Ocean-side Cruise Ship Terminal

Matters of National Environmental Significance

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Client: City of Gold Coast

ABN: 84 858 548 460

Prepared by

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10-Mar-2016

Job No.: 60517891

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

Quality information

Document	Ocean-side Cruise Ship Terminal 60517891
Ref	p:\605x\60517891\4. tech work area\4.8 epbc referral\60517891_cgc_gc csgt epbc - mnes_20170310_b.docx
Date	10-Mar-2016
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Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
B	10-March - 2017	For Issue	Dylan Porter Technical Director - Planning	

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Abbreviations

ABN	Australian Business Number
ABS	Australian Bureau of Statistics
AECOM	AECOM Australia Pty Ltd
ALA	Atlas of Living Australia
AMSA	Australian Maritime and Safety Authority
CAMBA	China-Australia Migratory Bird Agreement
CMD	China-Australia Migratory Bird Agreement
Cth	Commonwealth
DEHP	Department of Environment and Heritage Protection, Queensland Government
DNPSR	Department of National Parks, Sport and Racing, Queensland Government
DoEE	Department of the Environment and Energy, Commonwealth Government
EIS	Environmental Impact Statement
EPBC Act	Environment Protection and Biodiversity Conservation Act
ESA	Environmentally sensitive area
ha	Hectare
HAT	Highest Astronomical Tide
JAMBA	Japan-Australia Migratory Bird Agreement
LAT	Lowest Astronomical Tide
m	Metre
mm	Millimetre
MNES	Matters of national environmentally significance
PTS	Permanent threshold shift
PWC	PricewaterhouseCoopers Australia
Qld	Queensland
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
SDPWO Act	State Development and Public Works Organisation Act
SPRAT	Species Profile and Threats
TTS	Temporary threshold shift
WONS	Weed of national significance

Executive summary

Proposed action

The City of Gold Coast (the City) is currently investigating the business case for development of an ocean-side cruise ship terminal as strategic marine industry infrastructure for the cruise ship market that has the potential to grow both Queensland and regional tourism.

To maximise the economic development opportunities for the City, the proposal is to establish the cruise ship facility as a base port that will provide facilities to support cruise ships at point of origin and destination, including resupply and refuelling. Additional infrastructure options that may provide enhanced economic and social benefits include a diving platform, viewing platform and combined pedestrian/cycle access.

Philip Park on Seaworld Drive, Main Beach, has been identified as the preferred location for the new offshore terminal as it is in close proximity to both existing and proposed retail, hotel and entertainment facilities.

The proposed infrastructure will involve the development of 1200 m inline jetty and wharf structure with berthing/mooring dolphins of raked piling construction and 780m caisson and rock armour breakwater within Queensland State waters. Landside development will provide a terminal for passenger processing (e.g. immigration, customs and biosecurity) and visitor lounge, logistics, operations and administration buildings, transport interchange and staff car parking. The cruise ship terminal will require connection to power, potable water, sewage and waste services, as well as fuel loading capability (most likely provided via a fuel barge).

It is estimated that the proposal will commence construction in January 2019 for a period of three years, with operation of the facility commencing in January 2022, subject to change following consultation with stakeholders.

Matters of National Environmental Significance

AECOM Australia Pty Ltd (AECOM) was engaged to assess the likelihood and significant impact criteria of the proposal upon matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and make a referral to the Department of the Environment and Energy (DoEE) for assessment decision. This document will accompany the referral of the proposed action under the EPBC Act and provides supporting information to assist the DoEE to assess the proposal and potential impacts on Matters of National Environmental Significance (MNES).

A desktop assessment was undertaken to identify EPBC Act listed species and/or their habitat that may occur within the vicinity of the proposal. Available literature and databases on regional and environmental context and observations made during site inspection informed the assessment of the likelihood of occurrence of MNES within the area of the proposal. For those species with potential to occur onsite, a preliminary indication of whether the action is likely to have a significant impact on MNES was assessed as per the MNES Significant Impact Guidelines 1.1 (DoEE, 2013).

Commonwealth marine areas and wetlands of international importance

The seaward extent of the proposal is entirely within Queensland coastal waters; however it is anticipated that cruise ship traffic may pass through Commonwealth marine areas en route. The Central Eastern Commonwealth Marine Reserve, part of the Temperate East marine region, lies more than 150 km offshore. This protected reserve comprises biologically important areas for the protected humpback whale, vulnerable great white shark and a number of migratory seabirds

The Moreton Bay Ramsar site is located in wetland and intertidal zones in and around Moreton Bay, within the Moreton Bay Marine Park, which includes the bay and adjacent offshore waters (extending 3 nautical miles seawards to the limits of Queensland waters). The protected offshore waters lie approximately 3 km north of the proposal while the bay is accessible via the Gold Coast Seaway approximately 2.5 km north of the proposal. The Moreton Bay Marine Park supports more than 50,000 migratory waders during their non-breeding season. At least 43 species of wading birds use the intertidal habitats, including 30 migratory species listed on international conservation agreements.

Threatened ecological communities

The protected matters search identified two threatened ecological communities as potentially occurring within the search area:

· Lowland Rainforest of Subtropical Australia (critically endangered)

· Subtropical and Temperate Coastal Saltmarsh (vulnerable).

No threatened ecological communities were identified on or adjacent to the proposed site. The vegetation of the site and immediate surrounds were characterised as coastal fore dunes and not suitable for establishment or recovery of such ecological communities.

As the ecological community does not occur within, or adjacent to, the proposed site, there is no chance or possibility that the proposed action will reduce the extent, substantially change or fragment the quality or integrity of the ecological community.

Conservation significant flora species

The desktop assessment indicated that 17 species had potential to occur on site.

No critically endangered, endangered or vulnerable flora species were recorded during the site inspection; however observed conditions were considered to provide suitable habitat for the following vulnerable flora species to possibly occur within the proposed site:

· *Acacia attenuata* (no common name recorded)

· *Cryptocarya foetida* (Stinking cryptocarya)

· *Cryptostylis hunteriana* (Leafless tongue-orchid)

· *Thesium australe* (Austral toadflax).

The proposed action will remove some coastal vegetation and planted landscape trees for jetty landing and construction of landside facilities; however the proposal intends to retain a large part of the existing vegetation and fore dunes that offer habitat and habitat connectivity on the Spit. Given the similar vegetation available adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on scale, quality, or long term size of populations. Biosecurity control measures will ensure no weeds or pests are introduced.

Conservation significant fauna species

The desktop assessment identified 57 threatened fauna species as potentially occurring within the search area, comprising 33 birds, 1 fish, 4 sharks, 11 mammals and 8 reptiles.

No critically endangered, endangered or vulnerable terrestrial fauna species were recorded during the site inspection; however the existing vegetation, fore dunes and coastal waters are considered to provide some habitat values for foraging, nesting, roosting and connectivity for movement to the northern extent of the Spit.

Based on the identified habitat values, the likelihood assessment indicated 19 conservation significant fauna species as a known or possible occurrence within the proposal area, comprising 13 birds, 2 sharks, 3 mammals and 1 reptile.

· Birds
  - *Calidris canutus* (Red knot) (endangered)
  - *Calidris ferruginea* (Curlew sandpiper) (critically endangered)
  - *Calidris tenuirostris* (Great knot) (critically endangered)
  - *Charadrius leschenaultia* (Greater sand plover) (vulnerable)
  - *Charadrius mongolus* (Lesser sand plover) (endangered)
  - *Diomedea antipodensis* (Antipodean albatross) (vulnerable)
  - *Limosa lapponica bauera* (Bar-tailed godwit) (vulnerable)

- *Limosa lapponica menzbieri* (Northern Siberian bar-tailed godwit) (critically endangered)
- *Macronectes giganteus* (Southern giant petrel) (endangered)
- *Macronectes halli* (Northern giant petrel) (vulnerable)
- *Numenius madagascariensis* (Eastern curlew) (critically endangered)
- *Thalassarche melanophris* (Black-browed albatross) (vulnerable)
- *Turnix melanogaster* (Black-breasted button-quail) (vulnerable).

· Marine species
- *Carcharias taurus* (Grey nurse shark) (critically endangered)
- *Carcharodon carcharias* (Great white shark) (vulnerable).

· Mammals
- *Megaptera novaeangliae* (Humpback whale) (vulnerable).
- *Pseudomys novaehollandiae* (New Holland mouse) (vulnerable)
- *Pteropus poliocephalus* (Grey-headed flying fox) (vulnerable)

· Reptiles
- *Dermochelys coriacea* (Leatherback turtle) (endangered).

Migratory species

The desktop assessment identified 80 migratory species as potentially occurring within the search area, comprising 20 marine birds, 21 marine species, 6 terrestrial species and 33 wetland species.

No migratory species were recorded during the site inspection; however the exiting vegetation, fore dunes and coastal waters are considered to provide some habitat values for foraging, nesting and roosting. In addition to the conservation significant fauna species (assessed separately), the likelihood assessment indicated 19 migratory species as a known or possible occurrence within the proposal area, comprising 13 birds, 2 sharks, 3 mammals and 1 reptile.

· Migratory marine birds
- *Anous stolidus* (Common noddy)
- *Apus pacificus* (Fork-tailed swift)
- *Fregata ariel* (Lesser frigatebird, Least frigatebird)
- *Fregata minor* (Great frigatebird, greater frigatebird)
- *Sterna albifrons* (Little tern).

· Migratory wetland birds
- *Actitis hypoleucos* (Common sandpiper)
- *Arenaria interpres* (Ruddy turnstone)
- *Calidris acuminate* (Sharp-tailed sandpiper)
- *Calidris alba* (Sanderling)
- *Calidris ruficollis* (Red-necked stint)
- *Charadrius bicinctus (*Double banded plover)
- *Gallingo hardwickii* (Latham's snipe)
- *Limicola falcinellus* (Broad-billed sandpiper).

· Marine mammals
- *Dugong dugon* (Dugong)

- *Orcaella brevirostris* (Irrawaddy) or *Orcaella heinsohni* (Australian snubfin dolphin)
- *Sousa chinensis* (Indo-Pacific Humpback Dolphin)

· Marine mammals
- Reef and Giant Manta rays

Potential impacts and mitigation measures

Based on the conservative description of the proposal and associated construction and operation activities, the following potential impacts were identified and considered to have potential impacts on MNES:

· Increased marine vessel traffic with potential to increase interactions with marine fauna and risk of fauna strike causing stress, injury or fatality in proposal area and on associated cruise ship and supply vessel routes through Moreton Bay Marine Park or Commonwealth marine areas.

