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Public Information Package

Mission Beach Safe Boating Infrastructure Project

All comments and submissions in relation to the project should be directed to:
Great Barrier Reef Marine Park Authority
Attn: Major Projects Assessments Team
PO Box 1379
Townsville QLD 4810
E: assessments@gbrmpa.gov.au
Website: www.gbrmpa.gov.au/about-us/consultation

We now seek public comment under regulation 88D of the Great Barrier Reefs Marine Park Regulations 1983 (C’th) and s15 of the Marine Parks Regulation 2006 (QLD). Public submissions will be considered by the Great Barrier Reef Marine Park Authority (GBRMPA) and the Queensland Parks and Wildlife Service (QPWS) in making a decision on this permit.
Mission Beach Safe Boating Infrastructure Project

Date 5 February 2015
Reference 238465-002-***
Revision 23

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Executive summary

Project need

Boat Bay Reserve, Mission Beach has a long maritime history, providing links to the Great Barrier Reef and offshore islands, and supporting economic development and tourism in the region. Existing maritime facilities within Boat Bay Reserve include the Perry Harvey Jetty and the Clump Point Boat Ramp, and their associated infrastructure.

The existing facilities provide valuable community infrastructure that supports recreational fishing and boating, enjoyment of the Great Barrier Reef Marine Park (GBRMP), and supports tourism activities in the region. However, existing facilities in Boat Bay Reserve are in need of various upgrades to improve public safety.

Boat Bay is provided with a moderate level of natural protection from winds and waves by Clump Point, a northerly facing basalt headland. The Clump Point Boat Ramp is also provided with a level of wave protection by a rock breakwater. The Perry Harvey Jetty is exposed to wave action, and in particular, this facility has no protection from the northerly winds and waves which occur regularly in this location. Safety risks arise as the jetty has no wave protection, and significant wave heights (1 m or more) are often experienced when berthing vessels and loading and unloading passengers. Safety hazards are also experienced at the Clump Point Boat Ramp, as a result of the occasional congestion which occurs between vessels and vehicles accessing the boat ramp.

To improve the safety of existing public infrastructure within Boat Bay, the Department of State Development Infrastructure and Planning (DSDIP) plans to enhance existing maritime infrastructure.

Proposed improvements outlined within this Information Package include a combination of solutions to enhance the safe use of existing facilities at the Perry Harvey Jetty and the Clump Point Boat Ramp.

The current proposal represents the outcome of a comprehensive assessment and consultation process which sought to identify solutions to improve boating safety, whilst being respectful of the environmental, amenity and heritage values of Boat Bay. New infrastructure has been specifically designed to minimise impacts on the marine environment. Accordingly, no dredging activity is proposed to be undertaken within the marine park.

Objectives and proposed solutions

The objective of Mission Beach Safe Boating Infrastructure Project is to improve conditions for safe boating within Boat Bay. By improving boating safety, it is also expected that utilisation of existing facilities will be improved and the occasional conflict between recreational vessels and larger commercial sized vessels visiting the boat ramp will be reduced.

The objectives of the proposed works are to:
- Enhance boating facilities at the Clump Point Boat Ramp by improving boat launching facilities, reducing vehicle congestion and promoting a safe user experience
- Increase the operational window for larger vessels to safely access the Perry Harvey jetty
- Improve the longevity and structural integrity of marine infrastructure to withstand coastal processes and adverse weather conditions
- Minimise congestion and reduce conflict between maritime and land based infrastructure use

To achieve these objectives, the following works are proposed:

**Perry Harvey Jetty**
- An overtopping breakwater to shelter the jetty (with a crest length of approximately 125 m)
- An access ramp and berths on the northern side of the jetty to improve passenger transfer
- Two permanent moorings to reduce risk of vessel grounding

**Clump Point Boat Ramp**
- A third boat ramp lane and approach reclamation to reduce congestion
- A second floating walkway to improve boat access
- Improved drainage system to reduce siltation
- Expansion of parking facilities to reduce conflict
- Reclamation and revetment works for safer parking facilities (comprising 1880 m² below highest astronomical tide (HAT))
- Removal of two isolated high level rocks to reduce risk of grounding
- Required repair of the existing rock breakwater

Figure 1-1 illustrates the general location and layout of proposed works.

Responsibility for ongoing ownership and maintenance of new infrastructure will be shared between the Cassowary Coast Regional Council (CCRC) and the Department of Transport and Main Roads (DTMR), as outlined in Section 4.5 of this report. DSDIP will coordinate the construction of the above infrastructure.

**Consultation and project definition**

The determination of appropriate solutions to improve boating safety in Boat Bay Reserve began in 2011 with an analysis of wind and wave conditions. A comprehensive assessment and consultation process has been undertaken since this time, which sought to identify solutions to improve boating safety, whilst being respectful of the environmental, amenity and heritage values of the area.

A key input to the project definition stage included a multi criteria analysis (MCA) which was undertaken by Aurecon in September 2013. The MCA provided an objective comparison of 20 alternative design options, ranked against five predetermined decision making criteria relating to Environment, Effectiveness, Social value, Government process and Economics. The MCA resulted in the selection of a number of infrastructure concepts to progress to the concept design stage.

In late 2013, the results of the MCA and the final proposed design solutions were presented to State Government agencies, representatives of the Djiru Warrangbura Aboriginal Corporation (the Djiru People) and key stakeholders in Cairns and Mission Beach. Since this time, DSDIP has undertaken regular communication and consultation with the community and interested stakeholders, including coordination of a community survey to obtain feedback on the proposed design. DSDIP has consulted...
regularly with Government stakeholder’s, representatives of the Djiru People, North Queensland Land Council (NQLC) and the wider community regarding the project.

Environment

The project is located within the boundaries of the GBRMP; a World Heritage Area and National Heritage Place; inscribed on the World Heritage and National Heritage lists for its unique natural environment and value in representing complex interrelationships between flora and fauna species.

To inform the design and review the nature of the existing environment within the project area, DSDIP and Aurecon have coordinated a number of environmental assessments. The results of environmental assessments undertaken for the project are outlined in Chapter 3 and include:

- Marine Ecology
- Water quality
- Terrestrial ecology

Marine ecology surveys undertaken within Boat Bay Reserve did not identify any notable benthic habitat within the investigation area, with the exception of number of sparsely placed sediment covered rocks with evidence of red, brown and green algae growth, hard and soft corals. The results demonstrated a disturbed environment within the investigation area, with sparse seagrass and coral growth.

A key objective for the project was to ensure that proposed infrastructure solutions were designed in a manner to maximise the safety and functionality of maritime infrastructure, whilst minimising impacts on the ecological and heritage values of the GBRMP. As such, the results of environmental assessments have directly informed the design of proposed infrastructure solutions. The proposed new infrastructure has been designed to integrate with existing maritime facilities, to limit reclamation needs and to avoid the need for capital dredging.

Cultural heritage

The area of Mission Beach and Clump Point is recognised to have particular indigenous heritage value. A number of cultural heritage sites are recorded in the vicinity of Clump Point. These include two stone alignments within Boat Bay Reserve and a fish trap located immediately south of Clump Point headland.

DSDIP continues to work with the Djiru People and the NQLC to ensure the project works appropriately address cultural heritage matters.

Statutory approval requirements

The following statutory approvals are required to authorise the proposed works:

- **Marine Park Permit** under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act) (Cwlth), the *Great Barrier Reef Zoning Plan 2003* (the GBRMP Zoning Plan) (Cwlth), and the *Marine Parks Act 2004*

- **Development Permit** under the *Sustainable Planning Act 2009* (QLD), for the following assessable development triggers:
  - Operational Works within a coastal management district that is prescribed tidal works
  - Operational Works within a coastal management district that is interfering with quarry material as defined under the Coastal Protection and Management Act on State coastal land above high water mark
  - Operational Works for the removal, damage, or destruction to marine plants
This report has been prepared to provide an Information Package for the purpose of public consultation associated with the current application for a Marine Park Permit from the Great Barrier Reef Marine Park Authority (GBRMPA).

**Relevant contacts**
This project is being undertaken by DSDIP. Relevant contact details for any enquiries about this project are provided below.

**Postal address**

The Department of State Development, Infrastructure and Planning  
PO Box 15009  
City East QLD 4002

**Contact details**

The Mission Beach Project Manager  
The Department of State Development, Infrastructure and Planning  
P: 07 3452 7314  
E: majorprojectsoffice@dsdip.qld.gov.au  
Web: www.dsdip.qld.gov.au/missionbeach

**Submissions**
All comments and submissions in relation to the project should be directed to:

Great Barrier Reef Marine Park Authority  
Assessments Team  
PO Box 1379  
Townsville QLD 4810  
E: assessments@gbrmpa.gov.au  
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**Note:** This Information Package outlines the nature of development proposed as part of the overall project and includes a description of both marine based and land based works. However, it is noted that the Marine Park Permit application currently assessed by GBRMPA relates only to works which are located within the GBRMP (C’th).

Submissions related to the project should be limited to GBRMPA’s jurisdiction to assess the extent of maritime works that are located within the GBRMP, as listed below:

- **Perry Harvey Jetty:**
  - An overtopping breakwater
- An access ramp and berth on the northern side of the jetty
- Two permanent moorings

**Clump Point Boat Ramp:**

- Third boat ramp lane and approach reclamation
- Floating walkway
- Repair of the existing rock breakwater
- Improved drainage system
- Expansion of parking facilities
- Reclamation and revetment works to improve existing and provide additional parking facilities
- Improved navigational access through the removal of isolated rocks
# Glossary

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<tr>
<td>ASS</td>
<td>Acid Sulfate Soils</td>
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<tr>
<td>CHMP</td>
<td>Cultural Heritage Management Plan</td>
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<tr>
<td>CCRC</td>
<td>Cassowary Coast Regional Council</td>
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<tr>
<td>CMD</td>
<td>Coastal Management District</td>
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<tr>
<td>DEHP</td>
<td>Department of Environment and Heritage Protection</td>
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<tr>
<td>DNRM</td>
<td>Department of Natural Resources and Mines</td>
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<tr>
<td>DoE</td>
<td>Department of the Environment</td>
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<tr>
<td>DSDIP</td>
<td>Department of State Development, Infrastructure and Planning</td>
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<tr>
<td>DTMR</td>
<td>Department of Transport and Main Roads</td>
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<tr>
<td>DNPRSaR</td>
<td>Department of National Parks, Recreation, Sport and Racing.</td>
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<tr>
<td>EPBC Act</td>
<td>Environment Protection and Biodiversity Conservation Act 1999</td>
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<td>GBRMP</td>
<td>Great Barrier Reef Marine Park</td>
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<td>GBRMPA</td>
<td>Great Barrier Reef Marine Park Authority</td>
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<tr>
<td>GBRMP Act</td>
<td><em>Great Barrier Reef Marine Park Act 1975</em></td>
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<td>GBRMP Zoning Plan</td>
<td><em>Great Barrier Reef Marine Park Zoning Plan 2003</em></td>
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<td>HAT</td>
<td>Highest Astronomical Tide</td>
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<td>IDAS</td>
<td>Integrated Development Assessment System</td>
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<td>ILUA</td>
<td>Indigenous Land Use Agreement</td>
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<td>LAT</td>
<td>Lowest Astronomical Tide</td>
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<td>MHWS</td>
<td>Mean High Water Spring</td>
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<td>MLWM</td>
<td>Mean Low Water Mark</td>
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<td>MSQ</td>
<td>Maritime Safety Queensland</td>
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<tr>
<td>NES</td>
<td>National Environmental Significance</td>
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<tr>
<td>NQLC</td>
<td>North Queensland Land Council</td>
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<tr>
<td>RPEQ</td>
<td>Registered Professional Engineer of Queensland</td>
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<tr>
<td>SPA</td>
<td><em>Sustainable Planning Act 2009</em></td>
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Marine Ecology, Water Quality & Sediment Sampling Report
1 Introduction

1.1 Overview

DSDIP plans to enhance maritime infrastructure within Boat Bay, Mission Beach, to improve boating safety. 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 during ambient conditions.

Existing facilities within Boat Bay Reserve 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 (DTMR)). Supporting infrastructure at the Clump Point Boat Ramp includes a rock breakwater, finger pontoon 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 as such, the ability to safely access the jetty is significantly restricted during periods of adverse wave conditions.

The lack of provision for safe access at the jetty has resulted in the Clump Point Boat Ramp becoming the preferred access point for both recreational and commercial vessels. During periods of peak demand, the over-utilisation of the boat ramp has led to vessel congestion within the navigational channel and traffic congestion on the mainland where vehicles compete for limited parking and manoeuvring space.

Solutions to enhance existing facilities within Boat Bay Reserve have been discussed by the community, boating users, and State and local government for several years. The identification of solutions to improve boating safety in Boat Bay Reserve began in 2011 with an investigation of wind and wave conditions undertaken by GHD (refer Section 1.5.1). The current proposal represents the outcome of a comprehensive assessment and consultation process which has been undertaken since this time.

To enhance the safety and functionality of existing maritime infrastructure within Boat Bay, a combination of infrastructure solutions has been identified. The proposed solutions are reflective of the key concerns and desires expressed by the community, government representatives and boating users and provide design outcomes which are respectful of the existing environmental, amenity and heritage values of Boat Bay. The current application relates to the following additional infrastructure proposed within Boat Bay:
Perry Harvey Jetty

- An overtopping breakwater to shelter the jetty
- An access ramp and berths on the northern side of the jetty to improve passenger transfer
- Two permanent moorings to reduce risk of vessel grounding

Clump Point Boat Ramp

- A third boat ramp lane and approach reclamation to reduce conflict
- A second floating walkway to improve boat access
- Improved drainage system to reduce siltation
- Expansion of parking facilities to reduce conflict
- Reclamation and revetment works for safer parking facilities (comprising 1880 m² below highest astronomical tide (HAT))
- Removal of two isolated high level rocks to reduce risk of grounding
- Required repair of the existing rock breakwater

The proposed infrastructure aims to improve the operational window for the safe berthing of commercial vessels at the jetty, and to improve the layout and functionality of trailer boating infrastructure at the boat ramp. By improving the layout and design of infrastructure, the project will enable vessels to operate more safely within Boat Bay; and improve accessibility during periods of peak demand.

It is noted that the project does not propose any expansion or widening of existing navigational channels, nor any capital dredging works.

Aurecon, on behalf of DSDIP is now seeking the necessary authorisations for the proposed works. Figure 1-1 illustrates the general location and layout of proposed works subject to this application.

1.2 Project rationale

1.2.1 History of maritime transport in Boat Bay

Historically, the Perry Harvey Jetty has operated as the principal transport link to the Great Barrier Reef and offshore islands, and has supported economic development and tourism in the region since its initial construction in the early 1900’s.

At that time, the jetty contained a tramway tracked on steel rail and was used for the export of timber and agricultural products. Dunk Island Resort was established in 1934 and WWII saw the development of an Australian Royal Air Force airfield on Dunk Island. Continued expansion of coastal settlement and tourism re-enforced the need for maritime transport options servicing Dunk Island and Bedarra Island. Boat Bay Reserve was designated as a State Reserve for ‘Boat Harbour’ purposes in 1986.

