting and be attached to the Advice statement.

Organisation	Member	Meeting			
		1 22/06/16	2 20/07/16	3 03/08/16	4 16/08/16
Mission Beach Boating Association (MBBA)	Alan Jago	✓	✓	✓	✗
	Danny Dade	✓	✓	✗	✗
	Richard Giuliani	✗	✗	✓	✗
	David Breadmore	✗	✗	✗	✓
Mission Beach Community Association (MBBA)	Glen Murray	✓	✓	✗	✗
	Peter Heywood	✗	✓	✓	✓
Community for Cassowary and Coastal Conservation (C4)	Peter Rowles	✓	✓	✓	✓
	Dr Helen Larson	✗	✓	✓	✓
Cassowary Coast Alliance (CCA)	Liz Gallie	✓	✓	✓	✓
Cassowary Coast Regional Council (CCRC)	David Goodman	✓	✓	✓	✓
Cassowary Coast Safe Boating Association	Stephen Chillcott	✗	✗	✗	✓
	Glen White	✗	✓	✗	✗
Department of State Development	Ian McKirdy	✓	✓	✓	✗
	Alicia Fava	✗	✗	✗	✓
Department of Transport and Main Roads	Chris Voisey	✗	✓	✓	✓
	Roger Priest	✗	✓	✓	✓
Reference Group facilitator	Simon McNeilage	✓	✓	✓	✓
Advisor - commercial vessel operator	Jason Shearer	✗	✗	✓	✗
Advisor - barge master Dunk Island Landing Barge	Justin McCallum	✗	✗	✓	✗

Appendix 2 Final Reference Group Advice Statement

Final Advice Statement to be included following Reference Group meetings

Appendix 3 Legislative and Planning Requirements

This Section describes the legislative context of the Project, including relevant permitting regimes. This includes consideration of likely policy instruments that would apply to the Project.

Commonwealth and State Legislation

Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a framework for assessment and approval of actions that will have or are likely to have a significant impact on MNES.

Policy statements and instruments relevant to assessing development related to these matters consist of the following:

- EPBC Act Policy Statement 1.1: Significant Impact Guidelines
- EPBC Act Referral Guidelines for the Outstanding Universal Value of the Great Barrier Reef World Heritage Area (May 2014)
- EPBC Act Policy Statement 3.9: Littoral Rainforests and Coastal Vine Thickets of Eastern Australia
- EPBC Act Policy Statement 3.15: Significant Impact Guidelines for the Endangered Southern Cassowary (*Casuarius casuarius johnsonii*) (January 2010).

Great Barrier Reef Marine Park Act 1975 (Cth) and Marine Parks Act 2000 (Qld)

The *Great Barrier Reef Marine Park Act 1975* (GBRMP Act) establishes the GBR Marine Park and a system for assessment and approval of activities within the park. The GBRMP Act sits alongside the *Marine Parks Act 2004* which establishes the GBR Coast Marine Park which is administered at a state level; the state marine park extends beyond the federal park to include the area between high and low water. A memorandum of understanding exists between the Commonwealth and the State to coordinate assessment processes under both Acts.

Zoning of both parks is provided for under respective zoning plans:

- Great Barrier Reef Marine Park Zoning Plan 2003 (Cth)
- Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004 (Qld).

The study area includes part of the Habitat Protection Zone ('dark blue' zone) of the marine park. Under the Act and zoning plans, conducting works within this zone requires a permit. In addition, any refuelling activities in the marine park must be undertaken under a relevant permit.

In assessing a permit application, the GBRMP Authority (GBRMPA) is expected to apply the following policies:

- Environmental Impact Management Policy
- Dredging and Dredge Spoil Material Disposal Policy
- Structures Policy
- Moorings in the Great Barrier Reef Policy

Native Title Act 1993 (Cth)

The *Native Title Act 1993* legally recognises the rights of indigenous land owners with native title over land and waters. A native title claim by the Djiru people was recognised by the Federal Court of Australia in 2011 over the Project area, and the Djiru people will need to consent to the proposed works. The entire study area is also under the Djiru Cassowary Coast Regional Council Area Indigenous Land Use Agreement (ILUA) entered into with the Cassowary Coast Regional Council in 2010.