· Marine transport of fuel and refuelling activities, and potential risk that a plume resulting from a loss of containment may impact on the adjacent coast or sensitive areas.

· Construction activities, particularly piling, generating a noise propagation zone underwater that introduces short term temporary risks for marine species.

· Construction activities, particularly dredging, in the marine environment are expected to generate sediment plumes that have the potential to impact on water quality.

· Anthropogenic lighting during construction and operation of the cruise ship terminal.

· Increased traffic and noisy activities during landside construction has the potential to cause a temporary disturbance to the ambient acoustic and air environments and local habitats.

· Minor loss of already degraded native vegetation on the coastal fringe of Philip Park and temporary disturbance of coastal habitats.

· Introduction of weed and pest species.

Where a MNES has been identified as having potential to occur in the vicinity of the proposal, potential impacts of the proposal were identified and assessed to evaluate and effectively mitigate the risk that the proposal will have, or is likely to have, a significant impact on MNES. Specific avoidance, mitigation and management measures have been nominated to address the identified potential impacts.

This assessment concludes that the proposed action is not considered to trigger related controlling provisions under the EPBC Act and the proposed action is not a controlled action based on the following:

· The proposed site has been substantially modified by development and ongoing beach nourishment programs; permanent loss of coastal vegetation and fore dune habitats will be minimised.

· The proposed action is not within a Commonwealth marine area or reserve, and potential facilitated impacts of increased traffic on marine fauna will be managed in:
  - Regard to conditions under general approval for commercial vessel transit (shortest direct route) and regulatory requirements for interactions between vessels and cetaceans (EPBC Regulations 2000 – Part 8 Division 8.1 (Regulation 8.04 – Interacting with cetaceans) i.e.
    § Vessels will not travel at greater than 6 knots within 300 m of a cetacean (caution zone) and minimise noise.
    § Vessels will not approach closer than 50 m for a dolphin and/or 100 m for a whale (with the exception of animals bow riding).

· Proposed action is not within proximity of any World Heritage or National Heritage, and is therefore not expected to impact on such values. Historic ‘Scottish Prince’ ship wreck will be

clearly demarcated within an exclusion zone to avoid interference so as not be impacted by the proposal.

- The proposed action is not expected to have a significant impact on a wetland of international importance or migratory species – potential for indirect impacts as a result of pollution (loss of containment) or increased traffic on Ramsar wetland or associated migratory species in Moreton Bay will be managed so as not to impact on such values, in accordance with:
  - Regard to designated shipping routes and vessel speed restrictions specified in the Moreton Bay Marine Park User Guide (2015).
  - Further detailed assessment of worst case loss of containment event and potential plume trajectory in local conditions as part of future environmental impact assessment process.
  - Maintain comprehensive emergency response systems and loss of containment controls, including state of the art equipment and trained personnel.
- The proposed action is not expected to have a significant impact on any listed threatened species or ecological communities – where interactions with terrestrial, marine and migratory fauna have been identified, specific avoidance, mitigation and management measures have been identified so as not to have a significant impact on populations or habitats, including:
  - Minimise disturbance of existing vegetation and habitats, and implement rehabilitation strategy prioritising revegetation with local native species.
  - Implementation of traffic controls such as designated routes and speed limits for terrestrial and marine vehicle movements.
  - Adopt sensitive design principles and selective construction methods to minimise potential environmental impacts (sediment and turbidity, noise, etc.) on terrestrial and marine environments and fauna.
  - Further detailed environmental assessment of the proposal will involve an investigation conducted by a specialist underwater acoustics consultant to identify the site-specific underwater noise propagation zones for piling in an open ocean environment.
  - Monitor safety zones to identify approaching marine mammals and implement operational procedures to minimise the risk of impacts upon them.
- Further site-specific environmental assessments will be undertaken as part of a State assessment process for project approval.

1.0 Introduction

The City of Gold Coast (the City), ABN 84 858 548 460, is investigating the opportunity to establish an ocean-side cruise ship terminal (the proposed action) at Philip Park, Main Beach, Queensland.

The City has engaged PricewaterhouseCoopers Australia (PwC) and AECOM to complete a feasibility study for the ocean-side cruise ship terminal. AECOM has prepared this report for the City and it draws on the findings of the feasibility study for the cruise ship terminal. The purpose of this report is to assess the likelihood and significance of the proposal's potential impacts on matters protected by the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) and make a referral to the Department of the Environment and Energy (DoEE) for assessment decision.

1.1 Background

The ocean-side cruise ship terminal has been identified as strategic marine industry infrastructure for the cruise ship market that has the potential to grow both Queensland and regional tourism. It will provide a new gateway for the expanding cruise shipping market to access the high quality and unique tourism and recreation experiences of the Gold Coast enhancing the City's reputation as a world class tourist and lifestyle destination.

The primary cruise ship terminal infrastructure will involve development of a 1,200 metre (m) long inline jetty and wharf structure and 780 m caisson breakwater, with access from landside facilities 7m wide decked access way. Landside development will involve passenger processing facility, transport interchange and car parking.

Philip Park on Seaworld Drive, Main Beach, has been identified as the preferred location for the new offshore terminal as it is in close proximity to both existing and proposed retail, hotel and entertainment facilities. It is estimated that the proposal will commence construction in January 2019 for a period of three years, with operation of the facility commencing in January 2022, subject to change following consultation with stakeholders.

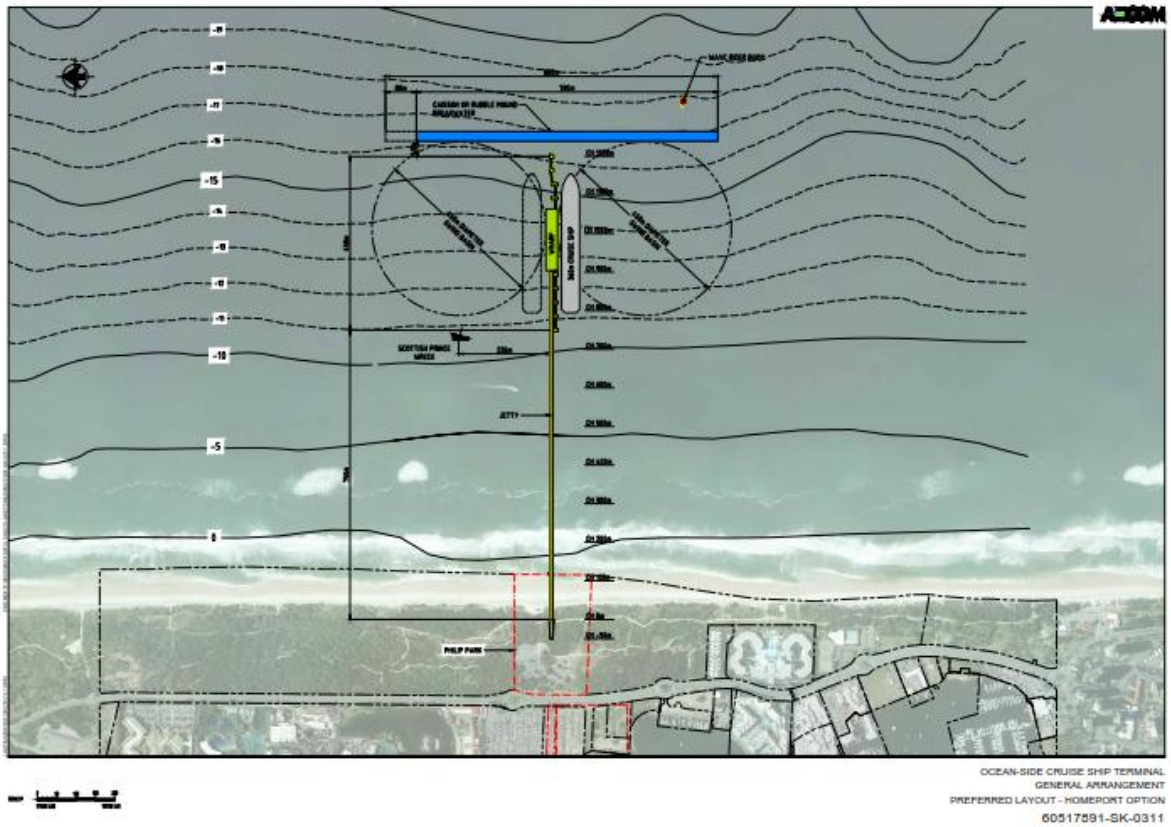


Figure 1 Ocean Side cruise ship terminal general layout (base port only option)

To maximise the economic development opportunities for the City, the proposal is to establish the cruise ship facility as a base port that will provide facilities to support cruise ships at point of origin and destination, including resupply and refuelling. A staging option may be the establishment of a day visit only port in the first instance. This would allow a modest reduction in the size of the wharf and land side infrastructure as an interim measure.

The base port will require a wharf platform and landside facilities for logistics and processing (e.g. immigration, customs and biosecurity). Additional infrastructure options that may be provided to enhanced economic and social benefits include a diving platform, viewing platform and combined pedestrian/cycle access.

A full series of figures illustrating the general arrangement of the cruise ship terminal are provided in Appendix A.

The City is currently conducting a detailed investigation of the feasibility of the ocean-side cruise ship terminal to inform preparation of a business case, which will be supported by a decision on this referral. This document provides information to support a referral of the proposed action to the DoEE under the EPBC Act and will assist the Minister in determining whether the proposal requires EPBC Act approval. This referral covers aspects associated with the planning, construction, operation and decommissioning of the cruise ship terminal.

1.2 Location and tenure

The proposal will be developed on Philip Park, Lot 3 on Plan SP104014, and extend approximately 1,200 m offshore into open coastal waters entirely within Queensland State waters. The location and context of the cruise ship terminal is shown in Figure 2.

Philip Park is located on Main Beach toward the southern end of the Spit. The land is highly modified with a large proportion of the lot sealed for car parking facilities and amenities. Unsealed pathways cut through a narrow band of remnant coastal vegetation to access the open surf beach. The Federation Walk starts from the car park in Philip Park, which is a designated pathway that provides north-south access through the Coastal Reserve to the Gold Coast Seaway.