In recent years, the jetty has provided a key transport link transferring passengers and goods to the Dunk Island Resort, at its peak operation servicing 8 daily rotations to Dunk Island.

The impact of significant storms and cyclones in the region has resulted in the jetty being repaired or replaced a number of times, and most recently being reconstructed following extensive damage caused by Cyclone Yasi in 2011. The reinstated jetty, now called Perry Harvey Jetty, was opened in October 2013. Cyclone Yasi also forced the closure of the Dunk Island resort, and since this time, there has been no commercial ferry operating from the jetty.
The use of the jetty for providing maritime transport in Boat Bay Reserve has an extensive history and the facility has the potential to serve as valuable community infrastructure, supporting economic growth, recreational activity and tourism within the region. The re-development of the Dunk Island Resort (which is currently in progress) and the potential return of a commercial ferry for reef and island tours highlights the need for safe and efficient maritime transport infrastructure within Boat Bay.
Legend

Clump Point Boat Ramp
- Breakwater head repair
- Flushing system and drainage upgrade
- Navigation channel rock removal
- Northern Car/Trailer Park
- Reclamation
- Seawall realignment
- Floating walkway
- Boat ramp

Clump Point Boat Ramp (Excluded works - Refer s.4.1.1)
- Utility and services
- Toilet block and washing station
- Southern Car Park

Perry Harvey Jetty
- Access Ramp and Berth
- Overtopping Breakwater
- Moorings
- Navigational aids
- Cadastre

Source:
Cadastre: Department of Environment and Heritage Protection, Qld, 2013.

Date: 26/11/2014
Version: 1

Mission Beach Safe Boating Infrastructure Project

Figure 1.1: Overview of Proposed Works

Legend

Clump Point Boat Ramp
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Date: 26/11/2014
Version: 1

Mission Beach Safe Boating Infrastructure Project

Figure 1.1: Overview of Proposed Works
1.2.2 Existing conditions and safety hazards

It is acknowledged by the local community and boating users that the current facilities in Boat Bay Reserve pose a risk to public safety, and a number of near accidents have occurred at these facilities. Safety concerns arise as a result of the lack of wave attenuation during adverse wind and wave conditions, and the associated exposure to significant wave heights when launching and retrieving vessels and/or passengers.

Boat Bay Reserve is provided with a moderate level of natural protection from the prevailing south-easterly winds and waves which occur in the early morning by Clump Point, a northerly facing basalt headland located at the south-eastern extent of the bay (refer Figure 11). The Clump Point public boat ramp is also provided with a level of wave attenuation from north-easterly winds and waves by an existing rock breakwater. However, the Perry Harvey Jetty is significantly exposed, and in particular, this facility has no protection from the northerly winds and waves which typically occur in the late afternoon.

An analysis of local wave climate indicates that the largest waves approach the jetty consistently from the north-eastern direction, regardless of the incoming wind direction (refer Appendix G). This pattern is reflective of the sheltering effect of the Clump Point headland, and the wave refraction which limits the height of waves from the south. As the jetty has no protection from waves approaching from the north-east direction, this pre-dominant pattern results in the jetty being an unsafe berthing location. The observation has been made by boating users that the waves at the jetty present a safety hazard, and is perceived to have led to a decline in tourists in this location given greater expectations for public safety.

It is not uncommon that significant wave heights of approximately 1 m (and associated maximum wave heights of approximately 2 m) impact the jetty and make the berthing of vessels impractical and unsafe. The wave climate at the jetty is recognised to be hazardous, with a median significant wave height (50th percentile) modelled at 0.21 m, and a 1 year Averaged Recurrence Interval (ARI) wave significant height of approximately 1.3 m in the absence of cyclonic conditions. Such conditions make the jetty an unsafe landing and berthing platform for vessels.

As wave conditions at the jetty are frequently unsafe, the Clump Point public boat ramp has become the preferred location for the launching and retrieval of vessels, and the transfer of passengers and goods from larger craft via a tender vessel. Consequently, the lack of protection from coastal elements at the jetty has resulted in an over-utilisation of the public boat ramp, and on occasions, conflict results between commercial and recreational users competing for access to the pontoon and land based facilities.

Another hazard affecting the safe use of the boat ramp is the presence of large isolated rocks (or coral bommies) which are located within the navigable channel. Two isolated rocks have been identified as a particular hazard to boating, as these rocks are situated less than 700 mm below water level in low tide conditions. The limited water depth in the location of these rocks restricts the under keel clearance for vessels, presenting a risk to safe navigation. A diving survey undertaken by Aurecon (Refer Appendix D) identified evidence of propeller strikes on these rocks.

Additionally, the breakwater and car park at the boat ramp are situated approximately 0.5 m above the level of the Highest Astronomical Tides (HAT). During spring tides and strong winds the breakwater and car park become partially overtopped by waves. During less frequent king tides the boat ramp could become unsafe to vehicles, owing to the volume and depth the overtopping flow in these conditions. This exposure to overtopping waves remains a safety issue for both pedestrians, traffic and for the launching and recovery of boats.

At present Boat Bay Reserve also does not contain any facilities which provide a safe mooring location for vessels. This has resulted in the occurrence of inappropriate and illegal mooring within
Boat Bay, which presents safety hazards associated with the potential dislodgement of vessels; and environmental impacts associated with damage by anchors and chains.

The safe and efficient use of existing facilities within Boat Bay Reserve is currently restricted by a lack of wave attenuation, and is significantly influenced by the wave climate, tide and weather conditions. It is the objective of the project to improve the safety of existing infrastructure for its intended purpose.

1.2.3 Cyclone damage

The region has been subject to extensive damage from previous storm systems, including Cyclone Larry in 2006 and Cyclone Yasi in 2011. These events resulted in extensive damage to boating facilities within Boat Bay, including significant damage to the previous Jetty, the loss of rock armouring at the Clump Point breakwater, and damage to the seawall and car park at the boat ramp.

Following Cyclone Yasi, the previous timber deck jetty on Narragon Beach was replaced by a new concrete deck structure (the current ‘Perry Harvey Jetty’) with $3.5 million in funding sourced from the Commonwealth Natural Disaster Relief and Recovery Arrangements (NDRRA). However, damage to the breakwater and seawall at the boat ramp remains partially unrepaired and this affects the standard of wave attenuation being achieved. Accordingly, it is proposed to repair the damage of previous storm events, and provide new infrastructure which is generally more resilient.

1.3 Project objectives

Existing facilities in Boat Bay Reserve provide valuable community infrastructure that supports recreational activity, enjoyment of the GBRMP, and contributes to tourism in the region. However, it is acknowledged that the use of existing facilities in Boat Bay Reserve presents a risk to public safety during adverse wave conditions and periods of high demand.

The objective of the project is to improve conditions for safe boating within Boat Bay; and to improve the operational potential of existing facilities. This objective will be achieved through a combination of infrastructure solutions proposed at the Clump Point Boat Ramp and the Perry Harvey Jetty which aim to improve the safe access to, and use of, these facilities.

Another operational objective for the project is to reduce conflict between recreational users and larger commercial sized vessels at the boat ramp. It is considered that reducing contention for these facilities will also improve boating safety. This objective is to be achieved by providing solutions which enable the jetty to operate as the primary access point for larger vessels, and the boat ramp to continue to support recreational boating activities.

In summary, the objectives of the proposed works are to:

- Enhance boating facilities in Boat Bay Reserve through improving conditions for the safe transfer of passengers and goods under ambient conditions
- Increase the operational window in which commercial vessels can safely access the jetty
- Improve the longevity and structural integrity of marine infrastructure to withstand coastal processes and adverse weather conditions
- Minimise congestion and conflict for maritime and land based infrastructure

It is noted that the proposed works are not intended to provide protection during cyclonic conditions; and no structure forming part of this application has been designed to support an operational role during a major storm or cyclone.
1.4 Project definition and consultation

Definition of the project scope and selection of proposed infrastructure solutions to improve boating safety in Boat Bay Reserve has been the subject of ongoing consultation between DSDIP, local business, boating users, community groups, residents and other interested stakeholders (including government representatives) and the Cassowary Coast Regional Council (CCRC) since 2011. As a result of previous consultation, a number of alternative viewpoints and solutions have been considered to improve boating facilities in this location.

A key objective for the project was to ensure that proposed infrastructure solutions were designed and implemented in a manner to maximise the safety and functionality of maritime infrastructure in this location, whilst minimising the potential environmental impacts on the ecological and heritage values of the GBRMP. To this end, new infrastructure has been designed to integrate with existing maritime facilities, limit reclamation and avoid the need for capital dredging works.

A summary of the tasks undertaken in reaching the current proposal is outlined below.

1.4.1 Consultation summary

Feasibility and options analysis (2011-2012)
In June 2011 DTMR engaged GHD to undertake an assessment of wind and wave conditions in Boat Bay. The results of the assessment were incorporated into a March 2012 paper titled “Report for Clump Point and Dunk Island Jetty Further Investigations Wave Barrier Options” produced by GHD on behalf of DTMR. This report scoped a number of options to attenuate waves in Boat Bay, Mission Beach.

In 2011, DSDIP engaged GHD to undertake an assessment of wind and wave conditions at Boat Bay, and to scope a number of options for conceptual analysis. The high-level conceptual studies undertaken at this time provided the basis for further assessment of suitable design options.

In November 2012, DSDIP commissioned a workshop comprising coastal engineering, environmental (including representatives from the Great Barrier Reef Marine Park Authority (GBRMPA)) and community consultation specialists. The purpose of the workshop was to review alternative solutions proposed in an endeavour to better understand the feasibility and scale of infrastructure improvements that could be considered given various environmental, engineering and budgetary constraints. The workshop concluded that upgrade options at the jetty and boat ramp were worth investigating further.

The outcomes of the workshop are detailed within the Mission Beach Safe Boating Infrastructure: Options Workshop (February 2013, prepared by GHD).

Project introduction (Early-mid 2013)
In March 2013 the project was presented to key stakeholders in Mission Beach, including a preliminary meeting with GBRMPA and State government agencies. The following week (between 20 and 22 March 2013) DSDIP conducted individual stakeholder meetings in Mission Beach to understand and prioritise the community’s preferred upgrade solutions in Boat Bay Reserve and at Clump Point. Individual stakeholder meetings revealed a strong community desire for improving boating safety in Boat Bay. However, no single option received the community’s majority support. The minutes of these meetings are included in Appendix K.

Multi Criteria Analysis (MCA) (Late 2013)
In September 2013, DSDIP engaged Aurecon to undertake a multi criteria analysis (MCA) to identify a preferred design solution, and subsequently to undertake all necessary design and permitting services.
for the project. The MCA aimed to undertake an objective comparison of alternative design options, and involved the analysis of 20 alternative infrastructure ‘components’ proposed at both the jetty and boat ramp. Each component was assessed against five pre-determined themes relevant to the decision-making process, as detailed below:

- Environmental impacts
- Effectiveness
- Social value
- Government process
- Economics

The MCA resulted in the selection of a number of infrastructure solutions to progress to the preliminary design stage. In November 2013, the results of the MCA and the final proposed design solutions were presented to State Government agencies, representatives of the Djiru People and key stakeholders in Cairns and Mission Beach respectively. Further details of the methodology and results of the MCA can be provided by Aurecon if requested.

Community engagement and surveys (early 2014)
In January 2014 DSDIP issued a project brochure to all residents of Mission Beach, including a short survey seeking feedback on the proposed design solutions. Around 250 responses were received, with the responses indicating a diversity of opinion within the community on a preferred solution.

Following the survey, between 19 and 21 February 2014 a display was set up at the Wongaling Shopping Centre, Mission Beach, to allow the community an opportunity to review the proposed concepts identified through the MCA and talk to members of the project team.

The feedback received through this round of consultation indicated a desire to separate commercial and recreational facilities in Boat Bay, and also indicated strong support for increased expansion to land based facilities at the Clump Point Boat Ramp – specifically, the inclusion of amenities, wash down facilities and additional parking and pedestrian space. The community requested solutions to counter balance mangrove clearing through the inclusion of a mangrove terrace on the western side of Clump Point, within the proposed reclamation area. Provision for permanent sheltered moorings was also a common request articulated by the community.

The jetty concepts also received some concerned responses, and as a result, a number of alternative proposals were put forward by the community. Alternative solutions proposed a significant expansion of solutions at the boat ramp, with the aim of avoiding the need for commercial access at the jetty. These proposals were investigated with consideration to functional objectives and project budget. Alternative proposals were determined to be unsuitable for the following reasons:

- Inconsistent with objectives to minimise environmental impact (such as the requirement for extensive dredging and/or reclamation)
- Exceeded the available project budget
- May be inconsistent with policies for the management and protection of the GBRMP

Relevant consultation material developed during this period is included within Appendix H.

Revised design solutions (March – May 2014)
As a result of feedback received from the community within the survey responses, the project scope was amended to include the following design solutions:

- Clump Point Boat Ramp
- A revised layout of reclamation to provide additional parking and manoeuvring space and support re-vegetation within a proposed mangrove terrace
- Provision for a new floating walkway adjacent to the rock breakwater
- Provision of amenities, including a wash down bay and toilet block
- Removal of the pontoon and gangway upgrade (a commercial grade pontoon)
- Proposed re-location of two rocks located in shallow water depth within the navigable channel

**Perry Harvey Jetty**

- Provision for two permanent moorings located approximately mid-way between the boat ramp and jetty
- Redesign of the deck of the access ramp from concrete to fibre reinforced plastic

Between 31 March and 2 April 2014 the amended design solutions were presented to the Mission Beach community. An information brochure was developed outlining the key issues raised by the community during consultation, and how these were considered through the design process. A copy of this brochure is included in Appendix H.

**Consultation with the Djiru People and the North Queensland Land Council**

The area of Clump Point is recognised to have particular indigenous heritage value, and contains a number of registered cultural heritage places. Since the early stages of the Project, DSDIP has been engaged in regular consultation with the NQLC and the Djiru People, to discuss measures to address native title and cultural heritage aspects of the project.

Following the revision of proposed design solutions in April 2014, representatives of the Djiru People were provided with a project overview in Innisfail by directors from DSDIP’s Indigenous Services Unit and Major Project Office (MPO). Subsequent to this, DSDIP have held regular meetings and discussions with the NQLC to discuss approaches to formally recognising native title and cultural heritage. The Djiru advised DSDIP that they wished to manage cultural heritage for the project with a Cultural Heritage Management Plan.

DSDIP continues to consult with the Djiru People and their legal representative, the NQLC, to address native title and cultural heritage aspects of the project.

**Ongoing consultation**

Since November 2013, the Communications Unit of DSDIP has emailed ten project updates to over 200 interested stakeholders, approximately every month. A project page has been maintained at the following link:

www.dsdip.qld.gov.au/missionbeach
2 Project area and existing facilities

2.1 Locality
The project area is located within Boat Bay Reserve, Mission Beach. Boat Bay Reserve is located on the north-eastern coast of Queensland, approximately 2 km north of the township of Mission Beach, 135 km south of Cairns, and 235 km north of Townsville. Figure 2-1 illustrates the location of the project area.