Appendices

Sustainable Planning Act 2009 (Qld) and Associated Legislation

The *Sustainable Planning Act 2009* is the principle piece of planning legislation in Queensland, aimed at integrating the planning and approval systems from a range of other legislation. For the purposes of the Project, the Act provides the assessment system for the following approvals:

- Owners Consent – required for use of reserve land under the *Land Act 1994*
- Development Permit – required for the following activities:
 - prescribed tidal works (i.e. construction of maritime structures) under the *Coastal Protection and Management Act 1995* (CPM Act) and *Transport Operations (Marine Safety) Act 1994* (TOMS Act)
 - works in the coastal management district under the CPM Act
 - disturbance of marine plants under the *Fisheries Act 1995*
 - clearing of remnant vegetation under the *Vegetation Management Act 1999*

The agency responsible for issuing Owners Consent will be the Department of Natural Resources and Mines (DNRM). A Development Permit is assessed by both CCRC (usually as the assessment manager) and the State Government through the State Assessment and Referral Agency (SARA; usually as a referral agency).

Assessment for a Development Permit is conducted against the CCRC Planning Scheme and the State Development Assessment Provisions (SDAP). Table A3 1 summarises various relevant activities that would require a Development Permit and the corresponding codes for assessment.

Table A3 1: State government codes/policies for assessment

Aspect of development	Applicable code/policy for assessment
All elements above high water mark	CCRC Planning Scheme
Prescribed tidal works	Schedule 4A of CPM Regulation Module 10: Coastal protection Module 14: Maritime safety
Dredging	Module 4: Environmentally relevant activities Module 10: Coastal protection
Reclamation	Module 10: Coastal protection
Works in the coastal management district	Module 10: Coastal protection
Disturbance of marine plants	Module 5: Fisheries resources
Clearing of remnant vegetation	Module 8: Native vegetation clearing

Nature Conservation Act 1992 (Qld)

The *Nature Conservation Act 1992* provides for the protection of listed flora and fauna. It applies in the following circumstances:

- taking/clearing of a protected flora species not covered by a Development Permit
- disturbance of a breeding location of a protected fauna species.

Aboriginal Cultural Heritage Act 2003 (Qld)

The *Aboriginal Cultural Heritage Act 2003* establishes a cultural heritage duty of care for all persons. As part of this duty, persons are to take reasonable care to not damage any known or unknown cultural heritage items. Any works that require heritage items to be impacted must be undertaken under a Cultural Heritage Management Plan (CHMP) that has been approved by the relevant Aboriginal group.

Appendices

Environmental Offsets Act 2014 (Qld)

If a project causes a 'significant residual impact' on a MSES feature an environmental offset is required under the *Environmental Offsets Act 2014*. The criteria for identifying a significant residual impact are defined in the *Significant Residual Impact Guideline* (EHP 2014).

Matters within the study area that may trigger a significant residual impact are summarised in Table below, together with relevant impact thresholds.

Table Summary of relevant significant residual impact criteria

Matter	Relevant significant residual impact criteria
Of concern RE that is dense to mid-dense (structural category) i.e. RE 7.8.7b	Clearing an area greater than 0.5 ha
HES wetlands	Action causing any of the following: <ul style="list-style-type: none"> • Areas of the wetland or watercourse being destroyed or artificially modified • A measurable change in water quality of the wetland or watercourse • The habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected • A substantial and measurable change in the hydrological regime or recharge zones of the wetland • An invasive species that is harmful to the environmental values of the wetland being established in the wetland
Habitat for endangered and vulnerable wildlife (including essential habitat)	Action impacting on habitat in a way that is likely to: <ul style="list-style-type: none"> • Lead to a long-term decrease in the size of a local population • Reduce the extent of occurrence of the species • Fragment an existing population • Result in genetically distinct populations forming as result of habitat isolation • Result in invasive species that are harmful to an endangered or vulnerable species becoming established in the endangered or vulnerable species' habitat • Introduce diseases that may cause the population to decline • Interfere with the recovery of the species • Cause disruption to ecologically significant locations (breeding, feeding, nesting, migration or resting sites) of a species
Marine plants (i.e. seagrass)	Actions involving impacts to more than 25m ² of fish habitat and any of the following: <ul style="list-style-type: none"> • Temporary impacts that are expected to take five years or more for the impact area to be restored to its pre-development condition • A proposed reduction in the extent of marine plants through removal, destruction or damage of marine plants • Fragmentation or increased fragmentation of a marine ecological community • Adverse changes affecting survival of marine plants through modifying or destroying abiotic factors necessary for a marine plant's survival • Alteration in the species composition of marine plants in an ecological community, that causes a decline or loss of functionally important species • Interference with the natural recovery of marine plant communities

Appendices

Local Planning

A Development Permit for the Project works is assessable against the CCRC Planning Scheme. As there is no material change of use required for the Project, it is considered code assessable.

The codes applicable for assessment are summarised in Table. The trigger for each zone/overlay is 'operational work for filling or excavation and the total volume of material moved is more than 50m³'.