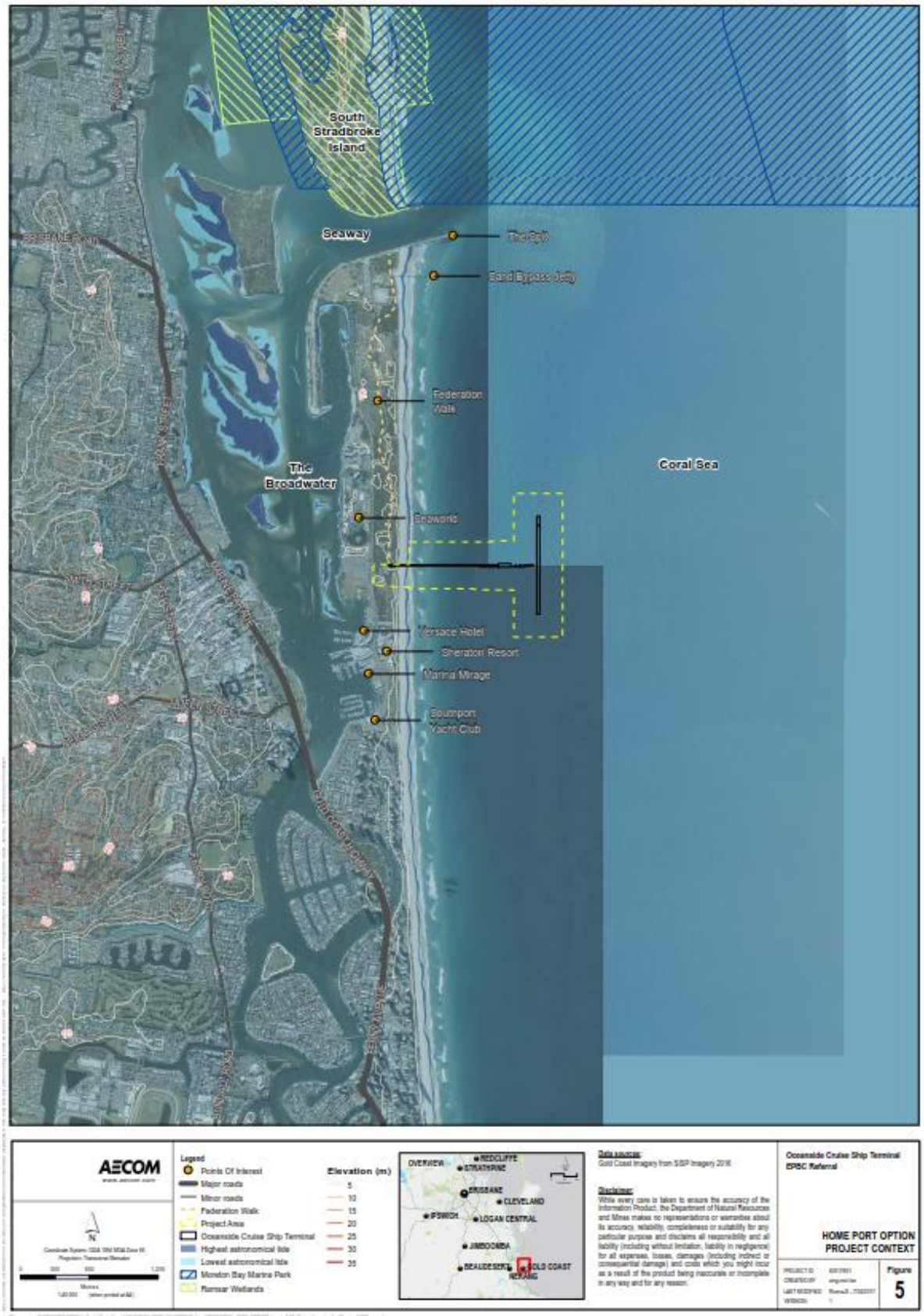
This location is close to the existing Sheraton Mirage Hotel, Seaworld theme park entrance and car park, and within 500 m of the Versace Hotel and Marina Mirage Shopping Centre. The site is also directly opposite the proposed Integrated Resort Development site which is currently being assessed by Queensland State Government. This location offers a number of advantages, including:

- No impact on the existing infrastructure or complex dynamics of the existing seaway, southern seaway wall or sand bypass jetty.
- No impact on surfing amenity and function of nearby surfing breaks on South Stradbroke Island.
- Proximity to existing and proposed tourist attractions.
- Opportunity to enhance amenity due to proximity to Scottish Prince wreck (diving) and safe swimming beach (from benign wave environment inside the breakwater).

For the purposes of this document, the proposal area includes the landside development area (approximately 6 hectares) and proposed infrastructure components, allowing a 200 m buffer to accommodate construction activities such as equipment mobilisation, materials delivery and construction activities; discussion of indirect and facilitated impacts outside this proposal area are discussed on a case by case basis.

The activities to occur as part of the proposed action require consultation with the DoEE due to the potential presence of EPBC Act listed species and/or their habitats within and in the vicinity of the proposal area.

Figure 2 Ocean-side cruise ship terminal location and context



1.3 The Proponent

The City is the proponent for the proposed action. The contact person for this proposal is:

Proponent: City of Gold Coast
Contact Name: Luke Adair - Coordinator Major Projects
Address: 8 Karp Court, Bundall 4217, Queensland, Australia
Phone: 07 5581 7786
Email: LADAIR@goldcoast.qld.gov.au

An overview of the City's environmental record relevant to this proposal is outlined in Table 1.

Table 1 Overview of the City's environmental record

Question	
Does the party taking the action have a satisfactory record of responsible environmental management?	The works will be contracted by the City of Gold Coast to a suitable top tier contractor [yet to be selected]. The environmental performance and history of the construction contractor will be considered as part of this selection process. The City of Gold Coast will oversee the works to ensure that they are conducted in accordance with the relevant permits and management plans and in a manner which is sensitive to the environment.
Has either (a) the party proposing to take the action, or (b) if a permit has been applied for in relation to the action, the person making the application - ever been subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources?	The City of Gold Coast has not been subject to such proceedings.
If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework?	The City of Gold Coast operates an internal Environmental Management System.
Has the party taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?	City of Gold Coast has previously made a referral to determine if the EPBC Act was relevant, however it is understood that for these past projects it has been determined that the proposal did not constitute a controlled action.

1.4 Purpose and scope of this document

This document has been prepared to accompany the referral of the proposed action under the EPBC Act and provides supporting information to assist the DoEE to assess the proposal and potential impacts on Matters of National Environmental Significance (MNES).

1.5 Relevant legislation

The proposal will be developed in accordance with Commonwealth, State and Local Government requirements. Following launch of the business case, the proponent will consult with relevant agencies to understand requisites specific to the location, scale and nature of the proposal. This section describes the proposed approval framework for the proposal and relevant legislation to be addressed.

1.5.1 Commonwealth context

The proposal is subject to relevant Commonwealth legislation applicable to environmental assessment presented in Table 2.

Table 2 Commonwealth legislation relevant to the proposal

Legislation	Description and relevance
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	This Act preserves areas and objects under threat that are significant to or in accordance with Aboriginal tradition.
Australian Maritime Safety Authority Act 1990	This Act provides for protection of the marine environment from pollution from ships and other environmental damage caused by shipping, and response to pollution or potential pollution of the sea, or harm to the marine environment by oil or hazardous and noxious substances.
Biosecurity Act 2015	In 2016, this Act replaced the *Quarantine Act 1908* providing the Commonwealth with powers and tools to manage modern biosecurity threats, including: · Biosecurity risks such as Weed of National Significance (WONS) · Risk of contagion of a listed human disease · Risk of listed human diseases entering Australian territory or a part of Australian territory, or emerging, establishing themselves or spreading in Australian territory or a part of Australian territory · Risks related to ballast water · Biosecurity emergencies and human biosecurity emergencies.
Environment Protection and Biodiversity Conservation Act 1999	This Act provides a scheme for protection of Commonwealth interests and conservation of nationally significant environment and heritage. A search of the EPBC Act database identified a number of nationally significant flora and fauna that may potentially occur in the area of the proposed action.
Environmental Protection (Sea Dumping) Act 1981	This Act protects the environment by regulating dumping into the sea, incineration at sea and artificial reef placements. The Act applies in all Australian waters and in respect of all Australian vessels and aircraft anywhere at sea. A permit is required under the Act for dumping dredged material at sea. The National Assessment Guidelines for Dredging (2009) provides a framework to assess environmental impacts from disposal of dredged material at sea. The City has current approvals to dredge for beach replenishment and erosion control. This proposal does not require capital or operational dredging for the manoeuvring or berthing of ships. Dredging of sand is an option that may be considered for filling the caissons once installed on the breakwater; or alternative fill sources will be identified. The breakwater design may also consider placement of rock armour as a bedding material and for protection of the caisson structure. On this basis, sea dumping triggers will need to be assessed.
Historic Shipwrecks Act 1976	Protects historic wrecks and associated relics in Commonwealth waters.
Native Title Act 1993	This Act provides for the recognition and protection of native title property rights, which reflects Indigenous relationship to land related to religion, culture and wellbeing.

Legislation	Description and relevance
Navigation Act 1972	This Act regulates the transport of material by waterways that do not come under the jurisdiction of the states and territories.
Sea Installation Act 1987	Governs certain installation in the sea and regulates permits for sea installations.

1.5.2 State context

Following confirmation of a sustainable business case, regulatory context and approval pathways will be confirmed in consultation with State Government and other stakeholders. The subsequent State environmental assessment of the proposal is subject to relevant State legislation, policy and guidance presented in Table 3.