![Figure 2-1 Illustration of the project locality, Boat Bay, Mission Beach (Source: Bing Maps)](image)

2.2 Marine Park Zoning
The project area is located within the ‘Habitat Protection Zone’ of the Cairns/Cooktown Management Area according to the Great Barrier Reef Marine Park Zoning Plan 2003 (C’lth) and the Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004 (QLD) (Map 6 – Innisfail). Figure 2-2 illustrates the location and zoning of the project area. Refer to Appendix B for a full scale copy of the zoning plan.
2.3 Land tenure

The proposed works are located on land designated as State Reserve (Lot 550 NR7351) and State Road Reserve (Alexander Drive and Clump Point Lookout Road). Figure 2-3 below illustrates the land tenure arrangements within the project area, and further details are provided in Table 2-1.
As illustrated in Figure 2-3, Lot 550 NR 7351 encompasses tidal waters within Boat Bay Reserve (including the current footprint of the Clump Point Boat Ramp, rock breakwater and the Perry Harvey Jetty), and is identified as State reserve for ‘Local Government - Boat Harbour’ purposes.

### 2.4 Existing facilities

The project area is located in Boat Bay Reserve, within the coastal settlement of Mission Beach. Existing maritime facilities within Boat Bay Reserve include the Perry Harvey Jetty at Narragon Beach, and the Clump Point Boat Ramp at Clump Point. Supporting infrastructure at the Clump Point Boat Ramp includes a rock breakwater, finger pontoon and car and boat trailer parking facilities. Supporting infrastructure at the Perry Harvey Jetty includes a car park and amenities block.
Figure 2-4 to Figure 2-6 below illustrates the project area and the location of existing maritime facilities within Boat Bay.

Figure 2-4 Location of existing infrastructure within Boat Bay Reserve (Source: Bing Maps)

Figure 2-5 Aerial image of the Clump Point Boat Ramp, finger pontoon and rock breakwater (source: Bing Maps, 2014)

Figure 2-6 Aerial image of the Perry Harvey Jetty and adjoining car park and amenities (source: Bing Maps, 2014)

Details of the ownership and administration of existing facilities within Boat Bay Reserve is outlined in Table 2-2 below, and photos illustrating the current appearance of existing facilities are provided in Figure 2-7 to Figure 2-12.
Table 2-2 Administration of existing facilities within Boat Bay

<table>
<thead>
<tr>
<th>Facility</th>
<th>Owner/administrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perry Harvey Jetty (inclusive of adjoining car park and amenities)</td>
<td>Cassowary Coast Regional Council (CCRC)</td>
</tr>
<tr>
<td>Clump Point Boat Ramp</td>
<td>Department of Transport and Main Roads (DTMR)</td>
</tr>
<tr>
<td>Clump Point Rock Breakwater</td>
<td>DTMR</td>
</tr>
<tr>
<td>Clump Point Pontoon</td>
<td>CCRC</td>
</tr>
<tr>
<td>Clump Point Car and Trailer Parking Facilities</td>
<td>CCRC</td>
</tr>
</tbody>
</table>

Figure 2-7  Clump Point Boat Ramp, rock breakwater and finger pontoon (photo taken looking south-east)
Figure 2-8  Clump Point Boat Ramp and finger pontoon (photo taken looking north-west towards Clump Mountain)

Figure 2-9  Parking facilities and existing rock armour seawall at the Clump Point Boat Ramp (photo taken looking south)
Figure 2-10  View of Perry Harvey Jetty, as seen from the Clump Point Boat Ramp (photo taken looking west)

Figure 2-11  Perry Harvey Jetty (photo taken looking east)
2.5 **Clump Point Site Management Arrangements 2005**

The ‘Clump Point Site Management Arrangements’ were developed in 2005 by GBRMPA, Queensland Parks and Wildlife Service (QPWS) and Maritime Safety Queensland (MSQ) for the Boat Bay Reserve reserve. The Clump Point Site Management Arrangements were developed in response to a number of applications to establish moorings within Boat Bay, and recognition of a number of existing unpermitted moorings, which have the potential to restrict public use, create conflict between users and impinge on the natural and cultural values of the area. The site management arrangements create a framework for the location (via the activity plan), permitting and management of mooring facilities in this location.

Figure 2-13 overleaf illustrates the Activities Map of the Clump Point Site Management Arrangements, and illustrates the location of existing facilities within Boat Bay. The Activities Map identifies designated ‘transit areas’ adjacent to the jetty and boat ramp where mooring facilities would conflict with navigational access and are therefore currently unpermitted. The map also identifies a zone where moorings may be acceptable.

It is recognised that works proposed as part of this project (if permitted) will impact on the implementation of the site management arrangements as they currently exist. As a result, if the project is approved, the current site management arrangements would be revised by GBRMPA to appropriately reflect the new infrastructure.
Figure 2-13 Clump Point Site Management Arrangements – Activities Map
3 Existing environment

3.1 Overview
This chapter provides a description of the existing environment in the project area, and a summary of the results of investigations undertaken for the project.

The results of the marine ecology, sediment sampling and water quality investigation are included in Appendix D.

3.2 Marine ecology and water quality
The project area is located within the boundaries of the Great Barrier Reef Marine Park (GBRMP). The GBRMP is inscribed on the World Heritage and National Heritage lists for its unique natural environment and value in representing complex interrelationships between flora and fauna species.

To review the habitat values of the project area, a marine ecology and water quality assessment was undertaken by Aurecon, involving a combination of desktop analysis, literature review and field surveys. Field surveys were undertaken during the dry season in November 2013, and during the wet season in February 2014. Surveys involved diving specified transect locations within the project footprint to review the nature of sub-tidal flora, fauna and coral. Baseline water quality monitoring and limited sediment sampling was also undertaken.

3.2.1 Marine ecology
The literature review indicated that studies undertaken prior to Cyclone Larry (in 2006) and Cyclone Yasi (in 2011) regarded the area as quite spectacular, not because of the rarity of any species recorded but because of the diversity of the fauna present in a small area (Clayton et al, 1990). Clayton et al (1990) included a snorkel survey of the fringing reef near Clump Point and observed painted crayfish, moray eel, cleaner wrasse, butterfly fish, soft corals and hard corals, calcareous algae, large amounts of seaweed on the tops of rocks and dead coral, attracting clams, stinging hydroids and small sharks.

During the diving surveys, Aurecon identified that the reef area adjacent to the project site is diverse but in rather poor condition close to the existing boat ramp. Rubble reef observed while swimming the four transects consisted of rocks and boulders, which provided substrate for brown algae (Sargassum sp.), macro-invertebrates and sparse coral. In addition, plate coral (Favites sp.), branching coral (Acropora sp.) and leather coral (Sarcophyton sp.) were observed by Aurecon along the two transects and on two bommies near the Clump Point Boat Ramp. In general, rock and rubble areas appeared to support a relatively high diversity of marine life (eg hydroids, sponges, soft corals, clams, red algae, green algae and oysters) when compared to sandy or silty substrate areas.
Very sparse and patchy areas of seagrass (Halodule sp. and Halophila sp) were observed during both the dry season and the wet season investigation. A previous investigation undertaken by Clayton et al. (1990) noted that seagrasses were not apparent on the eastern side of the bay, near the Clump Point boat ramp, and they only became obvious in the north-western limits of the bay. Aurecon observed that seagrass was present in the mid-littoral zone (Halodule sp. and Halophila sp.) but very scarce, in patches up to 2 m².

The areas that may be potentially impacted by the project (offshore from the Perry Harvey Jetty at Narragon Beach and adjacent to the Clump Point Boat Ramp) were identified as being predominantly bare sand / silty areas with very sparse areas of patchy seagrass (Halophila sp.) and silt tolerant coral rubble patches occurring sporadically on small basalt boulders.

During the dry season investigation, Aurecon identified hard corals (Favites sp. and Acropora sp.), soft coral (Sarcophyton sp.) and other unidentified corals, sponges, benthic macroinvertebrates and brown and green alga from photographs and video collected along the four transects.

During the wet season, hard corals (Turbinaria sp. Euphyllia ancora, Porites sp. and Acropora sp.), soft coral (Sarcophyton sp.), colonial zoanthid (Palythoa sp.), red alga (Corallinaceae), green alga (Halimeda spp., Halimeda cylindrical, Briopsis sp.), brown alga (Phaeophyta and Palythoa sp.) and unidentified sponges, green, brown and red alga species were identified. Specific locations along the transects near the Clump Point Boat Ramp were noted to be heavily silted and appeared to be degraded, characterised by a low abundance and diversity of species.

Overall, the observations made during the dry season and wet season investigations are indicative of a diverse coastal environment, supporting a number of coral, alga, sponges, macro-invertebrate and seagrass species. Generally, the area within the transect footprints near the Perry Harvey Jetty appeared to have a lower diversity and number of species than the area within the transect footprints near the Clump Point Boat Ramp.

Specific locations along transects near the Clump Point Boat Ramp were noted by Aurecon to be heavily silted and appeared to be degraded.

3.3 Water quality

Water quality was measured at the end of the dry season in 2013 and during the wet season in February 2014. The parameters measured were relatively stable throughout the water profile with pH and dissolved oxygen (DO) in both the dry and wet seasons being slightly below the Draft Surface Water Quality Guidelines – Wet Tropics Region (SWQG – WTR) pH and DO criteria for open coastal environments.

Turbidity results exceeded the draft SWQG – WTR criteria for the majority of samples during the dry and wet season sampling events, although all turbidity samples were below the ANZECC value of 20 NTU. Total suspended solids concentrations exceeded the draft SWQG – WTR guideline for open coastal waters during the dry season, but was not detected during the wet season sampling period.

The results of water quality sampling suggest a relatively turbid, high energy environment, supporting species which have adapted to such conditions. The results are typical of those expected in a near-shore coastal environment within the wet tropics region. Limited variation was identified between the dry season and wet season sampling events, with the exception of turbidity. Turbidity is generally influenced over weeks and days, and it is expected that the variability observed between the dry season and wet season turbidity results was due to natural fluctuations.
3.4 Soil and geology

Cainozoic basalts form Clump Point and the substrate for the adjoining submarine reefs (Chenoweth EPLA 2007). The occurrence of basalt substrate on Clump Point is of conservation significance, as this type of substrate does not occur anywhere else in the region (Chenoweth EPLA 2007). This unique geology contributes to a complexity of rainforest vegetation, and Mission Beach is recognised as one of the few areas where mesophyll vine forests extend to the coast.

An investigation undertaken by Clayton et al. (1990) noted that the southern edge of Clump Point and the eastern and northern margins of Clump Point around to the boat ramp breakwater, had a shoreline comprising mainly basalt rock and weathered boulders. Among the rocks there were accumulations of coral rubble, especially Acropora spp. and massives (Favidae).

Boulders 0.2 m to 2 m in diameter and of volcanic origin formed a perimeter seaward of the mangrove zone of Clump Point and surrounding coast. In some areas these boulders extended to below the intertidal area and provide substrate for brown algae or coral.

3.5 Terrestrial flora and fauna

Vegetation within the project area is mapped by the DNRM as a ‘Category B area’ (Remnant Vegetation). The vegetation community at Clump Point is identified under the VM Act Regional Ecosystem (RE) mapping as ‘Least Concern’ remnant vegetation (RE 7.8.1 and RE 7.1.1), comprising ‘Complex mesophyll vine forest, lowlands and foothills on basalt, of the very wet and wet rainfall zone’. Vegetation is this area is also identified as ‘Essential Habitat’ for the Southern Cassowary (Casuarius casuarius) and the Arenga Palm (Arenga australasica) (refer search results in Appendix B).

In addition, a search of the EPBC Act protected matters online search tool undertaken for an area within a 5 km radius of the project site, identified a total of 33 threatened species (including six plant species). The DEHP Protected Plants Flora Survey Mapping also identifies the entire project area as a ‘high risk’ area for containing endangered, vulnerable, or near threatened (EVNT) species.

Previous terrestrial surveys undertaken within the area (eg Clayton et al 1990) indicate that the forest environment at Clump Point is not pristine, and has suffered considerable damage from past cyclones, human activity and domestic animals. The development and use of the (unsealed) Clump Point lookout road has also created sedimentation impacts, resulting in the establishment and proliferation of exotic species.

Vegetation clearing is required for the project in association with proposed seawall upgrades and car parking expansions at the boat ramp (refer Chapter 4). Therefore, to review the nature of terrestrial flora and fauna present in the areas of proposed vegetation clearing, and to comply with the requirements of relevant legislation, ecological field surveys were undertaken on two separate occasions for the Project.

The purpose and findings of these surveys is summarised below.

Survey 1 (December 2013):

Survey 1 was undertaken during the concept design stage of the project, for an area encompassing Clump Point Lookout Road and tidal areas subject to infrastructure works associated with the Project. Within the location of the seawall upgrade and northern car park extension the ecological field survey identified evidence of disturbance associated with the existing car park and access road, including gravel, sediment and litter. The floristics of this area was defined by scattered, regrowth mangrove vegetation and large boulders which are associated with the existing seawall structure.

In the location of the proposed ‘southern car park’ development (not subject to the current Marine Park Permit application – refer Section 4.1.1 – Excluded works), existing vegetation was also considered to be representative of a disturbed environment, being subject to weed proliferation with ‘guinea grass’
the dominate species in the ground stratum, and ‘moonflower’ and ‘blue morning glory’ abundant in the canopy and shrub layers. Evidence of previous storm damage was also apparent in this location, evident by a number of fallen trees and branches. This survey identified a total of 41 native species classified as ‘Least Concern’ species under the NC Act, and 16 weed species (including two species of Class 3 declared plants under the Land Protection (Pest and Stock Route Management) Act 2002 (Qld)).

Survey 2 (June/July 2014)
Survey 2 was undertaken during the detailed design stage of the project, to address changes to the design and project footprint which occurred following the community consultation undertaken in early 2014; and also to address legislative changes to the Nature Conservation Act 1992 which had occurred since the earlier survey.

Specifically, the survey had the purpose to investigate the presence of any EVNT species within the area of proposed land based works at Clump Point; and also to address an additional reclamation area on the western side of Clump Point.

The EVNT flora survey covered an area of the mesophyll vine forest within a 10 m buffer either side of Clump Point Lookout Road, extending from the junction of Alexander Drive, to the southern car park. Vegetation within the mesophyll vine forest community was dominated by Dysoxylum gaudichaudianum (Ivory mahogany), Dysoxylum mollisimum (Miva mahogany) and Ficus variegata (Variegated fig). The canopy layer was estimated to have an approximate average height of 30 m and vegetative density of 40%; while the sub-canopy layer was estimated to have an approximate average height of 10 m and vegetative density of 60%. Weed proliferation was evident in areas of light penetration to the forest floor.