Table Local government codes for assessment

Zone/overlay	Applicable code
Environmental management and conservation zone	Excavating and filling code Infrastructure works code
Acid sulfate soils overlay*	Acid sulfate soils code
Coastal protection overlay	Coastal protection code
Environmental significance overlay	Environmental significance code
Flood hazard overlay	Flood hazard code
Scenic amenity overlay	Scenic amenity code
Waterway corridor and wetlands overlay	Waterway corridor and wetlands code

*Most of the area at the Clump Point boat ramp is not included under this overlay as this area is considered below high water.

In addition to the Planning Scheme, CCRC has prepared a Foreshore Management Plan for the Greater Mission Beach Area, intended to cover the planning period 2015 to 2035 (BMT WBM, 2015). This plan has established preferred design outcomes for a number of 'Future Activity Areas', including Clump Point. The plan acknowledges the proposed upgrading of the Clump Point boat ramp while also identifying opportunities to improve access and nature-based recreational use in the area. This includes controlling vehicle access to the lookout, and providing potential walking tracks, linked to the Cutten Brothers walking track further inland.

The plan also identifies strategic directions and outcomes in relation to key management issues. These include maritime infrastructure and ocean access, protection and restoration of nature conservation values and vegetation management, and natural hazards. Outcomes and directions relevant to the Project within these issue categories include:

- boat ramps, pontoons and jetties must be public facilities
- maritime infrastructure should minimise impacts on the marine environment, foreshore values and coastal processes, primarily through design and location
- littoral rainforest and coastal vine thickets, and habitat for southern cassowary must be maintained, protected and restored
- design of new or upgraded infrastructure in areas at risk of natural hazards must ensure maximum resilience from impacts from hazards and must take into account impacts from sea level rise and climate change.

Development of the Project is acknowledged and promoted under the plan as part of a strategic direction for maritime infrastructure.

Appendices

Previous Approvals

As part of the previous concept design and works approach, a number of permit applications were made by DSD/TMR in 2014. These included applications for a Marine Parks Permit (for both GBR Marine Park and GBR Coast Marine Park) and a Development Permit (for prescribed tidal works, interfering with state coastal land, and damaging marine plants). In addition, application was made for an Environmental Authority under the *Environmental Planning Act 1994*(Qld) for silt removal works at the toe of the existing ramps. These applications covered the following works:

- additional boat ramp land and approach reclamation
- floating walkway
- repair of the existing rock breakwater
- improved drainage system
- expansion of parking facilities
- reclamation and revetment works to support the provision of additional parking facilities
- improved navigational access through the removal of two isolated rocks/boulders.

These works are described in more detail in the 2014 Aurecon planning report (Aurecon, 2014a).

Permits to support elements of these works were granted in 2015/2016 though no works have been progressed to date.

Appendix 4 Design standards for Project works

Designation	Title	Application
AS 1000	The International System of Units and its application	Units to be used
AS 1111	ISO metric hexagon commercial bolts and screws	Specification for standard bolts
AS 1163	Cold formed steel sections	Specifications for standard steel sections
AS 1170 (Parts 0 to 4)	Minimum design loads on structures	General loadings including wind load and earthquake loads Load combinations
AS 1554	Welded connections	Steel fabrication
AS 1657	Fixed platforms, walkways, stairways and ladders – Design, construction and installation	Design of walkways and stairways
AS 2159	Piling – Design and installation	Piling works
AS 2758.6	Guidelines for the specification of armourstones	Armourstone durability
AS 3600	Concrete structures	Design of concrete elements
AS 3678	Hot rolled steel plates	Specifications for standard steel plates
AS 3679	Hot rolled steel sections	Specifications for standard steel sections
AS 3962	Guidelines for the design of marinas	Navigation and design for small craft facilities
AS 4100	Structural steel work	Design of steel structures
AS 4678	Earth retaining structures	Design of soil retaining structures
AS 4673	Cold-formed stainless steel structures	Design requirements with stainless steel
AS 4997	Guidelines for the design of maritime structures	General design requirements Extreme still water level for deck level determination and extreme wave loads for structural design Design loads Load combinations
BS 6349 (Part 1 & 7)	British standard code of practice for maritime structures	Design wave loadings Design of revetment
n/a	TMR Manual: Design criteria for boat ramps	Design of public boat ramps in Queensland
EM2093	DEHP Operational Policy: Building and engineering standards for tidal works	Minimum design criteria for tidal works under Sustainable Planning Act

Detailed design will be undertaken in general accordance with AS 4997. While a 'design vessel' has not been adopted for the works, a list of vessels likely to use the facilities has been provided by the Reference Group. The detailed design will use this data with the advice of the Harbour Master to determine an appropriate final design vessel.

Appendix 5 Bathymetry study area



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