Table 3 State legislation relevant to the proposal

Legislation	Description and relevance
Aboriginal Cultural Heritage Act 2003	The Act establishes a duty of care that requires an activity to be carried out with all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage.
Coastal Protection and Management Act 1995	The Act provides for protection, conservation, rehabilitation and management of the coast, including its resources and biological diversity, and sustainable development of the coastal zone. Coastal management plans must be prepared to identify how the coastal zone within the State coastal management district will be managed. The coastal location of the proposal sits within the coastal management district and coastal hazard areas.
Environmental Protection Act 1994	The Act provides for a general environmental duty of care and does not permit activities that may cause environmental harm unless all reasonable and practical measures have been employed to prevent or minimise such harm. The associated regulations provide for authorisation of prescribed environmentally relevant activities that have the potential to harm the environment such as extraction and dredging. Associated policies identify objectives to protect quality of coastal waters, acoustic and air environments.
Fire and Rescue Service Act 1990	Prevention of and response to fires and certain other incidents endangering persons, property or the environment.
Fisheries Act 1994	The Act protects commercial and recreational fisheries resources and their habitats through sustainable use and conservation of values such as marine plants.
Land Act 1994	This Act provides for allocation of tenure over State land.
Nature Conservation Act 1992	This Act declares and manages protected areas and provides for the protection of threatened flora and fauna species, listed as endangered, vulnerable or near threatened, regardless of their location within Queensland.
Queensland Heritage Act 1992	This Act protects non-indigenous cultural heritage by listing heritage places on the Queensland Heritage Register.

Legislation	Description and relevance
Sustainable Planning Act 2009	The Act provides for integrated assessment and approval of development aspects, including material change of use, reconfiguring a lot, operational work, building work, and plumbing and drainage work. Under the Act, the Queensland Government established the State Planning Policy (2013) to define the specific matters of state interest in land use planning and development, specifically the coastal environment. As this proposal is located within the coastal zone, the Coastal Protection State Planning Regulatory Provision applies in coordination with the local planning scheme. The relevant local government planning scheme for land based development is the Gold Coast Planning Scheme 2003, Version 1.2 amended November 2011.
State Development and Public Works Organisation Act 1971	The Act aims to facilitate timely, coordinated and environmentally responsible infrastructure planning and development. The Act gives the Coordinator-General powers to declare a project to be a 'coordinated project' and coordinate the environmental impact assessment of the project.
Transport Infrastructure Act 1994	Integrated planning and management of an efficient system of transport infrastructure and for the regulation of development that will impact on State-controlled roads.
Transport Operations (Marine Safety) Act 1994	Regulates the maritime industry safety.

At this stage, the proposal is expected to require a rigorous impact assessment involving whole-of-government coordination due to:

- Complex approval requirements
- Contentious environmental effects
- Strategic significance to the locality, region or state for the infrastructure, economic and social benefits the proposal may provide.

At this stage, the proponent anticipates applying to the Coordinator-General to have the proposal declared a 'coordinated project' under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The proposal is likely to require a comprehensive environmental impact statement (EIS) rather than a targeted impact assessment report (IAR). In this case, the bilateral agreement between the Commonwealth and the State of Queensland relating to environmental assessment and approval under the EPBC Act would provide one consolidated/integrated decision including conditions on approval, accounting for Queensland matters and MNES.

2.0 Description of proposed action

2.1 Proposal development

The concept of developing a cruise ship terminal on the Gold Coast has been considered in many forms over recent decades. Integrated proposals for a cruise ship terminal with marina, hotel, retail and entertainment precincts have been developed and assessed for locations at Bilinga Beach (2012) and the Broadwater (2005). This proposal has been developed to maximise economic viability of the concept by targeting the area of existing integrated tourism development on the Spit and prioritising environmental values.

This proposal follows a comprehensive assessment of the siting options available for an ocean-side cruise ship terminal on the Spit, and feasibility of using existing infrastructure to minimise capital and environmental disturbance. The existing Gold Coast Seaway southern wall and sand bypass jetty both offer existing piers from which the cruise ship terminal could leverage; however detailed assessment demonstrated that Philip Park proved to offer most economical and integrated development solution.

A number of design and layout options have been considered to maximise access and berthing; however complex coastal processes and civil engineering for safe mooring and berth of vessels has driven the preferred design, which provides berthing for up to two large cruise ships. It is anticipated that the design of the breakwater can be further optimised to provide adequate protection for berthed vessels and minimise indirect impacts and capital costs. Similarly, construction methods will be further resolved and refined as the design is confirmed to minimise environmental impacts and capital costs.

The proposal to establish the cruise ship facility as a base port that will provide facilities to support cruise ships at point of origin and destination, including resupply and refuelling, will maximise the economic viability of the proposal. Landside development will involve passenger processing facility (immigration and customs), logistics and transport interchange and staff car parking.

2.2 Components

The primary cruise ship terminal infrastructure will involve development of a 1,200 m long jetty/wharf structure and 780 m caisson breakwater, with access from landside facilities via 7m wide trafficable deck to the jetty. A full series of figures illustrating the general arrangement of the cruise ship terminal are provided in Appendix A.

Jetty

From Philip Park's northern boundary, the jetty structure will extend 950 m offshore to connect with the wharf. The jetty platform (approximately 7 m wide) will provide a single carriageway to move passengers, staff and supplies to/from berthed vessels.

The jetty will be of raked piling construction using an 'over the top' type of construction (Canti-traveller or similar) to progress the jetty seaward. The construction is likely to involve driving 2-4 piles for a bent, placing the headstock on the bent; placing beams to allow the pile driving equipment to move forward; driving the next bent pile; and, laying the jetty platform into place behind – in total, 118 piles taking 3-5 days between piling each bent. Another less likely method may involve construction of a temporary bridge beside the jetty.

Wharf

The wharf structure will include mooring and berthing dolphins and a wider platform (approximately 22 m wide and 160m long) to support two-way carriageway and adequate area for transfer of luggage, personnel and supplies required for a base port. The wharf is also a raked pile structure – 102 piles in total, which is likely to be constructed from barges that are either floating or a combination of floating and jack-up barges.

Breakwater

The breakwater is a structure installed in the ocean to protect the terminal infrastructure and manoeuvring or berthing cruise ships from the ocean swell and high energy waves. Breakwater design is the subject of detailed and complex hydrodynamic and engineering investigations; however current

plans indicate a structure of 780 m in length will be installed perpendicular the beach and wharf in water 18 m deep and stand approximately 3-5 m above sea level.

It is expected that the breakwater will be constructed using a combination of caisson blocks and rock armour. The caissons will likely be fabricated elsewhere (e.g. Cairncross wharf in Brisbane River) and floated to the site behind a tug. Dredging of sand is an option that may be considered for filling the caissons once installed on the breakwater; or alternative clean fill sources will be identified. Rock armour may be placed as a bedding material and for seaward protection of the caisson structure.

Terminal and landside facilities

The base port will require expanded landside facilities for logistics and processing (e.g. immigration, customs and biosecurity) on ground floor and visitor lounge and jetty access on upper level. The current proposal for landside development includes an integrated two-storey terminal building at the landing of the jetty as well as single level buildings to accommodate administration and logistics services and access to the jetty.

Supporting infrastructure

The terminal facility will require connection to power, potable water, sewage and waste services. Access to short term passenger drop off and bus parking will be via Seaworld Drive, south of the roundabout. Only a small amount of car parking for staff will be provided onsite.

Additional infrastructure options that may provide enhanced economic and social benefits include a diving platform (from the jetty), viewing platform (from the terminal building and/or jetty) and combined pedestrian/cycle access (to the jetty during times when no cruise ships are berthed).

2.3 Schedule

The preliminary economic analysis has assumed the proposal will commence construction in January 2019 over a period of three years.

Depending on contract arrangements, construction is likely to progress concurrently on the jetty, wharf and breakwater structures. Philip Park will be established as a site office and laydown area for the duration of construction, before landside development occurs.

With a separate jetty and wharf work front, it is possible for the piling works to be undertaken within 12-18 months; although some allowance should be made for staging of the works and seasonal conditions. Each pile should take approximately 1-2 hours to drive.

Using barges to construct the wharf means that piling operations would depend on movements of the piling barges and the sequence. It is possible that this piling could progress more quickly than the jetty.

It is anticipated that operation of the facility will commence in January 2022, subject to change following consultation with stakeholders.

2.4 Operation

The cruise shipping schedule may provide for up to 150 cruise ship visits in a year, involving a 24 hour berth for disembarking, resupply, refuelling and boarding (assuming a base port scenario).

Operation of a base port will require facilities and fuel supply for refuelling cruise ship vessels. Fuel is likely to be transported from Brisbane either by road (same as all fuel bought on the Gold Coast) or via barge, which may travel via or near to Moreton Bay Marine Park from the Port of Brisbane.

When the terminal is not in use for cruise ships, there is potential for the jetty and wharf to be accessible to public for sightseeing or recreational pursuits such as diving.

2.5 Decommissioning

At this early stage, it is envisaged that the cruise ship terminal would remain operational for a period in the order of 50 years. At this time, a management plan will be prepared to guide the decommissioning process in accordance with relevant regulation and sustainable practices current at that time.

Typically surface infrastructure (buildings, jetty, etc.) will be dismantled and removed from site to a facility licensed to accept that product for reuse, recycling or disposal. Landform, vegetation cover and public access paths will be reinstated to a state consistent with the surrounding or to an alternative land use agreed with stakeholders.

3.0 Existing environment

3.1 Regional setting

The proposed action is located both on land and within Queensland State waters, extending approximately 1,200 m off the east coast of Australia from Philip Park, Main Beach.

The proposal area includes the landside development area within Philip Park (approximately 6 hectares) and proposed infrastructure components, allowing a 200 m buffer to accommodate construction activities such as equipment mobilisation, materials delivery and construction activities; discussion of indirect and facilitated impacts outside this proposal area are discussed on a case by case basis.

3.2 Environmentally significant areas

The proposal does not intersect any declared conservation areas however there are areas of environmental significance in the broader region, including Moreton Bay Marine Park and Ramsar wetland, Commonwealth marine areas and reserves as well as South Stradbroke Island.

3.2.1 Moreton Bay Marine Park and Ramsar wetland

Moreton Bay Marine Park

Moreton Bay Marine Park is a zoned, multi-use Marine Park Area and managed to provide for the ecologically sustainable use of Moreton Bay Marine Park and to protect its natural, recreation, cultural heritage and amenity values (DNPSR, 2015).