The survey identified evidence of the following protected ecological features within the project area:

- *Arenga ausytalasica* (Arenga Palm) listed as ‘Vulnerable’ under the provisions of the NC Act
- Flora species providing suitable habitat for the Southern Cassowary (a listed threatened species under the EPBC Act) were also identified (including *Ficus pleurocarpa* (Banana Fig), *Smilax australis* (Barbed wire vine), and *Terminalia arenicola* (Brown damson)).

No Threatened Ecological Communities’ (TECs) listed under the EPBC Act are recorded within the project area. However, the “Littoral rainforest and coastal vine thickets of Eastern Australia” is known to occur within the wider Wet Tropics region, and is listed as a critically endangered TEC under the EPBC Act.

Further description of the proposed clearing footprint subject to this application is included in Chapter 4, and potential impacts and mitigation measures associated with vegetation clearing are addressed in Chapter 5.

### 3.6 Coastal environment and geomorphology

The project area is located within a coastal environment and therefore is subject to changes as a result of erosion and sediment transport due to wind, waves and tidal action.

An analysis of sediment movement in this location indicates that typically the sediment transport in Boat Bay Reserve is relatively low. Boat Bay Reserve is a relatively well sheltered area in terms of coastal processes (with the exception of high tide and strong northerly wave conditions). Field data obtained for the Project indicates that tidal currents are weak, and have only a small contribution to the local coastal hydrodynamic as the beach sediment is principally made of medium sand.

The main contributing factors to sediment transport in Boat Bay Reserve are wind-waves generated in the Great Barrier Reef basin, and the availability of the sediment supply from the north and south of
Narragon Beach. According to a longshore transport numerical model, there is a potential mild net sediment movement to the north, in the order of approximately 8,000 m$^3$ per year. However, actual sediment transport rates are variable from year to year, and the potential net sediment transport rate is generally not realised due to limited sand supply.

The Clump Point headland restricts sand supply to the boat ramp area; and the headland between Narragon Beach and Bingal Bay restricts sand supply from the north. From an analysis of aerial images, it has been identified that a recession of Narragon Beach of between 3 m to 7 m has occurred since the early 1970’s.

### 3.7 Indigenous cultural heritage

The area of Mission Beach and Clump Point is recognised to have particular indigenous cultural heritage value. The indigenous cultural heritage values of Clump Point are recognised as providing a focal point for activities within the wider region, due to the ease of access to the hinterland and coast. Clump Point is also a place that the Djiru people enjoy today for its natural beauty, environmental value, and sense of connection it provides to traditional country (Girringun Aboriginal Corporation, 2007).

A number of cultural heritage sites are recorded in the vicinity of Clump Point. These include two stone alignments within Boat Bay, and a fish trap immediately south of Clump Point headland. A historic ceremony ground is also known to be located at the base of the headland, and various artefacts have been identified within the region (Girringun Aboriginal Corporation, 2007).

DSDIP is engaged in ongoing consultation with the Djiru People and their legal representative, the NQLC, to ensure the project works appropriately address cultural heritage matters.
4 Proposed development

4.1 Overview

The following works are proposed as part of the Project:

**Perry Harvey Jetty**
- An overtopping breakwater to shelter the jetty (with a crest length of approximately 125 m)
- An access ramp and berths on the northern side of the jetty to improve passenger transfer
- Two permanent moorings to reduce risk of vessel grounding

**Clump Point Boat Ramp**
- A third boat ramp lane and approach reclamation to reduce congestion
- A second floating walkway to improve boat access
- Improved drainage system to reduce siltation
- Expansion of parking facilities to reduce conflict
- Reclamation and revetment works for safer parking facilities (comprising 1880 m² below highest astronomical tide (HAT)).
- Removal of two isolated high level rocks to reduce risk of grounding
- Repair of the existing rock breakwater

Figure 1-1 illustrates the extent of works proposed, and proposal drawings illustrating the design, scale and location of proposed works are provided in Appendix A.

This chapter provides a summary of the design criteria and considerations for the proposed facilities.

4.1.1 Excluded works

It is noted that a sub-set of land based works associated with the enhancement of facilities at the Clump Point Boat Ramp are currently being progressed by DSDIP. These works are not subject to the current Marine Park Permit application, however a summary of these works is provided below for context purposes.

- Vegetation clearing and earthworks to support development of a new car park within an existing undeveloped area of Clump Point Lookout Road (referred to as the ‘Southern Car Park’) (currently in progress, with construction activities likely to be completed in early 2015)
- Construction of a toilet block in the ‘Southern Car Park’
■ Installation of services required for the operation of the toilet block (water, sewer and electricity) within an underground services trench along Clump Point Lookout Road

■ Re-grading of Clump Point Lookout Road from Alexander Drive to the Southern Car Park

Figure 4-1 illustrates the location and general layout of these works.

Figure 4-1 Location of ‘excluded works’ at the Clump Point Boat Ramp.

All of the above works are located above the limit of HAT, and are therefore outside of the limits of the Great Barrier Reef Marine Park (State and Commonwealth). Accordingly, these works are **not** covered by this report or current applications under the GBRMP Zoning Plan.

4.2 **Design basis**

4.2.1 **Design vessel**

In order to undertake technical design of proposed infrastructure facilities (in particular relating to the required tidal access levels and load limits), it was first necessary to identify an appropriate design vessel for the project.

It is noted that following Cyclone Yasi and the closure of the Dunk Island Resort, there is currently no commercial ferry operating in this area. Therefore, design vessel specifications have been determined based on a ferry operation that is considered likely to occur in this location in the future.

Details of the relevant design vessel adopted for the project are provided below.
### Table 4-1 Design vessel specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length overall</td>
<td>24 m</td>
</tr>
<tr>
<td>Moulded beam</td>
<td>8 m</td>
</tr>
<tr>
<td>Moulded depth</td>
<td>2.9 m</td>
</tr>
<tr>
<td>Hull draft</td>
<td>1.9 m</td>
</tr>
<tr>
<td>Displacement</td>
<td>60 t</td>
</tr>
<tr>
<td>Passengers</td>
<td>100</td>
</tr>
</tbody>
</table>

#### 4.2.2 Ambient wave conditions

As outlined previously, the objective of the project is to provide conditions for the safe transfer of passengers and goods during ambient conditions. To determine the relevant design criteria for the project, a model was developed to assess the ambient wave conditions within Boat Bay.

The ambient wave climate in Boat Bay Reserve has been modelled using the Simulating Waves Nearshore (SWMS) numerical modelling software and calibrated with data obtained from a wave pressure gauge which was installed at the Perry Harvey Jetty from 21 November 2013 to 18 February 2014.

The results of the model indicate that the ambient (50th percentile) significant wave height is 0.21 m and for a 1 yr ARI is estimated at 1.3 m. Extreme wave conditions during a 200 yr ARI (0.5% AEP) event are estimated to comprise a wave height of 3.2 m.

The ambient wave climate is consistent throughout the year. However, seasonality in wave direction is apparent, with southerly wind and waves experienced in spring to summer, and northerly winds and waves in autumn to winter.

Generally, the wave climate of Boat Bay Reserve is comparatively mild in the context of coastal parameters. However, for unloading passengers and cargo safely, conditions are challenging as waves are beyond an acceptable standard wave climate. It is understood that small craft typically avoid using the jetty as it is too exposed to wave action. Waves above 0.3 m in height occur on a daily basis and restrict safe access. Waves above 0.5 m are experienced on average 8 percent of the year, with a maximum exceedance probability of 15 percent in the month of April.

#### 4.3 Proposed development - Perry Harvey Jetty

##### 4.3.1 Overview

Proposed works at the jetty aim to improve safety through increasing the operational window for berthing access. To achieve this, additional wave attenuation is required to shelter the head of the jetty from wave action. Accordingly, an overtopping breakwater is proposed at approximately 45 m offshore of the head of the jetty.

The works also aim to improve the safety of berthing and access through the addition of a new berth on the northern side of the jetty, supported by a shallow sloping ramp.

The location and layout of proposed facilities at the jetty is provided in Figure 4-2 below.
The design standards adopted for these facilities are outlined below.

4.3.2 Overtopping breakwater

4.3.2.1 Design objectives

An overtopping breakwater is proposed to be constructed approximately 45 m offshore from the head of the jetty. The overtopping breakwater has a non-linear geometry, varying in height and width along its footprint. The structure comprises a length of approximately 135 m, a height of 6.0 m above the seabed (finished crest level located only 6.0 cm above the HAT) and a width of up to 40 m wide.

The layout and design of the proposed overtopping breakwater is illustrated in Figure 4-2 and drawing number CD-JE-10 to CD-JE-13 within Appendix A.

The layout and design of the overtopping breakwater was determined through consideration of operational safety, cost and environmental criteria. The primary factors influencing the design of the layout of the overtopping breakwater are:

- **Navigation** – provision for sufficient space between the breakwater and jetty to ensure safe navigation and berthing of vessels

- **Wave attenuation** - to attenuate waves to reduce the ambient wave climate at the berth. The breakwater has been developed to be of a height and width to sufficiently attenuate the easterly and north-easterly waves

- **Environmental and aesthetic impacts** - to minimise environmental impacts (including sedimentation effects) through a reduced length and elevation

- **Cost** – to limit the scale of the structure to minimise the required capital costs

In line with these considerations, the overtopping breakwater has been designed to shelter the berth from wave action during ambient conditions, but allows ongoing overtopping (i.e. waves will pass over
the top of the structure). As such, the ‘overtopping breakwater’ has smaller scale and footprint when compared with a standard (straight) breakwater.

Currently, waves greater than 0.6 m in height are experienced about 10 percent of the time and present a safety risk to berthing for large vessels. With the addition of the overtopping breakwater, the wave climate at the jetty will be substantially improved such that the design vessel will be able to access the berth safely in 99% of conditions when tidal access is available (excluding cyclonic conditions). Safe access for small craft will also improve significantly.

Currently wave heights of more than 0.3 m are experienced almost on a daily-basis. The results of physical testing and numerical modelling demonstrate that the overtopping breakwater will significantly improve the wave climate at the head of the jetty such that waves above 0.3 m will only be experienced a few times a year, resulting in ‘excellent’ berthing conditions in the majority of conditions.

4.3.2.2 Navigational aids

To mitigate the potential collision and/or grounding risk for vessels, it is proposed to install navigational aids at each end of the overtopping breakwater (Port and Starboard). The proposed location for the installation of navigational aids is presented in Drawing CD-JE-01 within Appendix A. The markers will require that all vessels approaching / departing the jetty will need to navigate on the outside of each marker. The design of navigational aids is subject to further discussions with Maritime Safety Queensland (MSQ).

4.3.3 Berth and access ramp

4.3.3.1 Design criteria

A new berth and access ramp is proposed to be developed on the northern side of the jetty to improve the safety of berthing and the loading and unloading of passengers and goods. Figure 4-1 and drawing number CD-JE-03 and CD-JE-10 within Appendix A illustrate the proposed berth and access ramp.

The total length of the proposed access ramp is approximately 50 m extending from the jetty deck level of 2.95 m AHD to 0.38 m AHD and has been determined with regard to achieving suitable access for the design vessel during the full range of tidal conditions. Seven boarding platforms have been defined along the north side and at the head of the jetty.

The access ramp has been designed to provide a gentle slope for improved access, having a gradient of 1:14. Each section is separated by flat landing platforms to provide for boarding of the ferry at all tide levels, and to provide a flat area for passengers when getting on and off vessels.

The access ramp will be comprised of a non-slip surface. Handrails have been provided on the sloping sections of ramp, with the landing platforms free of handrails for unobstructed berthing access.

4.3.4 Moorings

4.3.4.1 Design objectives

It is proposed to construct two moorings within Boat Bay. Moorings will provide safe designated mooring locations for large vessels (such as a passenger ferry) and minimise the risk associated with illegal and inappropriate mooring which has occurred in Boat Bay Reserve in the past.

The mooring are located broadly between the Clump Point Boat Ramp and the Perry Harvey Jetty, as identified on CD-AR-03 of Appendix A. This location has been identified as it is within the nominated Boat Bay Reserve mooring area shown on the current GBRMPA ‘Clump Point Site Management
Arrangements’, and are also at suitable water depths to accommodate the design vessel during low tide and design wave conditions.

As there is currently no ferry operating within Boat Bay, initially it is proposed that moorings would be developed as a public mooring, to be administered by CCRC. In the event that a private operator subsequently establishes within the bay, and seeks to obtain primary access to the structure, the moorings may be transferred to a private mooring.

4.3.4.2 Design solution

A number of alternative mooring designs were investigated for the project, including:

- Dead weight anchor system with large concrete block anchors
- Piled anchor system with screw pile or driven piles
- Catenary mooring with drag embedment anchor system

Design solutions sought to provide an appropriate mooring solution that supports the design vessel, whilst minimising environmental impact as far as practicable.

Due to the size of the design vessel and the significant loads induced during cyclonic wind and wave conditions, a dead weight anchor system was not considered to be effective in resisting the design loads, without requiring an impractically large anchor, or a deep burial of the anchor. The potential impacts associated with such a system (such as navigation obstruction, partial dredging and major seabed interface) were determined to be unsuitable for the project.

A piled anchor system is also not preferable for larger vessels. The design of a suitable piled anchor system to support the design vessel would require a detailed understanding of the geotechnical conditions, to ensure that the ground conditions are suitable, and also to ensure that construction can be undertaken with reasonable equipment. This option was not preferred for the project due to the uncertainty surrounding geotechnical conditions in this location and suitability in supporting the design vessel.

Conversely, a catenary mooring system, as currently proposed, was determined to be effective in supporting the design vessel. A spread anchor arrangement with three anchors chained together to a central ground ring is proposed to minimise chain dragging on the seabed. A schematic illustrating the proposed design is provided in Figure 4-3.

![Figure 4-3 Catenary mooring with drag anchors](image-url)
The catenary design solution has been determined to be most appropriate to achieve the design objectives for moorings, whilst minimising impacts to the marine environment associated with construction and operation.

4.4 Proposed works - Clump Point Boat Ramp

4.4.1 Overview

A combination of infrastructure solutions is proposed to improve the safety and functionality of public facilities at the boat ramp. Proposed works at the boat ramp aim to:

- Improve tranquillity conditions within the navigational channel
- Minimise (or eliminate) routine congestion
- Improve the integrity of existing infrastructure and minimise the effects of ongoing erosion
- Address landside impacts including traffic congestion

The location and layout of proposed facilities at the boat ramp is provided in Figure 4-4 below, and relevant design drawings for these works are provided in Attachment A.

![Figure 4-4 Overview of proposed works at the Clump Point Boat Ramp.](image)
4.4.2 Floating walkway

It is proposed to install a new floating walkway adjacent to the existing rock breakwater (refer Drawing CD-BO-04). The purpose of the floating walkway is to provide a second landing for recreational vessels to minimise congestion which often occurs during the launching and retrieval of vessels. The structure will also facilitate access for pedestrians using the first (existing) boat ramp lane adjacent to the breakwater (as safe access cannot currently be achieved via the breakwater).