Moreton Bay is a semi-enclosed basin east of the mainland bounded on its eastern side by large sand islands, including Moreton Island, North Stradbroke Island and South Stradbroke Island. Moreton Bay Marine Park includes the bay and adjacent offshore waters (extending 3 nautical miles seawards to the limits of Queensland waters). The protected offshore waters lie approximately 3 km north of the proposal while the bay is accessible via the Gold Coast Seaway approximately 2.5 km north of the proposal.

The habitats found in the marine park include open ocean, sandy beaches, coral reefs, rocky shores, seagrass and sponge beds, mangrove forests, mudflats and sandbanks. The Gold Coast Seaway at the southern end of South Stradbroke Island is fairly unstable and is unsuitable for the establishment of sustained seagrass meadows but provides access to/from the bay (Planit, 2012).

These habitats support diverse and conservation significant fauna and flora, including fish, marine turtles, sharks and dugongs and are important for marine mammals such as humpback whales and dolphins. Also many migratory shorebirds visit the marine park, feeding and roosting on its shoreline.

Ramsar wetland

The Moreton Bay Ramsar site is located in wetland and intertidal zones in and around Moreton Bay. Wetlands on the site include seagrass and shoals (eastern banks), tidal flats and associated estuarine assemblages (Pumicestone Passage), mangroves and saltmarsh (southern bay), coral communities (eastern bay), freshwater wetlands and peatland habitats (Bay Islands), and ocean beaches and fore dunes (Moreton Island).

The site supports more than 50,000 migratory waders during their non-breeding season. At least 43 species of wading birds use the intertidal habitats, including 30 migratory species listed on international conservation agreements (refer Section 3.4.7.6). The Bay is particularly significant for the populations of wintering Eastern curlews (3,000 to 5,000) and the Grey-tailed tattler (more than 10,000).

3.2.2 Commonwealth marine area and reserves

Commonwealth marine areas and reserves are MNES under the EPBC Act.

Commonwealth marine area

The Commonwealth marine area stretches from 3 to 200 nautical miles from the coast, covering any part of the sea, including the waters, seabed, and airspace, within Australia's exclusive economic zone and/or over the continental shelf of Australia that is not State or Northern Territory waters.

Australia's marine area is divided into six marine regions: South-west, North-west, North, Coral Sea, Temperate East and South-east, all of which contain a number of marine reserves. The proposal is located adjacent to the Temperate East marine region (DSEWPaC, 2012).

The seaward extent of the proposal is entirely within Queensland coastal waters; however it is anticipated that cruise ship traffic may pass through Commonwealth marine areas en route.

Commonwealth marine reserve

The proposed action will not take place within a Commonwealth marine reserve; however the proposal may facilitate additional cruise ship movement through or near to marine reserves.

Part of the Temperate East marine region, the Central Eastern Commonwealth Marine Reserve lies more than 150 km offshore and covers an area of more than 70,000 km^2 and depth range of approximately 120 to 6,000 m (DoEE, 2017). Major conservation values of the Central Eastern Commonwealth Marine Reserve listed by DoEE are:

- Biologically important areas for the protected humpback whale, vulnerable great white shark and a number of migratory seabirds.
- Examples of the ecosystems of the Central Eastern Province, Central Eastern Shelf Transition, and Tasman Basin Province provincial bioregions and the Tweed-Moreton meso-scale bioregion.
- Represents seafloor features including abyssal-plain/deep ocean floor, canyon, pinnacle, slope, knoll/abyssal-hills/hills/mountains/peak and seamount/guyot.
- Includes two key ecological features:
    - Canyons on the eastern continental slope (part of one of three shelf-incising canyons occurring in the region is represented)
    - Tasmantid seamount chain (known breeding and feeding areas for a number of open ocean species such as billfish and marine mammals).

3.2.3 South Stradbroke Island Conservation Park

The South Stradbroke Island Conservation Park protects over 80% of the island's regionally significant vegetation communities, including banksia-dominated coastal woodland, paperbark and cabbage palm swamps and mangrove communities, as conservation estate. It represents significant habitat for a wide variety of fauna and flora, specific to lowland habitats not commonly seen on the mainland.

The southern section of South Stradbroke Island immediately north of the Gold Coast Seaway (more than 2 km north of the proposal) is not protected under the South Stradbroke Island Conservation Park.

3.3 Physical environment

The following sections provide a general description of the physiographical setting of the proposed site and surrounds. This information has been collated from a desktop review of available information.

3.3.1 Climate and oceanography

The Gold Coast has a subtropical climate with mild temperatures and predominantly south easterly (and less frequently north easterly winds) with moderately high rainfall (BOM, 2017). Average temperatures in summer range between 20-30 degrees Celsius (^{o}C) and average winter temperatures range from 12-22^{o}C. February is the wettest month, receiving on average 173 mm of rain with the driest month being September, only receiving 44 mm on average.

The landside development site is located on Southport Spit, located along a relatively high energy, dynamic coastline, subject to ocean swells from the Pacific Ocean, predominantly south-easterly and north-easterly, that show strong seasonal variability. The coastal location and dynamic processes are

affected by east coast lows, with the major influence being waves, and minor influence of tides and cyclones. At 1,200 m from the coast, swell up to 12 m above sea level has been recorded at a wave buoy immediately adjacent to the proposal (sourced from Queensland Government, Department of Science, Information, Technology, Innovation and the Arts, 2016).

The coast can be affected by strong coastal surge that can result in more suspended sediment particles and reduce the visibility in nearshore waters. Storm events often cause significant impacts on the coast and surrounding areas with impacts including flooding, beach erosion and wind damage.

Natural sand transport (longshore drift) can naturally vary depending on coastal processes and can result in accretion or erosion of the beach. A sand bypass system has been installed by Queensland State Government to manage sand transport along the coast.

3.3.2 Topography and bathymetry

The topography of Southport Spit primarily consists of low lying coastal land and foreshore dunes with gently sloping, sandy beaches down to surf beach. The landside development site is situated in low lying coastal land and traverses foreshore dunes and beach over open waters.

The coast in the area of the proposal is dynamic and seasonal change is dominated by natural longshore drift involving migration of sand in a northerly direction. The Spit sand bypass jetty system provides artificial sand transport to adequately nourish beaches and manage coastal erosion.

The proposal extends from the intertidal area out to a depth of approximately 18 m below the lowest astronomical tide (LAT) over the 1,200 m extent of the proposal (i.e. 1 m decline every 60 m travelled out along the seabed). This is a dynamic coastal environment subject to natural variations.

3.3.3 Seabed geology, geomorphology and features

The open ocean and smooth bathymetry indicate mobile, soft-sediment and unvegetated seabed. Seabed geology is expected to be comprised of a sandy substrate typically associated with high energy sandy beach coastlines. Further site-specific assessments will be undertaken as part of the detailed environmental assessment of the proposal.

The only substantial seabed features in the vicinity of the proposal area is a wreck, the Scottish Prince (1887); a 64 m iron barque ship located approximately 800 m from the shore and approximately 150 m to the north of the jetty alignment, in approximately 10-15 m of water.

3.4 Biological environment

The following section provides a general description of the biological setting of the proposal. Information on the environmental setting has been informed from available literature and online databases.

3.4.1 Epibenthic communities

Sandy beaches are an important ecosystem that links the ecology of sand dune, the surf zone, intertidal zones and nearby rocky reefs. These ecosystems are generally dynamic with unstable substratum, which prejudice the establishment of substantial epibenthic communities. It is expected that the seabed will offer similar benthic habitats to that mapped for coastal waters north of the proposal, which found sparse or depauperate sandy habitats (Stevens and Connolly, 2005); however further site-specific survey and assessment will be conducted as part of the detailed environmental assessment for the proposal.

The Scottish Prince wreck (Section 3.3.3) has provided a stable structure for epibenthic communities to colonise and is typical of a reef ecosystem with some soft coral and sponges established. These epibenthic communities are restricted to the structures of the wreck.

3.4.2 Infauna communities

Sandy beach environments are inhabited by small invertebrates such as nematodes, crustaceans, polychaetes and molluscs (Jones et al., 2004). Most invertebrate animals recorded in sandy beach environments are represented as either meiofauna or macrofauna (McLachlan and Brown, 2006)

3.4.3 Cetaceans

The Gold Coast coastal waters are known to provide opportunistic feeding and efficient pathways for movement and seasonal migration of cetaceans, including whales, dolphins and occasionally dugongs. Key threatening processes to these species include injury and fatality caused by ingestion of, or entanglement in, harmful marine debris and vessel strike (DEWHA, 2009).

Whales

Whales are observed in coastal waters off the Gold Coast during seasonal migration. Generally, northbound migration takes place throughout May to July where whales tend to remain in deeper waters. During the southern migration, from September through to November, whales tend to migrate in close proximity to the coast, more than likely to access resting areas with their calves. Gold Coast region has been identified as one of three major aggregation areas for the eastern Australian population of humpback whales in Queensland (DEH, 2005b).