It is noted that the floating walkway is not intended to provide a permanent access point for any commercial operator in the area.

4.4.3 Additional boat ramp lane

An additional boat ramp lane is proposed to be constructed adjoining the southern side of the existing boat ramp lanes. The additional lane is intended to improve access for recreational vessels, and minimise the congestion between vehicles and boats during periods of peak demand. The additional boat ramp lane will, therefore, provide opportunities for the launch and retrieval of boats on both sides of the existing finger pontoon.

The design of the additional boat ramp lane is illustrated on CD-BO-02 of Appendix A.

4.4.4 Additional car, boat and trailer parking facilities

To minimise congestion which occurs at the boat ramp during periods of high demand, it is proposed to upgrade car and boat trailer parking facilities at Clump Point. There are currently four (4) single car parking bays and 15 car trailer units (CTUs) available at the boat ramp. Parking facilities are often at capacity during periods of peak demand, and it is not uncommon for boating users to park alongside the verge of Clump Point Lookout Road, as illustrated in Figure 4-5.

Figure 4-5 Indication of parking demand at the Clump Point Boat Ramp during peak operation (Source: GoogleEarth, imagery date 8/8/2013)
Parking facilities at the boat ramp are proposed to be upgraded to provide a total of 11 single car parking bays, and 33 CTU’s. These additional parking spaces are to be accommodated across the existing land area at the boat ramp, within a proposed reclamation area on the western side of Clump Point (adjacent to the boat ramp lanes), and within a land-based extension of the existing car park. These areas are reflected on CD-BO-04 within Appendix A. The layout of car parking areas has been determined to minimise the clearing of vegetation and marine plants as far as practicable, whilst still meeting acceptable design standards.

It is noted that additional parking spaces are also proposed to be developed within an existing (and unused) area of road reserve at Clump Point as outlined in Section 4.1.1 (‘excluded works’). Development of this car parking area is not subject to approval under the GBRMPA Act and therefore is not addressed in this report.

4.4.5 Reclamation (and mangrove terrace)

To alleviate congestion for parking facilities and ensure there is sufficient space for vehicle manoeuvring during the launch and retrieval of boats, it is proposed to undertake reclamation of approximately at the western side of Clump Point, adjacent to the new boat ramp lane. The reclamation area is identified on CD-BO-04 of Appendix A, and comprises 1880 m² below highest astronomical tide (HAT) and 1445 m² below mean low water mark (MLWM).

Reclamation in this location will provide for a manageable turning circle at the head of the boat ramp, and support provision for additional parking near to the near boat ramp lane to manage potential traffic conflicts. The seaward edge of the reclamation area would be protected from erosion by a rock armour seawall. The crest level of the reclamation edge is situated above HAT.

This location may also accommodate a mangrove terrace, subject to an agreeable re-vegetation strategy being developed. The proposed mangrove terrace is illustrated on CD-BO-04 and ‘section A’ CD-BO-05 of Appendix A; and has been situated at approximately MSL to support tidal influence.

Fill material for all reclamation works is intended to be obtained from a licenced quarry. No material will be sourced from the coastal/marine environment.

4.4.6 Improved drainage infrastructure

There is no significant drainage infrastructure at Clump Point. Currently, water from overtopping waves and stormwater runoff is transferred, uncontrolled, to the marine environment. The impact of waves and runoff is observed to be dislodging pavement material from the road and car park areas and transferring this to the marine environment. Pavement material is evident within the intertidal zone adjacent to the boat ramp, and this may be restricting further mangrove establishment in this location.

To control runoff at the boat ramp, a stormwater drainage channel is proposed alongside the eastern side of the Clump Point headland. The drainage channel will extend from the southern extent of the ‘northern car park’ to the existing boat ramp lanes, discharging adjacent to the rock breakwater (and below the floating walkway). This drainage system will capture overland flow and overtopping waves at Clump Point, transferring this to the navigational channel at the boat ramp. The drainage discharge will be concentrated at the boat ramp toe so that it flushes any sediment that may deposit at the toe of the boat ramp. This drainage infrastructure is expected to mitigate the need for future maintenance dredging through utilising the natural flushing effects of overland flow and overtopping waves collecting on hard surface areas. The drainage channel will also reduce erosion of the land during conditions when the car park area is overtopped by waves.
4.4.7 Breakwater repair
A minor repair of a defined section of the existing rock breakwater is proposed where previous damage has occurred and rock armouring has been displaced. The area subject to repair works is illustrated on Drawing CD-BO-08 of Appendix A. It is estimated that up to 40 rocks will be required to repair the armour.

4.4.8 Seawall edge
A new seawall is proposed to be developed alongside the eastern edge of the Clump Point headland, extending south from the head of the existing boat ramp lanes, alongside the 'northern car park' edge (refer Drawing No CD-BO-04 and CD-BO-06).

The seawall will be comprised of rock armour material and will have a crest level at 4.2m AHD. All existing rock material will be re-used on the wall where possible, to minimise the extent of imported material required.

The cross section of the seawall is comprised of a geotextile layer underneath the wall, overlaid with two layers of secondary armour, and two layers of primary armour. A set of stairs (2.4 m wide) has been incorporated into the seawall to support safe access to the tidal area on the eastern side of Clump Point, without the need to cross the rock armour seawall.

4.4.9 Relocation of isolated rocks
4.4.9.1 Navigational hazard survey
A review of previous bathymetric surveys undertaken in Boat Bay Reserve and information received during consultation indicated the presence of a number of isolated rocks which may restrict under-keel clearance for vessels, and pose a risk to safe tidal access. Accordingly, a ‘navigation hazard survey’ was undertaken by Aurecon during the wet season marine ecology survey, and sought to identify the presence of large isolated rocks in the vicinity of the boat ramp and overtopping breakwater which may present a risk to safe navigation. The methodology and results of this survey are detailed in Appendix D.

The survey undertaken by Aurecon identified numerous rocks located in close vicinity to the boat ramp. The location of these rocks is identified in Figure 4-6 below.
Two rocks identified during the survey, referred to as ‘J4’ and ‘T1’, were identified as a potential hazard for boats passing west of the breakwater and approaching the boat ramp, due to:

- The rocks being located less than 20 m away from the breakwater and in the likely turning path of most vessels
- The location and scale/dimension of these rocks results in limited water depth at low tide (ie the clearance from LAT is less than 700 mm)

The estimated dimensions of rocks ‘J4’ and ‘T1’ are identified in Table 4-2, and photographs illustrating their general appearance are provided in Figure 4-7 to Figure 4-10.
### Table 4-2 Clump Point Boat Ramp Navigational hazards

<table>
<thead>
<tr>
<th>Reference</th>
<th>Description</th>
</tr>
</thead>
</table>
| J4        | Height 1.500m  
Diameter 3.2m  
Circumference 9.0m  
Top of Rock -2.35m AHD  
Seabed Level -3.85m  
Est. mass 28,900kg |
| T1        | Height 650mm  
Diameter 2 m  
Circumference 6.48m  
Top of Rock -2.26m AHD  
Seabed Level -2.91m  
Est. mass 4,900kg |

As illustrated in the figures above, evidence of coral and algae growth was observed on these rocks, including:

- Coral – *Porites* sp., *Favia* sp. *Acropora* sp., *Montipora* sp., *Xenia* sp., colonial zoanthid
- Alga – *Bryopsis* sp., *Phaeophyta* sp., other unidentified green, red and brown algae
The evidence of coral and algae growth is consistent with the findings of the marine ecology survey whereby rock rubble areas appeared to support a greater abundance and diversity of species. Whilst coral species were identified, none are considered rare or threatened.

The findings of the survey (Appendix D) also demonstrated evidence of impellers striking these rocks (refer Figure 4-7). This confirms feedback received from the recreational boating community that the access channel to the boat ramp has historically been compromised by underwater obstructions.

4.4.9.2 Proposed safety improvement

To improve navigational safety, it is proposed to re-locate rocks ‘T1’ and ‘J4’ to increase water depth within the channel. These rocks would be relocated to a receiving environment at similar water depth and having similar habitat characteristics.

A potential methodology for the re-location of these rocks has been discussed with GBRMPA during pre-lodgement discussions. These discussions highlighted the need to ensure that any proposed re-location method is able to ensure the survival of inhabiting species (coral, alga) in the new location. It is noted that the complete avoidance of impacts would not be achievable, however, the re-location method must seek to minimise impacts to marine ecology as far as practicable.

A possible methodology to relocate these rocks is outlined below:

a) Use an air blower to remove sand under the rock and loosen its hold on the seabed;

b) Sling a broad ‘webbing’ under the rock to make a basket;

c) Hook the basket to a barge crane;

d) Maintain the rock under water and move via barge crane to the proposed receiving location; and

e) At the receiving location, settle the rock into the new location by scouring out sand at the sea floor.

It is understood that such a methodology has previously been carried out for the re-location of coral bommies within the GBRMP, resulting in the survival of species in a new location.

Whilst the above methodology has previously been carried out successfully in the marine park, it is possible that other options may be explored in line with work method practicalities and environmental management objectives.

4.4.10 Vegetation clearing

Vegetation clearing will be required in the following locations to accommodate proposed infrastructure at the Clump Point Boat Ramp:

- Along the eastern edge of Clump Point in association with proposed seawall upgrade works

- Within the ‘northern car park’ extension (at the southern extent of the existing parking facilities extending to the boundary of Lot 540 NR 7350)

- At the eastern side of Clump Point within the proposed ‘reclamation’ area

Accordingly, ecological surveys have been undertaken to review the nature of vegetation in these areas. Figure 4-11 below illustrates the clearing footprint for the Project; as well as the legislative and ecological context, as informed by the ecological surveys.
As illustrated above, mangroves subject to approval under the Fisheries Act were identified in the area of proposed reclamation on the western side of Clump Point; alongside the area of proposed revetment/seawall upgrades at the eastern side of Clump Point; and also within the car park extension at the southern extent of the existing parking facilities (adjoining Lot 540 NR 7351).

Within the area of proposed seawall upgrade works at the eastern side of Clump Point, existing vegetation was entirely characterised by mature and juvenile mangrove species regulated under the Fisheries Act, including Red mangrove (*Rhizophora stylosa*) and Grey mangrove (*Avicennia marina*). This location comprises a total land area of approximately 600 m$^2$, for which the vegetation cover was estimated to be 15 percent in the canopy layer, and 10 percent in the shrub stratum. Figure 4-12 and Figure 4-13 illustrate this area.
Within the proposed ‘northern car park’ expansion, vegetation was characterised by both terrestrial and marine species. Terrestrial species in this location comprised predominantly exotic species, although some native species were also identified. Marine species included Red Mangrove and Grey Mangrove. This location comprises a total area of approximately 740 m², for which the vegetation cover (of both terrestrial and marine plants) was estimated to be 40 percent in the canopy layer, and 10 percent in the shrub stratum. Figure 4-14 and Figure 4-15 illustrate this area.

Within the proposed reclamation area at the western side of Clump Point, vegetation was comprised entirely of mature and juvenile mangrove, including Red mangrove (*Rhizophora stylosa*) River Mangrove (*Aegiceras corniculatum*), and Grey Mangrove (*Avicennia marina*). This area comprises approximately 300 m², within which the vegetation cover was estimated at 50% in the canopy layer, with a height range of 2 to 3 m.
In total, the project is estimated to require the clearing of approximately 1,640 m² of land containing mangroves. Figure 4-18 below illustrates the areas which have been identified to contain mangrove species, and are required to be cleared for the project.
4.5 Ownership and maintenance

The current Project is being jointly funded by the Commonwealth and State government. DSDIP will coordinate all project works, if permitted, through to the completion of construction. The arrangements for future ownership and maintenance of proposed facilities will be the responsibility of DTMR and CCRC. The intended arrangements for future ownership are outlined below.

Table 4-3 Infrastructure ownership arrangements

<table>
<thead>
<tr>
<th>Agency</th>
<th>Infrastructure</th>
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<tbody>
<tr>
<td>CCRC</td>
<td>Jetty access ramp</td>
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<tr>
<td></td>
<td>Moorings</td>
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<td></td>
<td>Reclamation area and car parking at the boat ramp</td>
</tr>
<tr>
<td></td>
<td>Clump Point land based facilities (not subject to this application – refer Section 4.1.1).</td>
</tr>
<tr>
<td>DTMR</td>
<td>Boat ramp lane</td>
</tr>
<tr>
<td></td>
<td>Seawall/breakwater upgrades (Boat Ramp)</td>
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<tr>
<td></td>
<td>Overtopping breakwater</td>
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<tr>
<td></td>
<td>Floating walkway</td>
</tr>
</tbody>
</table>

4.6 Construction methodology

The following section provides a brief summary of the intended construction methodology for the proposed works. It is noted that the information provided is preliminary only, and details of the construction methodology cannot be confirmed until a construction contractor has been engaged.

It is intended that further detail regarding the construction methodology for the works and methods to minimise environmental impact would be outlined within a Construction Environmental Management Plan (CEMP) to be developed prior to construction.

4.6.1 Construction schedule

Construction works are expected to commence in mid-2015 assuming the receipt of all necessary statutory approvals for the project, and construction contractors have been engaged. The construction period is likely to comprise six to nine months, weather permitting.

4.6.2 Equipment and machinery

Specific equipment to be used during construction cannot be confirmed at this time. However the proposed works will require a combination of on-shore and marine based construction methods.

On-shore construction is expected to be undertaken for all civil works including construction of car parking, seawall, revetment, and reclamation works. Likely equipment to be used for these works may include an excavator, bulldozer, loaders, trucks, asphalt paver, and a roller compactor for the development of the pavement areas.

Marine based construction is expected to be required for the overtopping breakwater and access ramp at the jetty, as well as breakwater and floating walkway at the boat ramp. It is anticipated these works would be carried out with the use of a small barge (approximately 25 m in length) which has jack-up capabilities. Mitigation measures associated with marine based works are outlined in Chapter 6.
4.6.3 Material supply and laydown

A quarry source for the supply of rock material for the Project is not known at the time of writing, and is subject to further investigation.

It is intended that rock supply for the construction of the overtopping breakwater and seawall upgrade works will be sourced and transported to the site in stages, as required. However, there may be a need for temporary stockpile (laydown) of machinery or materials during the construction period.

For works at the jetty, it is intended that a temporary laydown area would be located within the existing public car park adjacent to the jetty, within the road reserve (or esplanade) of Alexander Drive. For works at the boat ramp, laydown areas may be established within the proposed 'southern car park' (not subject to this application – refer Section 4.1.1 'excluded works') (once vegetation has been cleared), within the existing car and boat trailer parking area at the end of Clump Point Lookout Road and/or at the Clump Point lookout.