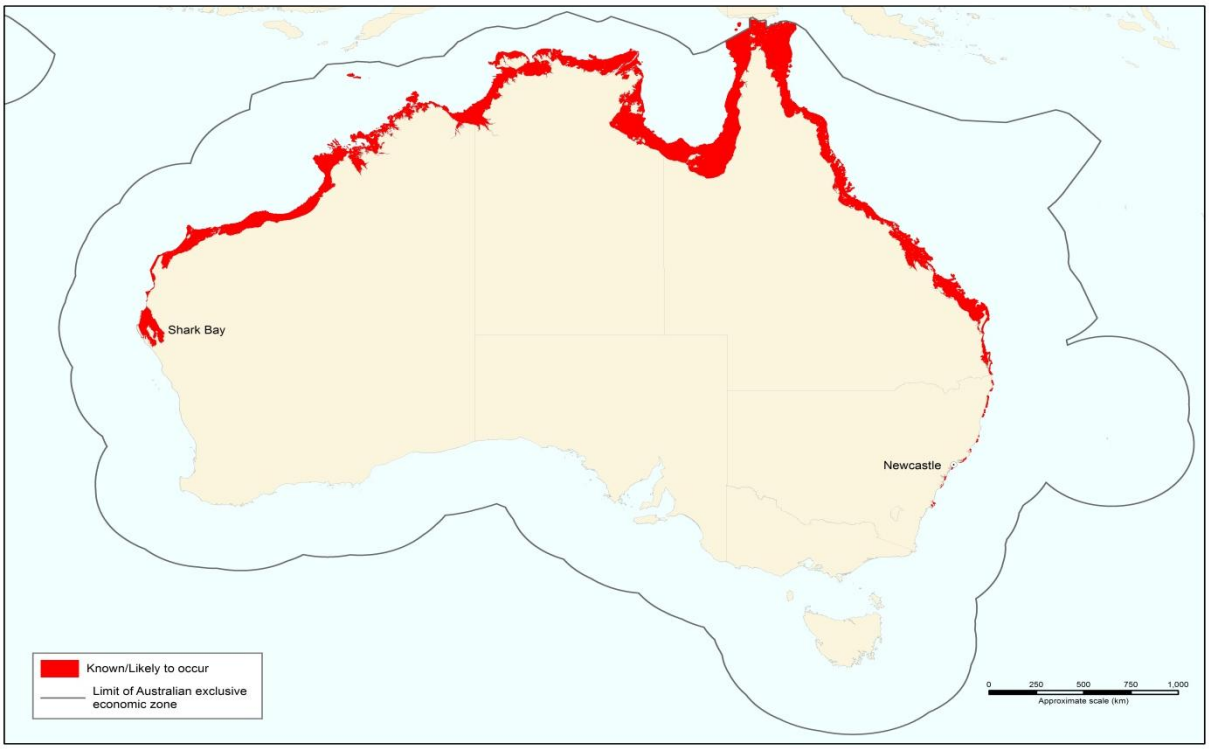
Dolphins

Dolphins frequently feed and travel in deep open coastal waters, and are occasionally observed from beaches playing in the waves and swell.

Dugongs

Dugongs feed on seagrass and the distribution of dugongs is generally correlated with the presence of seagrass. Major concentrations of dugongs along the Queensland coast occur in wide, shallow, protected bays and mangrove channels, in areas of significant seagrass beds. Moreton Bay is considered an important habitat for dugongs with a stable population of approximately 759 (±181) individuals (Sobtzick et. al., 2015).

Figure 3 Australian distribution of Dugongs



3.4.4 Marine reptiles

Turtles

Concentrated populations of marine turtles are known to feed in Moreton Bay. Although the proposal is not located within known foraging area or important breeding habitat area for marine turtles, the coastal waters adjacent to the proposal are known to provide opportunistic feeding and efficient pathways for movement up and down the coast.

The main threats are identified as by catch of marine turtles in fisheries, marine debris and decline of water quality, coastal development and loss of habitat, and predation of turtle eggs by native and introduced animals.

Sea snakes

Sea snakes in the region occupy three broad habitat types: shallow water coral reef and seagrass habitats, deep water soft bottom habitats away from reefs, and surface water pelagic habitats (Guinea, 2007).

3.4.5 Sharks and rays

Moreton Bay is recognised as an important habitat and nursery for grey nurse sharks. The Central Eastern Commonwealth Marine Reserve is important habitat for vulnerable great white shark. Sharks and rays are known to occur in open coastal waters for feeding and movement up and down the coast.

Threats to these species are mortality resulting from the accidental or illegal (i.e. targeted) capture by commercial and recreational fishers and shark control activities. Other potential threats to the species include the impacts of illegal trade in great white shark products, ecosystem effects as a result of habitat modification and climate change (including changes in sea temperature, ocean currents and acidification) and ecotourism, including cage diving.

3.4.6 Fish

The coastal waters within and adjacent to the proposal are used for fishing. The ‘Scottish Prince’ ship wreck provides the only stable habitat for fish feeding and resting.

3.4.7 Birds

3.4.7.1 Marine birds

Marine birds (seabirds and/or pelagics) are those birds which frequent the coastal waters and the open ocean. Marine birds spend most of their lives at sea, ranging over large distances to forage over coastal waters and open ocean with their preferred breeding habitat being offshore and nearshore islands.

Non-breeding migratory species of marine birds are often recorded in Australian waters foraging over the oceanic continental slopes. Some marine birds, such as Chatham’s albatross, may be found scavenging close to commercial offshore fishing grounds.

Marine bird habitat within the proposed site includes the coastal waters and inlets to the north of the site.

3.4.7.2 Resident shorebirds

Resident shorebirds are those species that do not undertake international migration. Resident shorebirds use the same habitats identified for international migratory shorebirds; however resident shorebirds will maintain these habitats year round (although they may undertake some migration throughout Australia). Resident shorebirds are listed under the Birds Australia shorebirds species list.

As with the international migrants, available habitat in the vicinity of the proposed site includes the coastal intertidal zones and estuarine waterways found along the Broadwater and Moreton Bay shoreline.

3.4.7.3 Waterbirds

Bird species considered waterbirds are those which are not listed on the Birds Australia shorebirds species list. Waterbird species may inhabit a variety of wetland ecosystems including terrestrial and coastal. Preferred habitats for waterbird species include, but are not limited to, river shallows,

estuaries, tidal mudflats, freshwater wetlands and large dams. Available habitat within the vicinity of the proposed area includes natural and artificial wetlands, waterways and intertidal flats.

A number of migratory waterbird species occur within the area and predominantly use the more extensive wetland areas associated with the Broadwater and Moreton Bay, west and north of the proposal. However roosts and/or breeding of some of the species could occur within disturbed coastal vegetation exhibited on the proposed site.

3.4.7.4 Raptors

Raptor bird species are those considered as 'birds of prey' in the Field Guide to Australian Birds (Morecombe, 2004). Preferred habitat for the osprey includes coasts, estuaries, bays and inlets, nesting in tall trees near water.

3.4.7.5 Woodland birds

Woodland bird species are those which inhabitat dry sclerophyll forest, open forest and woodland, and riparian habitats. Forests may be shrubby or grassy and dominated by *Eucalyptus*, *Callitris*, *Casuarina* or *Acacia* species. Many woodland birds feed on insects from leaves and bark, in the air and on the ground. Threats include clearing or fragmenting of habitat, invasive weeds or other introduced bird species.

3.4.7.6 Migratory birds

Migratory shorebirds use a variety of habitat types including tidal mudflats and sandflats, inland lakes or waterways and estuaries. A number of internationally significant sites occur across Queensland. The nearest significant site is the Moreton Bay wetland and is found more than 2 km north of the proposal.

International migratory shorebirds are trans-equatorial migratory waders, which arrive in Australia each spring and disperse throughout the continent to feeding grounds amongst coastal and wetland habitats. Bird species considered International migratory shorebirds are those listed under the Birds Australia migratory shorebirds species list (Birds Australia, 2009). These species are protected under the EPBC Act as well as the following International Agreements:

- Bonn convention
- China-Australia Migratory Bird Agreement (CAMBA)
- Japan-Australia Migratory Bird Agreement (JAMBA)
- Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

The known threats to migratory shorebird species include the following:

- Clearing, inundation, infilling or draining of habitat.
- Changes in hydrology, water quality or structural changes near roosting sites causing an indirect loss or degradation of habitat.
- Habitat degradation due to loss of marine or estuarine vegetation, weed invasion of intertidal mudflats, water pollution and changes to the water regime, changes to hydrological regimes leading to the exposure of acid sulphate soils.
- Disturbance of migratory birds during foraging as a result of residential and recreational activities.
- Direct mortality as a result of interferences in the flyways or degradation of important sites across flyways. These may include but are not limited to the development of wind farms in migration pathways, bird strike by aeroplanes and oil and chemical spills.

3.4.8 Terrestrial mammals

The landside part of the proposal is highly modified for public car parking and amenities; however, although disturbed and regularly accessed by the public, the coastal vegetation and fore dunes retain habitat values for foraging and nesting mammals. Modification or loss of habitat and predation by introduced feral animals are threats to these species.

3.4.9 Terrestrial reptiles

The landside part of the proposal is highly modified for public car parking and amenities; however, although disturbed and regularly accessed by the public, the coastal vegetation and fore dunes retain habitat values for foraging and nesting mammals. Modification or loss of habitat and predation by introduced feral animals are threats to these species.

3.5 Social environment

The following section provides a general description of the social setting of the proposal. Information on the social environment has been informed from desk-based sources such as Australian Bureau of Statistics (ABS), Australian Maritime Safety Authority (AMSA) and City of Gold Coast.