A Traffic Management Plan will be developed by the contractor, prior to the commencement of construction works, detailing routes for the transport of materials to site and the intended arrangements for laydown and storage.
5 Legislative context

5.1 Overview

The proposed works trigger the following assessable development relevant to this development application:

- **Commonwealth legislation:**
  - Marine Park Permit under the *Great Barrier Reef Marine Park Act 1975* (GBRMP Act) (Cwlth) and the *Great Barrier Reef Zoning Plan 2003* (the GBRMP Zoning Plan)

- **State legislation:**
  - Marine Park Permit under the *Marine Parks Act 2004*
  - Operational Works within a coastal management district that is prescribed tidal works
  - Operational Works within a coastal management district that is interfering with quarry material as defined under the Coastal Protection and Management Act on State coastal land above high water mark
  - Operational Works for the removal, damage, or destruction to marine plants

It is noted that this Public Information Package relates only to an application for a Marine Park Permit under the GBRMP Act (C'th) and the GBRMP Zoning Plan (C'th). However for context purposes, the following sections provide a summary of the legislative context applicable to the project at Commonwealth, State and local levels.

5.2 Commonwealth

5.2.1 Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act provides that any action (ie a project, development, undertaking, activity or series or activities) that has, will have or is likely to have a significant impact on a matter of national environmental significance (NES), or other matters protected under the Act such as the environment of Commonwealth land, requires approval from the Commonwealth Environment Minister (the Minister). If a project is likely to impact on any of these matters of NES a referral, under the EPBC Act must be made to the Minister.

**Relevance to project:**

Searches were undertaken of the ‘EPBC Protected Matters Search Tool’ on the 10 December 2014 for an area within a 5 km radius of the project site. The EPBC search results identified the following matters of NES protected under the Act (refer search results within Appendix B):

- Two threatened ecological communities
- Thirty three (33) threatened species
- Thirty two (32) migratory species
- Two World Heritage Properties (Wet Tropics of Queensland, Great Barrier Reef)
- Three National Heritage Places (Wet Tropics of Queensland, Great Barrier Reef, and Wet Tropics World Heritage Area (Indigenous Values))
- Three zones within the GBRMP.

Figure 5-1 illustrates the project area in relation to key protected features, as identified under the EPBC Act.

Figure 5-1  EPBC Act Protected Matters (Source: Bing Maps, EPBC Act Protected Matters Online Search Tool)

As the project is located within the boundaries of the GBRMP, World Heritage Area and National Heritage Place, two separate referrals were submitted to the DoE under the EPBC Act to address proposed development located at the Clump Point Boat Ramp and Perry Harvey Jetty.

A referral was submitted on 19 December 2013 for works associated with the Clump Point Boat Ramp (DoE Reference number 2013/7100) and was determined to be ‘not a controlled action’ on 26 February 2014.

A second referral was submitted on 17 February 2014 associated with proposed works at the Perry Harvey Jetty site (DoE Reference number 2014/7189) and was determined to be ‘not a controlled action’ on 27 June 2014.

Accordingly, the project was determined to be ‘not a controlled action’, and no further assessment under the EPBC Act is required.
5.2.2 Native Title Act 1993

The Native Title Act 1993 (NT Act) provides the legal principles for the recognition of native title and the integration of this form of property right into the existing land title system. The Act establishes the processes involved in having native title recognised and the roles and responsibilities of the different bodies involved in this process.

Where native title has not been extinguished, the procedural requirements of the NT Act are required to be met prior to securing an appropriate tenure or undertaking works.

Relevance to project

Searches have been undertaken of the Native Title Register administered by the Native Title Tribunal to identify any native title claims existing over the project site. The search results indicate a determined native title claim (Tribunal reference number QCD 2011/005) applicable to the project area.

This determination reflects the legal acknowledgement by the Federal Court of Australia that that non-exclusive native title rights and interests apply over 142 ha of land and waters within the project area. It is noted that it has been determined that native title has been extinguished within the area of Clump Point Lookout Road as a result of previous lawful public works.

It is recognised that any procedural and compensatory requirements of the NT Act must be met prior to the commencement of construction. Accordingly, DSDIP is currently engaged with the NQLC, on behalf of the Djiru People, to address Native Title aspects of the project. It is proposed that the non-extinguishment principle of the NT Act would apply to the project, such that proposed works would not extinguish native title through the construction of public works.

5.2.3 Great Barrier Reef Marine Park Act 1975

The GBRMP Act is the primary Act governing the control, care, development and use of the GBRMP and is administered by the Great Barrier Reef Marine Park Authority (GBRMPA). The GBRMP (C’th) extends from the mean low water mark (MLWM) to the boundary of the 200 nautical mile exclusive economic zone.

The GBRMP Zoning Plan is the primary planning instrument for the conservation and management of the GBRMP. The GBRMP Zoning Plan establishes eight zones which regulate access and establish a system of permissions (or permits) to authorise entry or use within the marine park.

Relevance to the project

Tidal works associated with the project that are located below the MLWM are located within the Habitat Protection Zone of the GBRMP (Cwlth). Therefore, the project requires a permit for 'use or entry' in the marine park (ie a marine park permit), in accordance with Section 2.3.4 of the GBRMP Zoning Plan.

It is noted that the works also affect land located within the State marine park (extending between HAT and MLWM). A memorandum of understanding exists between the Commonwealth and the State to coordinate the assessment process under both the GBRMP Act and the MP Act. As such, a single marine park permit will be obtained for the Project through a coordinated assessment by both the GBRMPA and the Department of National Parks, Recreation, Sport and Racing (DNRPRSaR).
5.2.3.1 Existing permits

It is noted that CCRC and DTMR hold the following marine park permits for the ‘Operation and Maintenance of Facilities’ within Boat Bay:

- CCRC, Reference G12/35298.1, Valid from 14 Dec 12 to 28 Feb 2019
- DTMR, Reference G11/34760.1, Valid from 17 Jan 12 to 30 Sep 2018

These permits specify the conditions under which DTMR and CCRC must manage and maintain their respective infrastructure.

The current proposed works, if approved, would be authorised under permits to be held by DTMR and CCRC.

5.3 State legislation

5.3.1 Sustainable Planning Act 2009

The SPA is the legislation that governs planning in Queensland. The SPA seeks to achieve ecological sustainable outcomes for development within Queensland by coordinating and integrating planning mechanisms at local, regional and state levels, managing the effects of development on the environment, and managing the process by which development takes place.

Development that is prescribed as assessable development in Schedule 3 of the Sustainable Planning Regulation 2009 (SP Reg), or by a local government through a planning scheme, requires a development approval under the SPA before the development can take place. The relevant approving authority for the application (referred to as the assessment manager) is identified in Schedule 6 of the SP Reg, and other agencies with jurisdiction to assess the application (referred to as ‘referral agencies’) are identified in Schedule 7.

Relevance to the project

The proposed works trigger the following assessable development under Schedule 3 of the SP Reg:

- Operational Works within a coastal management district that is prescribed tidal works (Schedule 3 Table 4 Item 5(a) of the SP Reg)
- Operational Works within a coastal management district that is interfering with quarry material as defined under the Coastal Protection and Management Act on State coastal land above high water mark (Schedule 3 Table 4 Item 5(b)(i) of the SP Reg)
- Operational Works for the removal, damage, or destruction to marine plants (Schedule 3 Table 4 Item 8 of the SP Reg)

5.3.1.1 Assessment manager

As the proposed works are located partly within a local government tidal area (ie within 50m of MHWS), in accordance with Schedule 6 Table 1 Item 1 of the SP Reg, the CCRC will act as the Assessment Manager for the development application under SPA.

5.3.2 Coastal Protection and Management Act 1995 (Coastal Act)

Development within the coastal zone is administered by the Department of Environment and Heritage Protection (DEHP) under the Coastal Protection and Management Act 1995 (Coastal Act). DEHP (in conjunction with SARA) is responsible for making decisions on development proposals in line with the objective of the act to “provide for the protection, conservation, rehabilitation, and management of the coastal zone, including its resources and biological diversity”.


Relevance to project
Tidal works are defined under the Schedule to the Coastal Act, and relate to “work that is undertaken on land that is in, on, or above, land under tidal water...”. The project requires approval for ‘tidal works’ under the Coastal Act associated with the development of maritime infrastructure within the tidal environment, and also for construction works which will interfere with quarry material on State coastal land above the high water mark. Interfering with quarry material relates only to the necessary interference with sand and gravel associated with construction activities.

Additional matters relevant to the assessment of works under the Coastal Act are outlined below.

5.3.2.1 Prescribed Tidal Works
Under Section 14 of the Coastal Protection and Management Regulation 2003 (Coastal Reg), “tidal works that are located completely or partly located within a local government tidal area” are defined as ‘prescribed tidal works’. A local government tidal area is defined as the area within 50 m seaward of the mean high water mark, which in this case encompasses the majority of the proposed works (with the exception of the overtopping breakwater). As the proposed works are located partly within a local government tidal area (ie partly within 50m of MHWS) the works the proposed works will be assessed under the Coastal Act as ‘prescribed tidal works’.

5.3.3 Marine Parks Act 2004
The Marine Parks Act 2004 (MP Act) provides the framework for the management and protection of the marine environment which is outside Commonwealth waters and under the jurisdiction of the State. The Great Barrier Reef Coast Marine Park (GBR Coast MP) is located between the boundaries of HAT and the Commonwealth marine park (ie MLWM).

The Marine Parks (Great Barrier Reef Coast) Zoning Plan 2004 (the GBR Coast Zoning Plan) has been created under the MP Act and has the purpose to manage and regulate activities within the GBR Coast MP.

Relevance to the project
The proposed works are partially located within the GBR Coast MP and, therefore, also require a Marine Park Permit under the MP Act. The GBR Coast Zoning Plan complements the GBRMP Zoning Plan through adopting similar zone objectives, and entry and use provisions. A memorandum of understanding exists between the Commonwealth and the State to coordinate the assessment process under both the GBRMP Act and the MP Act. As such, a single marine park permit will be obtained for the Project through a coordinated assessment by both the GBRMPA and the Department of National Parks, Recreation, Sport and Racing (DNRPRSaR).

5.3.4 Fisheries Act 1994
The Fisheries Act provides for the management, use, development and protection of fisheries resources and fish habitats, and the management of aquaculture activities. The following activities are regulated under the Act:

- Waterway barrier works
- Works in a declared Fish Habitat Area (FHA)
- Removal, destruction and/or damage to marine plants

A number of policies and guidelines have been developed to implement the purpose and objectives of the Act, including self-assessable codes which may be used for certain low-impact development activities.
Relevance to the project

Schedule 3, Part 1, Table 4, Item 8 of the SP Reg specifies that Operational Work for the removal, destruction and/or damage to marine plants is assessable development. Marine plants include mangroves, seagrass, samphires, salt couch, saltmarsh plants, algae and other tidal plants growing adjacent to the tidal zone.

An ecology survey undertaken within the area of the Clump Point boat ramp (refer Appendix D, Aurecon, 2013) identified mangrove species that are classified as marine plants under the provisions of the Fisheries Act. Mangroves subject to approval under the Fisheries Act were identified in the area of proposed reclamation on the western side of Clump Point; alongside the area of proposed revetment/seawall upgrades; and also within the car park extension at the southern extent of the existing parking facilities.

Construction of the proposed rock seawall upgrade and car park extension is estimated to require the clearing of approximately 1640 m² of land containing mangrove species; however it is noted that only approximately half of this clearing footprint is considered to be subject to tidal influence.

Additionally, marine ecology surveys undertaken by Aurecon (refer Appendix D) identified the presence of brown and green algae, primarily inhabiting sub-tidal rocks/ boulders and man-made structures within the study area. Isolated patches of seagrass (less than 2 m²) were also identified in the vicinity of the jetty (transect 1) during the dry season, and near to the boat ramp during both the wet season and dry season (transect 3 and 4). As such, development approval is required for the removal of ‘marine plants’ encompassing impacts of the project on mangroves, algae and seagrass.

Additionally, marine plants are identified as a “prescribed environmental matter” of “State environmental significance” under the Environmental Offsets Act 2014; and the removal, destruction and/or damage to marine plants is identified as a “prescribed activity” for which offsets may apply. Therefore, consideration to the Queensland Environmental Offsets Policy is required.

5.3.5 Vegetation Management Act 1999

The Vegetation Management Act 1999 (VM Act) regulates the conservation and management of vegetation communities. Under the VM Act, a Regional Ecosystem (RE) is defined as a vegetation community in a bioregion that is consistently associated with a particular combination of geology, land form and soil.

Relevance to the project

Vegetation within the project area is mapped by the DNRM as a ‘Category B area’ (Remnant Vegetation) (Refer search results within in Appendix B). The vegetation community at Clump Point is identified under the VM Act Regional Ecosystem (RE) mapping as ‘Least Concern’ remnant vegetation and comprising ‘Complex mesophyll to mesophyll vine forest on well-drained basalt lowlands and foothills’ (RE 7.8.1) and ‘Mangrove closed scrub to open forest’ (RE 7.1.1). Vegetation is this area is also identified as ‘Essential Habitat’ for the Southern Cassowary (Casuarius casuarius) and the Arenga Palm (Arenga australasica).

As outlined in Chapter 3, the project will require the clearing of ‘Category B’ ‘Least Concern’ RE’s in association with proposed seawall and car parking upgrades at the Clump Point boat ramp. The clearing of marine plants within RE7.1.1 requires a development approval under the Fisheries Act (refer Section 5.3.4). However, no clearing permit is required under the VM Act as exemptions apply for the clearing of land for community infrastructure (under Schedule 24 of the SP Reg).
5.3.6  Aboriginal Cultural Heritage Act 2003

The Aboriginal Cultural Heritage Act 2003 (ACH Act) binds all persons, including the state, to provide recognition, protection and conservation of Aboriginal cultural heritage. Section 23 of the ACH Act states that ‘a person who carries out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal cultural heritage’ (the ‘cultural heritage duty of care’).

The ACH Act requires the development of a Cultural Heritage Management Plan (CHMP) if:
- An Environmental Impact Statement (EIS) is required; or
- An environmental authority is required under a different act.

A CHMP may also be required where a development application is required under SPA, and the chief executive of the ACH Act is a concurrence agency for the application. The need for a CHMP in this instance is requested through an ‘Information Request’ under SPA for works that have the potential to impact on aboriginal cultural heritage (Section 89 of the ACH Act).

Relevance to the project
An Aboriginal Cultural Heritage Search has been obtained for an area within 1 km of the project site and the results are included within Appendix B. The search results identify that the relevant Aboriginal party for the area as:

QC03/3 – QUD6003/03
Djiru People #2
North Queensland Land Council
61 Anderson Street
Cairns QLD 4870
Telephone 07 4042 7000

Four recorded cultural heritage sites are recorded in the vicinity of Clump Point, including two stone alignments within Boat Bay, one of which is identified immediately south of the boat ramp; a historic ceremony ground at Clump Mountain National Park; and a fish trap immediately south of Clump Point headland.

The project does not require an EIS or other environmental authority in which a CHMP is prescribed by regulation (Section 88(b) of the ACH Act). Therefore, a CHMP is not mandatory under the ACH Act. However, in complying with Duty of Care requirements, DSDIP is currently engaged in ongoing consultation with the Djiru People and the NQLC and has agreed to develop a CHMP for the project. Development of the CHMP is currently in progress.

Recently, DSDIP also met with representatives of the Djiru People and NQLC at Clump Point to observe the stone alignment identified near to the proposed reclamation area. DSDIP continues to consult with the Djiru People and the NQLC to ensure the project works appropriately address cultural heritage matters. Specifically, design measures to ensure the protection of the stone alignment near the boat ramp are currently being discussed between DSIDP and the NQLC and may include an encasement below the proposed reclamation area.

5.3.7  Environmental Offsets Act 2014

The Environmental Offsets Act 2014 (EO Act) and Environmental Offsets Regulation 2014 (EO Reg) were adopted on 1 July 2014. The Act has the purpose to regulate the delivery of offsets in Queensland, integrating the previous multiple sets of policies previously in existence, and providing a single framework for the assessment and delivery of offsets. An environmental offset is defined under the Act as “an activity undertaken to counterbalance a significant residual impact of a prescribed activity on a prescribed environmental matter.”
The Act defines the type of activities for which offsets may be imposed (ie “prescribed activities”) where these activities are determined to result in a ‘significant residual impact’.

To achieve the purpose of the Act, the *Queensland Environmental Offsets Policy* (Version 1.0, 2014) has been developed to provide further guidance on the requirements for the assessment of ‘significant residual impacts’, and accepted methods for the delivery of offsets, where required.

**Relevance**

As discussed previously, the selection of proposed design solutions to improve boating safety in Boat Bay has involved key consideration to minimising potential environmental impacts. Nonetheless, it is recognised that some residual impacts exist in association with an increased development footprint in this location, which contains identified Matters of State Environmental Significance (MSES) and Matters of National Environmental Significance (MNES).

The delivery approach for offsets required for the project will be subject to discussion throughout the assessment process. Offset provisions for potential impacts to MNES will require integration between the assessment of the Marine Park Permit under the GBRMP Act (C’th), Marine Parks Act (State), and the development permit under SPA (Qld).

### 5.4 Local government regulatory framework

#### 5.4.1 Johnstone Shire Planning Scheme 2005

The subject site is located within the Cassowary Coast Regional Council (CCRC) local government area. Planning and development within the locality of the subject site is regulated by the CCRC under the *Johnstone Shire Planning Scheme 2005* (the planning scheme).

**Relevance to the project:**

As the proposed works are located partly within a local government tidal area (ie within 50m of MHWS), the CCRC will act as the Assessment Manager for the development application under SPA, in accordance with Schedule 6 Table 1 Item 1 of the SP Reg.
6 Potential impacts and mitigation measures

6.1 Summary of potential impacts
Potential environmental impacts as a result of the proposed works will comprise both short term impacts associated with construction activities, and potential long term impacts to coastal geomorphology. As noted within Chapter 4, the proposed works are anticipated to be constructed over a period of six to nine months, weather permitting. During this time, it will be essential that appropriate management controls are established to mitigate the short term impacts associated with construction activities in and around the coastal environment.

An assessment of the potential impacts associated with the project is provided below, including the identification of potential mitigation measures, where appropriate.

6.2 Coastal geomorphology

6.2.1 Narragon Beach

6.2.1.1 Hydrodynamics
Field data was collected to gauge the relative significance of tidal currents flowing in Boat Bay. The field data indicated that tidal currents in Boat Bay are weak, and consequently are likely to have a limited contribution to sediment transport patterns. It is therefore considered that the proposed overtopping breakwater will have a negligible effect on coastal processes as a result of tidal currents, as the structure occupies a relatively small footprint within the bay.

6.2.1.2 Wave action
The overtopping breakwater may have a localised impact on sediment transport patterns as a result of creating sheltered conditions landward of the structure (i.e. between the head of the jetty and the shoreline). As a result of its function to provide wave attenuation, sediment that is mobilised by wave action may be deposited on the landward side of the structure where wave energy is reduced due to the presence of the overtopping breakwater. Additionally, as waves refract around the structure a salient could develop as sand transport is modified in the shadow of the breakwater.

These effects of wave attenuation and refraction have the potential to result in potential sediment build up (i.e. formation of a salient) at the shoreline. However, it is noted that this effect on shoreline geomorphology typically noted with wave attenuation structures was acknowledged through the design process, whereby:
Wave attenuation structures having a large physical footprint (e.g., piled wave screen, normal breakwater) were rejected through the MCA process at the beginning of the project, due to the magnitude of potential shoreline impacts.

The size, shape and position of the proposed overtopping breakwater was optimised through physical testing, specifically with the aim of minimise shoreline impacts, whilst still achieving the desired design objectives.

**Physical testing**

Recognising that wave processes dominate the sediment transport processes within Boat Bay and along Narragon Beach, the overtopping breakwater was studied in detail via numerical modelling and physical testing, as these methods provided the most effective tools to investigate the effects attributable to the overtopping breakwater.

Physical testing involved the creation of a scaled 3D model to investigate the impact of the structure on waves, storm tide and sediment transport; as well as to optimise its location, orientation and physical dimensions. The physical testing process was undertaken from early January to mid-February 2014, in a series of stages, and allowed many iterations of the overtopping breakwater. Throughout the process, factual information was obtained regarding the potential impact of the structure on the shoreline.

The results indicate that during ambient conditions, the presence of the overtopping breakwater, over time, may result in localised changes to the shoreline within the breakwater wave shadow zone north and south of the position of the overtopping breakwater. Over a period of years a pro-gradation of the shoreline may be observed at the shoreline south of the overtopping breakwater. Additionally, minor erosion may be observed at the shoreline to the north of the overtopping breakwater. The laboratory study confirmed that it is "likely that localised beach widening will be relatively minimal during ambient wave conditions" (refer p. 25, Section 9.3.3, Flocard & Drummond, 2014) in the wave shadow created by the structure.

The testing identified that only during an extreme cyclonic conditions (200 yr ARI), a noticeable salient forms behind the overtopping breakwater, while the unprotected beach north and south of the overtopping breakwater partially recedes. The extent of accretion in the lee of the breakwater was estimated to be approximately 25 m. The length of shoreline over which impacts were observed was approximately 120 m.

Whilst localised shoreline impacts were apparent as a result of a cyclone event, physical testing also sought to investigate the potential for subsequent beach recovery. To investigate beach recovery processes, the model tested 80th percentile wave conditions which are reflective of a weekly storm event. The results demonstrate that "post-cyclone beach alignment recovery processes would be likely to still occur even when the proposed overtopping breakwater is in place" whereby the salient was observed to recede during testing under ambient waves conditions after a cyclone event (refer Section 8.6 and 9.3.3 of Flocard & Drummond, 2014). This suggests that the breakwater has a limited effect on beach equilibrium.

It is important to note that the reduced scale and size of the overtopping breakwater has been specifically refined through the physical testing process to minimise impacts on sediment transport, when compared to a standard breakwater design with a larger footprint. The overtopping breakwater currently proposed provides a reduced scale and crest height, which allows for overtopping (i.e., waves to pass over the structure) in extreme conditions to minimise shoreline impacts.

Nonetheless, it is recognised that the installation of the overtopping breakwater may have some impacts on the shoreline. As a result, it is anticipated that ongoing monitoring of beach movements will...
be necessary to manage the shoreline at Narragon Beach. It is unlikely that maintenance will be necessary in the absence of a cyclone event. However, following a major cyclone, the resulting change in beach alignment associated with extreme conditions may trigger the need for emergency shoreline protection works. In such circumstances, where a salient is formed behind the overtopping breakwater, this may provide a reasonable sand resource to replenish adjacent eroded areas of Narragon Beach.

6.2.1.3 Summary
Owing to a relatively mild wave climate and sheltering from the dominant southerly waves by the Clump Point headland and breakwater, Boat Bay is a relatively well sheltered area (with the exception of high tide and strong northerly wave conditions). There is very little sand supply from the south, as the Clump Point rocky headland restricts sand supply. The majority of sediment transport occurring is episodic, driven by a combination of longshore and cross-shore sediment transport during cyclonic events.

Investigations undertaken for the project confirm that shoreline movements with the addition of the overtopping breakwater are likely to be comparable to the existing sediment transport pattern (ie limited sediment transport under ambient conditions). Localised erosion and accretion of the beach is evident immediately behind the overtopping breakwater following a major cyclone (ie 200-yr ARI). However, over the long-term the shoreline returns almost to its pre-cyclone state. Accounting for the natural shoreline variability which occurs under ambient conditions, the long term impacts of the overtopping breakwater on coastal geomorphology are considered to be negligible.

6.2.2 Clump Point Boat Ramp
Works at the Clump Point Boat Ramp are proposed within the area of an existing and operational public boat ramp, located on the lee side of an existing breakwater which shelters the boat ramp from significant wind and waves. Owing to the partial sheltering provided by the Clump Point headland and breakwater, there is limited sediment movement in the area of the boat ramp (with the exception of during high tide and strong northerly wave conditions). Additionally, siltation near the toe of the boat ramp is observed to occur only episodically (typically during major storms and cyclones), but this siltation mostly clears itself overtime. The driving mechanism for siltation is extreme wave action. The recovery mechanism (cleaning) is driven by a combination of tidal currents, propeller wash and small waves during low tides.

Importantly, maintenance dredging is not absolutely necessary to operate the Clump Point boat ramp although the amenities become intermittently restricted during the lowest tides because of the siltation which occurs from time to time. The project effect on siltation is very likely to be negligible. Flushing improvement through the overtopping drain is likely to reduce the time to clear silts in between siltation episodes. However, the boat ramp basin self-cleaning ability remains unchanged as well as the mechanism responsible from siltation (extreme waves).

The proposed works are not anticipated to interrupt sediment transport patterns, or have any notable effect on the coastal processes, hydrodynamics or geomorphology of Boat Bay. The project utilises the existing navigational channel and does not require any capital dredging or additional maintenance dredging in the future. The proposed design of the natural flushing system will also act flush sediments and mitigate the need for maintenance dredging.

There may be some minor impacts resulting from the disturbance of sediments associated with the ongoing operation of the boat ramp (ie boat propeller induced turbulence and noise) reducing the benthic habitat value in this location and causing potential disturbance to marine mega fauna. However, these effects are likely to be consistent with that which currently occurs.
6.3 Heritage values

6.3.1 Great Barrier Reef World Heritage Area & Marine Park

The project area exists within the boundaries of the Great Barrier Reef World Heritage Area (GBRWHA). The Great Barrier Reef (GBR) was declared a World Heritage Area in 1981 because of its ‘outstanding universal value’ (OUV).

The OUV of the GBRWHA are reflected in the UNESCO Statement of Outstanding Universal Value for the Great Barrier Reef (Statement of OUV). The Statement of Universal Value outlines the four natural heritage criteria for which the GBR was inscribed in the World Heritage List, and reflects the elements contributing to its OUV.

As stated in the EPBC Act referral guidelines for the outstanding universal value of the Great Barrier Reef World Heritage Area, 2014’ the attributes that contribute to the OUV of the GBRWHA in relation to Criterion (vii) include:

- Superlative natural beauty above and below the water
- String of reef structures
- Mosaic patterns of reefs, islands and coral cays produce an unparalleled aerial panorama of seascapes
- Green vegetated islands
- Spectacular sandy beaches
- Azure waters
- Vast mangrove forests
- Vegetated mountains
- Lush rainforest gullies
- Breeding colonies of seabirds and marine turtles
- Green turtle breeding
- Over-wintering butterflies
- Coral assemblages of hard and soft corals
- Thousands of species of reef fish
- Coral spawning
- Migrating whales
- Nesting turtles
- Significant spawning aggregations of many fish species.

With regards to the above, it is acknowledged that Boat Bay and neighbouring areas display a number of the attributes that contribute to the OUV of the GBRWHA, including:

- green vegetated islands/outcrops (Clump Point, Dunk Island);
- sandy beaches;
- rainforest habitat;
- vegetated mountains;
- mangrove and seagrass habitat; and
- assemblages of hard and soft corals.

However, ‘superlative natural beauty’ suggests an aesthetic or natural value which is outstanding or unparalleled. While lightly developed, Boat Bay is not pristine as it contains an existing public boat ramp and jetty. The Bay is also designated as a State Reserve for Boat Harbour purposes, and has historically provided an important point of access to the GBR and offshore islands. The existing tenure of Boat Bay reflects its suitability for accommodating maritime infrastructure.
To inform the design process and assess the potential impact of the project on the outstanding universal values of the GBRWHA, marine ecology, water quality, and terrestrial ecology surveys have been undertaken by Aurecon (refer Appendix D). The marine ecology surveys undertaken for the project identified the water quality within the investigation area to be relatively turbid.

Isolated coral species were identified, although none were rare or threatened, and complex reef structures were not identified within the project area. Overall, the marine ecology of the investigation area was reflective of a moderately disturbed environment.

Nonetheless, it is acknowledged that proposed works have the potential to impact the GBRWHA through both direct and indirect impacts, including impacts to visual amenity, terrestrial and marine ecology, water quality, noise, vibration and coastal geomorphology (addressed in subsequent sections of this chapter). However, the works also aim to provide positive impacts to the locality, including:

- Improvement in safety, which reduces the potential for vessel grounding, wreckages and contamination to the marine environment;
- Reduction of overtopping across the breakwater and associated sediment disturbance; and
- Improved access to the marine environment, potentially contributing to greater appreciation of outstanding values exhibited by the region.

It is considered that the extent of potential impacts to the GBRWHA will be largely related to the construction phase, and are not considered to result in an impact that would result in the loss, degradation or alteration of the specified criteria for ‘outstanding universal value’.

The selection and design of proposed infrastructure solutions has been undertaken with particular regard to maximising the effectiveness of existing infrastructure, and minimising the additional development footprint within this sensitive environment. Appropriate methods will be established through the CEMP to mitigate the potential impacts of construction activities.

6.3.2 Visual amenity

Criterion (vii) of the Statement of OUV recognise that the GBRMP “is of superlative natural beauty above and below the water, and provides some of the most spectacular scenery on earth”. Visual amenity values provide an important contribution to the OUV of the GBRMP.

The protection of the existing amenity values of the GBRWHA was a key consideration in the selection and design of this proposed infrastructure. It must be emphasised that all works, inclusive of the ‘overtopping’ breakwater, were designed to limit their visible scale and footprint. DSDIP also considered alternative proposals submitted by a number of community stakeholders, including a significant expansion of the existing rock breakwater and reclamation at the Clump Point Boat Ramp; and an artificial island with a sheltered berthing basin. The investigation of alternative solutions was especially cognisant of the need to minimise visual and aesthetic impacts, and is reflected through the proposed design.

It is acknowledged that proposed infrastructure solutions, in particular the overtopping breakwater in front of the Perry Harvey Jetty, will introduce new visual elements to the landscape, resulting in a change to existing visual amenity.

A detailed viewshed analysis has not been undertaken for the project. However, computer generated imagery (CGI) has been developed to provide an approximate representation of the visual appearance of the overtopping breakwater. Images taken from the CGI are provided in Figure 6-1 to Figure 6-3.