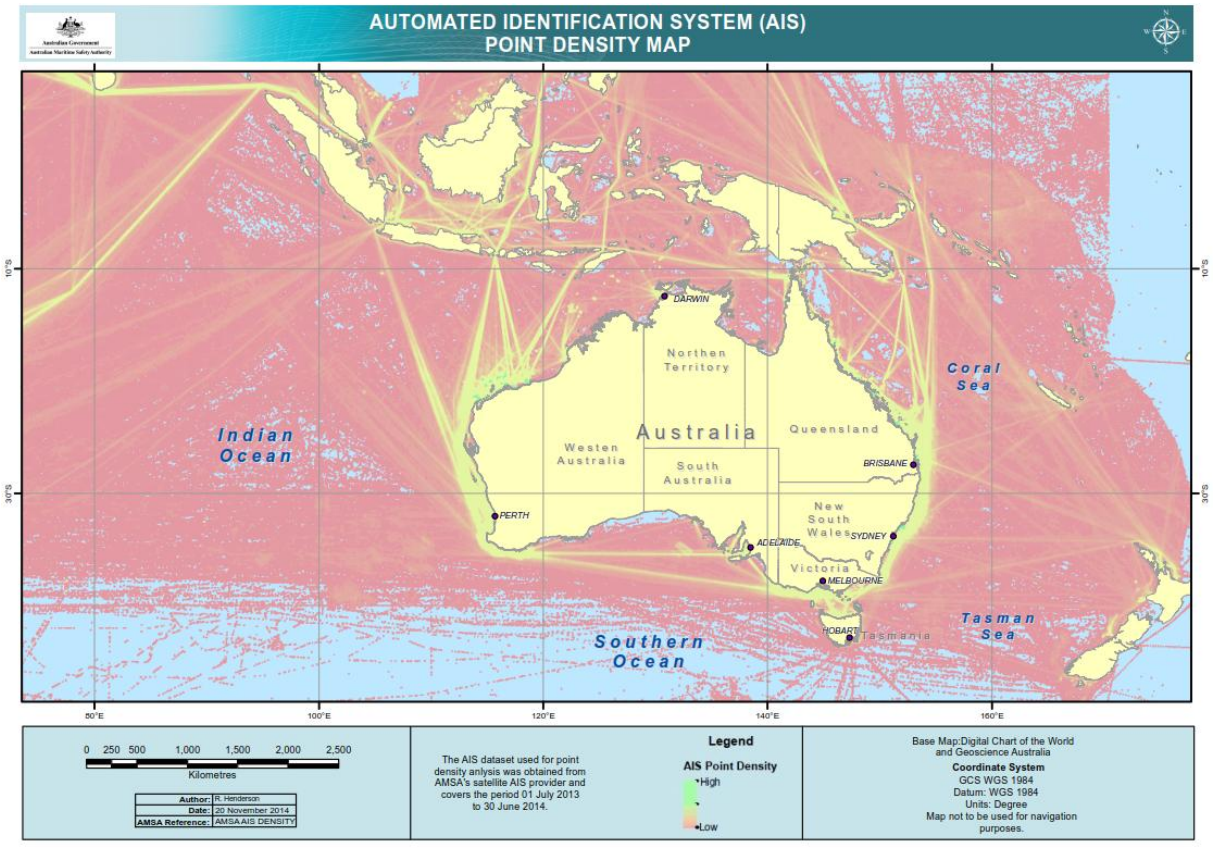
3.5.1 Population

The Gold Coast is Australia's sixth largest city, with a population of more than 500,000, with an estimated 320,000 additional people expected to live in the City by 2035. Main Beach is a high density residential, tourist and parkland area. The 2015 Estimated Resident Population for Main Beach is 3,966, with a population density of 12.48 persons per hectare (ABS, 2011). Settlement of the area dates from the 1870s; however major growth occurred in the early 1900s due to improved access and construction of holiday houses. Significant development occurred from the 1950s following land reclamation. Population growth is stable, largely a result of a decline in dwelling stock.

3.5.2 Shipping

There is comparatively average shipping activity across the east coast of Australia, including Gold Coast coastal waters, due to the freight and cruise ship activity (Figure 4). Generally shipping routes are outside of the proposal area as they extend beyond the Moreton Bay Marine Park i.e. further than 3 km offshore.

Figure 4 Shipping traffic density represented by vessel automated identification system data (AMSA, 2014)



3.5.3 Tourism

The Gold Coast area is one of Australia's premier tourist destinations, and draws in approximately 12 million visitors annually (combined day trip and overnight visitation) with its recreation (beach) and entertainment activities on offer. It has the largest concentration of themed attractions in the southern hemisphere, including Seaworld, which is located adjacent to the proposal on Seaworld Drive.

The Spit is a popular tourist area for the following activities:

- Beach access
- Nature and sightseeing (beach, Federation Walk and views of Gold Coast)
- Fishing and water sports
- Community events and festivals
- Restaurants
- High end hotel accommodation
- Retail, including some of Australia's largest duty free shopping centres and duty free outlets.

3.5.4 Recreation

Beach access

Philip Park provides direct access to the surf beach through the coastal vegetation and fore dunes, supported by public car parking, picnic facilities and amenities, which is popular with locals and tourists.

Nature and sightseeing

The land to the east of Seaworld Drive, including Philip Park, supports a large stand of coastal vegetation and fore dunes that is continuous for the length of the Spit.

Federation walk, which forms part of the Gold Coast City Council's Oceanway Network, is located within this coastal vegetation and attracts many bikers, joggers and walkers.

The natural environment is partially disturbed and local community groups undertake regular revegetation programs along the Spit.

Water sports

The Spit is a popular spot for surfing and diving. Surf breaks (South Stradbroke Island and Spit) are accessible from the Seaway and surf beach. The popular Gold Coast Seaway dive site and 'Scottish Prince' dive site lie in accessible depths (approximately 10-15 m) off the east coast of Southport Spit. The 'Scottish Prince' is approximately 150 m north of the proposed jetty.

3.5.5 Fishing

The Spit is also a popular spot for recreational fishing and fishing spots are accessible from the Seaway.

The waters off the Gold Coast are home to many managed commercial fisheries, including prawn, demersal scalefish, demersal finfish, mackerel, oyster and several types of tuna; however these fisheries lie in nearshore waters away from the proposal. While the proposal will intersect areas that are zoned for commercial fishing and areas within which recreational fishing may intermittently occur, the frequency of these activities are not considered 'extensive'.

3.6 Heritage

Prior to European settlement, literature indicates the existence of thriving Aboriginal communities in the vicinity of the site that the region supported with rich food resources available year round (Jabree, 2013). The historical and archaeological record produced by the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) indicates Indigenous heritage items at Southport and South Stradbroke Island. There is potential for heritage items such as shell middens, artefact scatters and possibly burials to be found onsite.

Historical aerials of the Spit, Main Beach and Southport taken in 1955 shows limited development. At this time, the Spit comprised a barrier dune system with some internal water, possibly perched waterholes, but most likely estuarine in nature, while mangroves grew further south on the Nerang River side. Land resumption in the late 1950s spurred development of the Spit.

The DATSIP search identified a number of historic shipwrecks located in the Broadwater, Gold Coast Seaway and open coastal waters. In the vicinity of the proposal, the Scottish Prince historic shipwreck is listed in the Australian National Shipwrecks Database (Shipwreck Id Number: 3107). This ship wreck is protected under the Commonwealth *Historic Shipwrecks Act 1976*; however does not lie within a protected or no-entry zone.

The 'Scottish Prince' grounded on the Southport bar and gradually broke up in 1887. The wreck lies in 10 m of water approximately 2 km south of the extremity of the Southport Spit and 500 m off shore. Generally the wreck is partially visible from the sand depending on the shifting sands (Queensland Museum and the Heritage Branch, Department of Communication and the Arts n.d). The wreck provides habitat for soft corals and sponges, crayfish, rays, sharks and large bream.

Local heritage and state heritage items of significance are generally located where historical development occurred at the southern end of the Spit. Full results of the DATSIP search are included at Appendix C.

Figure 5 Historical aerial imagery taken 1955

3.7 Stakeholder consultation

Consultation has been undertaken with the City of Gold Coast as the proponent, DoEE as the regulator responsible for assessing the referral and cruise ship operators as the end market client.

3.7.1 Department of the Environment and Energy

The DoEE hosted a pre-referral meeting in Canberra attended by AECOM and PWC on 31 January 2017. The details of the proposal were presented and a discussion held on the level of baseline information. The DoEE did not envisage significant impacts to occur from the proposal and suggested that while the risk was low based on the information of the proposal provided, the main issue of concern is associated with vessel interactions with wildlife during the construction. City of Gold Coast has taken the initiative to refer the proposal despite the low risks associated with the activities to MNES. A summary of meeting discussion is provided in Appendix D.

3.7.2 Cruise ship operators

Cruise ship operators were contacted to confirm potential visitation and requirements for base port activities such as refuelling and resupply services, which has been used to inform the business case for the proposal.

4.0 Matters of National Environmental Significance

4.1 Assessment methodology

A desktop assessment was undertaken to identify EPBC Act listed species and/or their habitat that may occur within the vicinity of the proposal. Available literature and databases on regional and environmental context and observations made during site inspection informed the assessment of the likelihood of occurrence of MNES within the area of the proposal. For those species, a preliminary indication of whether the action is likely to have a significant impact on MNES was assessed as per the MNES Significant Impact Guidelines 1.1 (DoEE, 2013). The following section provides further detail on the assessment approach.

4.1.1 EPBC guidance

DoEE (2013) provides the framework for the assessment of potential impacts upon MNES as a result of an action.

What is a significant impact?

> *A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance*.

When is a significant impact likely?

> *To be 'likely', it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not remote chance or possibility. If there is scientific uncertainty about the impacts of your action and potential impacts are serious or irreversible, the precautionary principle is applicable. Accordingly, a lack of scientific certainty about the potential impacts of an action will not itself justify a decision that the action is not likely to have a significant impact on the environment*.

The policy statement provides guidance on determining whether an action is likely to have a significant impact on MNES. The following measures should be considered:

- Whether there are any MNES located in the area of the proposed action (noting that 'the area of the proposed action' is broader that the immediate location where the action is undertaken; consider also whether there are any MNES adjacent to or downstream from the immediate location that may be potentially be impacted).
- Considering the proposed action at it broadest scope (that is, considering all stages and components of the action, and all related activities and infrastructure), whether there is potential for impacts, including indirect impacts, on MNES?
- Whether there are any proposed measures to avoid or reduce impacts on MNES (and if so, is the effectiveness of these measures certain enough to reduce the level of impact below the 'significant impact' threshold)?
- Whether any impacts of the proposed action on matters of national environmental significance are likely to be significant impacts (important, notable, or of consequence, having regard to their context or intensity)?

This report assesses only whether an impact on MNES is likely to be significant or not. Should the proposal business case be accepted, impacts on relevant MNES will be further assessed in detail as part of further EIS and relevant technical studies, where a detailed assessment of the likely impacts of the proposal on the existing environment will be undertaken. This assessment forms the basis of whether an impact on MNES is considered to be significant or not.

4.1.2 Desktop assessment

A desktop review of ecological data and literature was undertaken to characterise the biodiversity values and identify the potential occurrence of conservation significant vegetation communities, flora and fauna within the site. The objectives of the literature review include:

- Review of relevant biodiversity databases and existing studies for the area
- Assessment of the broad conservation values of vegetation communities and fauna habitat present in the area
- Identify the potential presence of conservation significant flora species and vegetation communities.

Data sources

Biodiversity data was acquired from online sources from the following key references:

- DoEE protected matters search
- DoEE species profile and threats (SPRAT) database
- DoEE conservation advice
- Department of Environment and Heritage Protection (DEHP) wildlife online database
- DEHP 1:100,000 pre-clearing and regional ecosystem mapping v.8
- DEHP 1:100,000 mature regrowth
- DEHP essential habitat mapping
- DEHP environmentally sensitive areas (ESA) mapping
- DEHP koala habitat mapping
- Species distribution maps from various current field guides
- DEHP groundwater dependent ecosystem mapping
- Queensland Herbarium (Herbrecs) records.