As illustrated within the CGI images, it can be seen that the low-crested overtopping breakwater proposed allows uninterrupted views of the horizon from any vantage point. The overtopping
breakwater features a low-crested, variable crest height such that it peaks at HAT, and only a small portion of the structure is visible at MHWS.

Figure 6-1 Representation of the potential view of the overtopping breakwater as seen from the Perry Harvey Jetty (image illustrates appearance at MHWS).

Figure 6-2 Aerial representation of the potential view of the overtopping breakwater (image illustrates appearance at approximately MHWS).
Figure 6-3 Aerial representation of the potential view of the overtopping breakwater (image illustrates appearance at approximately MHWS).

Figure 6-4 and Figure 6-5 below illustrate the current visual appearance of Boat Bay, as seen from the Perry Harvey Jetty and the Clump Point Boat Ramp.

Figure 6-4 View from beach adjacent to the Perry Harvey Jetty looking east (17°51'2.45"S, 146° 6'20.08"E).
Figure 6-5  View of the Clump Point Boat Ramp and infrastructure, looking north-west towards the Perry Harvey Jetty (17°51'12.78"S, 146° 7'0.66"E).

It is considered that the visual amenity of the Bay from the Clump Point Boat Ramp will be largely unaltered by the project given the overtopping breakwater will be approximately one kilometre distant (across the water) and only a small portion of the structure will be above the MHWS.

Furthermore, the tree lined road corridors, and morphology of the coastline between Mission Beach (to the south) and Bingil Bay (to the north), limit views of Boat Bay from all but its immediate environs. From the south, the Clump Point headland is situated in the direct line of view from Mission Beach, Wongaling Beach and Dunk Island. From the north, Boat Bay is only intermittently visible between the existing vegetation when travelling along Alexander Drive from Bingil Bay. The winding nature of the coastline, rocky outcrops and vegetated hills screen views of the Perry Harvey Jetty from most locations. Figure 6-9 to Figure 6-8 illustrate the views towards Boat Bay when travelling along Alexander Drive; and Figure 6-9 provides a view from Clump Point Access Road.

Figure 6-6 View from Alexander Drive, at the northern end of Bingil Bay (17°50’13.28”S, 146° 6’7.75”E) (Source GoogleEarth).
Figure 6-7  View from Alexander Drive, at the northern end of Boat Bay (17°50'34.41"S, 146°6'18.98"E) (Source GoogleEarth).

Figure 6-8  View of Boat Bay from Alexander Drive (17°50'37.21"S, 146°6'15.30"E) (Source GoogleEarth).
As illustrated, views of the boat ramp and jetty (and the proposed location of the overtopping breakwater) are limited from both Alexander Drive and Clump Point Road due to the variable topography, winding coastline, and the existing vegetation aligning the coast. From these locations, the physical distance and natural screening will considerably restrict views of the overtopping breakwater and reclamation areas at the boat ramp. The potential aesthetic impacts of proposed infrastructure solutions were one of the key factors considered during the MCA deliberations and concept design process.

Although the additional infrastructure at the jetty and boat ramp will be partially visible within Boat Bay, the project should not detract from overall visual amenity of the bay. The proposed solutions will enhance existing maritime infrastructure by improving conditions for safe boating at the jetty, and by providing the opportunity for continued enjoyment and appreciation of the GBR marine park by the regions’ residents and tourists.

6.3.3 Indigenous cultural heritage

A number of cultural heritage sites are recorded in the vicinity of Clump Point. These features have been considered through the design process to ensure that the footprint of physical works is consistent with the indigenous heritage values of the locality.

DSDIP is engaged in ongoing consultation with the Djiru People and their legal representative the NQLC, and has agreed to develop a CHMP for the project. Development of the CHMP is in progress.

Additionally, in October 2014, DSDIP representatives met with representatives of the Djiru People and NQLC at Clump Point to observe the stone alignments identified near to the proposed reclamation area.

DSDIP is currently engaged in consultation with the Djiru People and the NQLC to discuss potential measures for the protection of this stone alignment, such as a potential encasement below the reclamation area.

DSDIP continues to consult with the Djiru People and the NQLC to ensure the project works appropriately address cultural heritage matters, and identify an appropriate solution for the protection
of the stone alignment. It is expected that measures to ensure the protection of cultural heritage through the design and construction of works will be detailed within the CHMP.

6.4 Flora/fauna impacts

6.4.1 Terrestrial ecology

The protection of significant vegetation and habitat features was a key consideration for the design of land based infrastructure at the boat ramp, including identifying suitable locations for development and determining a suitable layout for proposed infrastructure.

As discussed in Chapter 3, ecological surveys have been undertaken to review the nature of terrestrial flora and fauna present within the proposed clearing footprint (refer Attachment I). The ecological survey confirmed that within the areas proposed for clearing associated with reclamation and construction of the ‘northern car park’ at the boat ramp; is defined by scattered, regrowth mangrove vegetation (mature and regrowth) and large boulders which are associated with the existing seawall structure. In these locations, no EVNT flora species listed under the provisions of the EPBC Act and/or the NC Act were recorded.

Proposed upgrade works at the Clump Point Boat Ramp may benefit the terrestrial ecology through the provision of designated parking facilities, which may avoid the need for users to park alongside the verge of Clump Point Lookout Road, therefore minimising edge effects associated with the use of vehicles in close proximity to adjoining vegetation. The proposed re-sealing of new pavement areas may also minimise the transfer of dust associated with traffic movements along Clump Point Lookout Road.

The clearing of mangrove species is subject to approval under the Fisheries Act, being sought as part of this application.

Measures will be adopted during construction through a CEMP to ensure the works to not cause unnecessary impacts to surrounding terrestrial habitat areas. Such measures will include clear delineation of the clearing footprint and areas for specific protection, presence of a DEHP licenced spotter-catcher during site clearing activities, and sediment and erosion control to prevent dust and sedimentation impacts to surrounding areas.

It is also noted that evidence of Class 3 pests’ as listed under the Land Protection (Pest and Stock Route Management) Act 2002 have been identified within the vicinity of the project area. Therefore, appropriate site management procedures will also be implemented through the CEMP to avoid the transfer of weed species off site. This may include physical weed removal in sensitive areas (ie hand pulling, chipping or cutting weeds).

6.4.2 Marine ecology

It is considered unlikely that marine mega fauna (such as whales, dolphin, dugong and sharks) would visit the tidal area in the vicinity of Boat Bay due to the shallow water depths, limited feeding opportunities and the impacts associated with current vessel use. However, smaller species may inhabit the area (such as turtles, frogs, crocodiles, fish, corals, invertebrate infauna, algae and seagrass) and, therefore, there is the potential for proposed works to impact on marine ecology.

A marine ecology survey was undertaken within the project footprint and the results of the survey are included in Appendix D. The survey did not identify any notable benthic habitat, with the exception of number of sparsely placed sediment covered rocks with evidence of red, brown and green algae growth, hard and soft corals. The results identified a disturbed environment within the investigation area, with sparse seagrass and coral growth.
It is considered that impacts to marine ecology will be primarily confined to the construction phase. Such impacts may include disturbance or displacement of fauna species due to noise and vibration, and unintended impacts to surrounding vegetation or habitat.

These potential impacts are proposed to be managed through the CEMP to be developed prior to construction. The CEMP will include procedures for the following:

- Environmental awareness training for all workers and ongoing task/activity-specific training
- Protection of water quality through the implementation of sediment and erosion control practices
- Scheduling of construction works during low tide (where possible) to avoid impacts to marine fauna
- Implementation of the ‘Soft Start’ (Ramp Up) Procedure for all machinery operated near to the marine environment
- Visual observations and monitoring for marine fauna by a suitably trained person

Through the implementation of these mitigation measures, impacts to marine ecology are considered to be minor.

6.5 Marine water and sediment

Construction works have the potential to impact on water quality as a result of sediment disturbance, exposure of contaminated materials (such as acid sulphate soils), and the use of machinery and hazardous substances within a marine environment. Accordingly, the following mitigation measures are proposed for construction works and will be included within the CEMP:

- Install and maintain erosion and sediment control measures during site works, including:
  - Sediment fencing and/or bunding (where appropriate)
  - Use of water for dust suppression
- Works requiring access to the tidal environment to be scheduled during low tide (where possible)
- Works to be undertaken in stages to ensure earthworks are limited to the daily extent of works, and the need for stockpiles of rock material is minimised
- Implement a visual turbidity monitoring program throughout construction. Should visible turbid plumes occur as a result of construction works, construction works will decrease until the plume settles.

6.5.1 Acid sulphate soils

The project site is identified as at an area risk of containing Potential Acid Sulfate Soils (PASS) and/or Actual Acid Sulfate Soil (ASS), being located on coastal land located below 5m AHD. For this project, only minor excavation is required below 5m AHD and therefore the risk of exposure of ASS/PASS is considered to be low. Notwithstanding, strict management measures will be adhered to during construction to minimise the risk of exposure.

Should PASS or ASS be encountered during construction works, adequate control measures to prevent environmental harm, including monitoring and treatment, will be managed in accordance with mitigation measures and control strategies to be developed prior to construction as part of an ASSMP.

Specifically, all material removed from the below 5 m AHD is proposed to be tested in situ as required by the National Environmental Protection (Assessment of Site Contamination) Measure 1999 and the Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland 1998. All excavated material would be disposed of on land to an appropriately licenced landfill facility.
6.6 Traffic impacts
As the construction of the project would be undertaken over a period of six to nine months, there is the potential for traffic impacts to the road network associated with the transport of construction materials (e.g., rock, fill) and the removal of wastes from the site.

It is anticipated that a Traffic Management Plan would be developed by the contractor, prior to the commencement of construction works, detailing routes for the transport of materials to site and the intended arrangements for laydown and storage. Pre-works notification will be provided to Council, boating users, and the wider community, to advise of intended construction dates, and any road closures that may be required.

6.7 Public hazards
The construction of new physical works has the potential to create additional public hazards associated with access to (and around) facilities. During construction, it is intended that appropriate fencing and signage would be established to prevent public access to and within the area of works. Additionally, pre-works notification will be provided to the Council, boating users, and the wider community, to advise of intended construction dates, and any road closures that may be required.

Following the completion of construction, permanent signage is proposed to be erected to discourage access across coastal infrastructure, and to warn of the dangers of coastal hazards and inundation. Additionally, navigational aids are proposed to be constructed on the ‘overtopping breakwater’ to provide a visual cue to warn vessels of a navigational hazard. The design of navigational aids is subject to further discussion with Maritime Safety Queensland.

6.8 Summary of mitigation measures
In summary, the following mitigation measures outlined below have been adopted either through the design, or are proposed to be implemented during construction to minimise environmental harm:

Table 6-1 Summary of mitigation measures

<table>
<thead>
<tr>
<th>Matter</th>
<th>Design mitigation</th>
<th>Construction mitigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal geomorphology</td>
<td>- The size, shape and position of the proposed overtopping breakwater was optimised through physical testing, to minimise impacts on coastal geomorphology.</td>
<td>- CEMP to be developed and will include measures to minimise construction impacts to coastal geomorphology associated with sedimentation.</td>
</tr>
<tr>
<td></td>
<td>- The upgrade of facilities at the Clump Point Boat Ramp has been designed to limit the extent of new development footprint (and associated need to clear vegetation) as far as practicable.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- The inclusion of the improved drainage channel at the Clump Point Boat Ramp will minimise the need for future maintenance dredging.</td>
<td></td>
</tr>
<tr>
<td>Heritage values</td>
<td>- GBRWHA</td>
<td>- CEMP to be developed and will include measures to minimise potential environmental impacts</td>
</tr>
<tr>
<td></td>
<td>- The selection and design of proposed infrastructure solutions has been undertaken with</td>
<td></td>
</tr>
</tbody>
</table>
### Visual Amenity
- Particular regard to maximising the effectiveness of existing infrastructure, and minimising the additional development footprint within the GBRWHA and marine park.
- The reduced scale of proposed infrastructure, such as the overtopping breakwater, will minimise visual amenity affects.

### Indigenous Cultural Heritage
- CHMP will detail measures to be implemented during construction for the protection of Aboriginal cultural heritage.

### Flora and fauna (terrestrial)
- Design of facilities has sought to improve the efficiency of existing infrastructure, and minimise the additional development footprint. The extent of vegetation clearing has been minimised as far as practicable.
- Provision of designated parking facilities at the Clump Point Boat Ramp, which may avoid overflow parking alongside the verge of Clump Point Lookout Road.

### Flora and fauna (Marine)
- Marine ecology survey and water quality investigation have been undertaken to assess potential impacts. The assessment concluded that the area of proposed works is reflective of a disturbed environment and no threatened coral species exist within the areas of disturbance. Potential impacts to marine ecology are considered primarily associated with construction activities.

### Marine water quality & sediment
- The size, shape and position of the proposed overtopping breakwater was optimised through physical testing, to minimise impacts on sediment transfer.
- Catenary mooring design seeks to minimise impacts to marine ecology through minimising chain drag.

### Flora and fauna (Marine)
- CEMP to be developed, proposed measures to include:
  - Environmental awareness training for all workers and ongoing task/activity-specific training;
  - Protection of water quality through the implementation of sediment and erosion control practices;
  - Scheduling of construction works during low tide (where possible) to avoid impacts to marine fauna;
  - Implementation of ‘soft start (ramp up)’, visual observations and monitoring procedure for machinery operating within the marine environment.

### Marine water quality & sediment
- CEMP to be developed, with proposed measures to include:
  - erosion and sediment control
  - marine works to be scheduled during low tide (where possible);
  - works to be undertaken in stages to ensure earthworks are limited to the daily extent of construction activities within the GBRWHA and marine park.
of works, and the need for stockpiles of rock material is minimised;
- implement a visual turbidity monitoring program.

**Traffic**

- The provision of designated parking facilities and a new boat ramp at the Clump Point will alleviate traffic congestion and avoid the need for users to park alongside the verge of Clump Point Lookout Road during peak periods.

- Traffic management plan to be developed, and will identify transport routes and laydown locations.

**Public hazards**

- Permanent signage is proposed to be erected to discourage access across coastal infrastructure, and to warn of the dangers of coastal hazards and inundation

- Navigational aids will be established near to the 'overtopping breakwater' to warn of a physical hazard.

- Fencing and signage would be established to prevent public access to and within the area of works.
7 Conclusion

This Information Package has been prepared to provide an overview of the Project, associated with the advertising of the Marine Park Permit for the Mission Beach Safe Boating Infrastructure Project.

The Project aims to improve boating safety in Boat Bay through the delivery of a combination of solutions to enhance existing facilities at the Perry Harvey Jetty and Clump Point Boat Ramp.

The proposed works represent an appropriate balance between maximising the safety and functionality of maritime infrastructure in this location, and minimising the potential environmental impacts on the ecological and heritage values of the GBRMP.
Appendices
Appendix A
Proposal drawings
Appendix C
Consultation material
Appendix D

Marine Ecology, Water Quality & Sediment Sampling Report