Records from a series of databases (listed below) were inspected and compiled into a single proposal-specific vertebrate database in order to gain:

- A list of all known vertebrate species from within the search area (i.e. a species list), and
- Specific locations (i.e. geographical coordinates) for MNES species records where possible.

In addition to providing a list of known MNES species, compiling the database provides an estimate of record frequency for those MNES species present. While useful, record frequency must be used cautiously as databases are biased towards obvious taxa such as birds.

It is also important to note that a species' presence in a database does not mean that the species is regularly observed in the study area. Single, unusual records may represent a transient individual that has been observed in the area. These individuals do not represent breeding populations and these records are of little value in the environmental planning process. Such records need to be carefully evaluated against the species' current known distribution and habitat requirements.

Search area

The database queries targeted Philip Park, Main Beach, using the relevant lot and plan number (Lot 3 on Plan SP104014) or a search area that applied a 10 km buffer to a central coordinate (-27.96214, 153.42815), which incorporates the proposal infrastructure and foreseeable underwater noise propagation zone. However the search area does not extend to the Commonwealth marine areas more than 150 km offshore.

Existing ecological reports

The following existing reports were consulted and referenced:

- PricewaterhouseCoopers Australia (2016). Ocean-side Cruise Ship Terminal: Preliminary update report.
- City of Gold Coast (2013). *Three Point Plan for Coastal Protection: Referral of proposed action*.
- Ecosure Pty Ltd (2012). Ecological site analysis (final report). Prepared for City of Gold Coast, dated June 2012.
- GHD. Notional Seaway Project EIS.
- Griffith Centre for Coastal Management (2007). An overview of available information on sandy beach ecology, coastal sand dunes, rocky reefs and associated biota on the Gold Coast. Prepared by R. Noriega for City of Gold Coast.
- Planit Consulting Pty Ltd (2012). *Gold Coast Ocean Terminal: Referral of proposed action*. Prepared for Gold Coast Ocean Terminal Pty Ltd, October 2012.
- Planit Consulting Pty Ltd (2012). *Gold Coast Ocean Terminal: Response to request for further information (EPBC Reference 2012/6610)*. Prepared for Gold Coast Ocean Terminal Pty Ltd, October 2012.

4.1.3 Field assessment – terrestrial

An AECOM ecologist conducted a site visit of the landside portion of the proposal on 22 December 2016 over a four hour period. The site visit involved recording field observations for the purpose of assessing likelihood of occurrence of MNES, and significance of potential impacts on MNES likely to occur on site. This assessment included identifying vegetation communities and confirming dominant characteristic species, identifying weed species present and assessing fauna habitat values. Fauna species observations were limited to incidental sightings. Digital photographs were taken throughout the site for future reference.

4.1.4 Occurrence/likelihood assessment

Conservation significant species identified in the EPBC protected matters search (Appendix B) were subject to a likelihood of occurrence assessment based on known and/or potential habitat values identified within the proposed site.

A likelihood of occurrence assessment for conservation significant terrestrial flora and fauna species and communities identified during the desktop review was undertaken, using the results of the field survey. The assessment reviewed known habitat of the conservation significant species against the vegetation communities and habitat identified in the vicinity of the site.

For marine species, likelihood of occurrence was assessed on the basis of existing studies in the vicinity of the proposal.

Each species was assessed against the three categories defined below:

- Unlikely occurrence – the site does not support suitable habitat for the species
- Possible occurrence – suitable habitat for the species is mapped within the site
- Confirmed present – the fauna species has been previously recorded within the site.

These assessments for flora and fauna are summarised in Table 4 and Table 5 respectively.

4.1.5 Significant impact criteria

DoEE (2013) outlines the self-assessment process, including detailed criteria, to decide whether an action has, will have, or is likely to have, a significant impact on a MNES. An action will require approval if the action will have or is likely to have a significant impact on a species listed in any of the following categories:

- Extinct in the wild

- Critically endangered
- Endangered, or
- Vulnerable.

An action will require approval if the action will have or is likely to have a significant impact on communities listed in a critically endangered or endangered category.

The significant impact criteria were assessed to decide whether the proposed action has, will have, or is likely to have, a significant impact on a MNES.

4.1.6 Nomenclature

Taxonomic nomenclature used for the description of floral species is according to Bostock and Holland (2013). Exotic flora species are signified in all text and tables by an asterisk (*).

Taxonomic nomenclature used for describing fauna species follows that outlined by Clayton et al. (2006), with the exception of recently published taxonomic revisions. Feral species are denoted by an asterisk (*).

4.1.7 World heritage

No world heritage properties were identified in the protected matters search (Appendix B).

4.1.8 National heritage

No national heritage places were identified in the protected matters search (Appendix B). The Scottish Prince historic shipwreck is listed in the Australian National Shipwrecks Database (Shipwreck Id Number: 3107). This ship wreck is protected under the Commonwealth *Historic Shipwrecks Act 1976*; however does not lie within a protected or no-entry zone.

4.2 Results of desktop assessment

4.2.1 Bioregion

Queensland has been divided into 13 bioregions that represent broad landscape patterns that reflect geology, climate and biota; these are used as the fundamental framework for the planning and conservation of biodiversity (Sattler and William, 1999).

The proposed action will occur within the Southeast Queensland Bioregion, which experiences a climate of warm to hot summers and cool winters, with an average annual rainfall of 800-1500 mm, with about 30% of that falling in winter (Sattler and William, 1999).

Within the Southeast Queensland Bioregion, the proposal will occur within the Southern Coastal Highlands subregion as defined by Sattler and Williams (1999). The geology of this subregion is diverse and includes sedimentary rocks as well as high dunes and marine and estuarine sediments. Dominant vegetation communities include *Melaleuca quinqenervia* forest and woodlands, heathlands and banksia woodlands, mangrove forests and tall and open forests of *Eucalyptus recemosa* and *E.pilularis*.

4.2.2 Regional ecosystems

State regional ecosystem (RE) mapping shows no REs within the vicinity of the proposal (DEHP, 2017).

4.2.3 Threatened ecological communities

The protected matters search (Appendix B) identified two threatened ecological communities as potentially occurring within the search area.

Lowland Rainforest of Subtropical Australia

Critically endangered Lowland Rainforest of Subtropical Australia communities occur on lowland areas typically more than 2 km from the coast and less than 300 m above sea level. Lowland Rainforest of Subtropical Australia communities occur on basalt and alluvial soils, including sand and old or elevated alluvial soils as well as floodplain alluvia in areas with high annual rainfall (> 1,300 mm).

Generally, Lowland Rainforest of Subtropical Australia communities comprise moderately tall to tall closed forest with multiple canopy layers and high species richness and diversity.

Subtropical and Temperate Coastal Saltmarsh

Vulnerable Subtropical and Temperate Coastal Saltmarsh communities occur in coastal areas under regular or intermittent tidal influence, mainly associated with soft substrate shores of estuaries, sandy or muddy indentation of the shoreline or some open, low wave energy coasts with high salinity. These communities are generally dominated by salt tolerant vegetation, including grasses, herbs, sedges, rushes and shrubs, less than 0.5 m in height.

4.2.4 Conservation significant flora species

The protected matters search (Appendix B) identified 17 threatened flora species as potentially occurring within the search area that were subject to likelihood assessment using available literature, online databases and field observations – refer to Section 4.4.

4.2.5 Conservation significant fauna species

The protected matters search (Appendix B) identified 57 threatened fauna species as potentially occurring within the search area, comprising 33 birds, 1 fish, 4 sharks, 11 mammals and 8 reptiles. These were subject to likelihood assessment using available literature, online databases and field observations – refer to Section 4.4.3.

4.2.6 Migratory species

The protected matters search (Appendix B) identified 80 migratory species as potentially occurring within the search area, comprising:

- 20 migratory marine birds
- 21 migratory marine species
- 6 migratory terrestrial species
- 33 migratory wetland species.

These migratory species were subject to likelihood assessment of species groups using available literature and online databases – refer to Section 4.4.4.

4.2.7 Essential habitat

The Essential Habitat mapping (Version 3.0; DERM, 2009) shows that no areas of Essential Habitat for threatened flora or fauna species are mapped within or adjacent to the proposed site.

4.3 Results of terrestrial field assessment

4.3.1 Weather conditions

On 22 December 2016, the climatic conditions encountered during the survey were typical of historical data analysed from the region. Weather observations are taken from the closest Bureau of Meteorology (BoM) weather station, Gold Coast Seaway, which is located 2 km north of the site. The temperature ranged from 22.5^{o}C to 28.8^{o}C on the day of the survey (2^{o}C warmer than the monthly average). Minor rainfall occurred prior to the field survey with 5 mm recorded at Gold Coast Seaway on 18-19 December 2016 and 23.6 mm recorded at Gold Coast Seaway on 6-9 December 2016.

4.3.2 Site conditions

The landside portion of the proposed site is highly modified with sealed car parking areas accounting for much of the area as well as unsealed pedestrian walkways (beach access and Federation Walk), maintained open space with public toilets and open coastal surf beach.

The site was recorded as supporting primarily modified and regrowth vegetation with some patches of relatively intact vegetation concentrated on the coastal fore dunes. This area is dissected by several tracks used for beach access.

The vegetation is typical of the surrounding coastal regime. The canopy layer in this community was dominated by coastal sheoak (*Casuarina equisetifolia subsp. incana*) also containing coastal banksia

(*Banksia integrifolia subsp*. *integrifolia*) and tuckeroo (*Cupaniopsis anacardioides*). The shrub layer consisted primarily of beach acacia (*Acacia sophorae*), macaranga (*Macaranga tanarius*) and lantana (*Lantana camara*) a weed of national significance (WONS). Hairy spinifex (*Spinifex sericeus*), beach flax lilly (*Dianella congesta*) and pigface (*Carpobrotus glaucescens*) are all locally dominant in the ground layer.

At the western extent of the site, adjacent to Seaworld Drive, a small patch of regrowth closed forest was present. The canopy in this vegetation community was dominated by narrow-leaved red gum (*Eucalyptus seeana*) and black she-oak (*Allocasuarina littoralis*). Other tree species present included macaranga (*Macaranga tanarius*), Moreton Bay fig (*Ficus macrophylla*), coastal hibiscus (*Hibiscus tiliaceus*) and white cypress-pine (*Callitris columellaris*). Planted lomandra (*Lomandra longifolia*) was dominant in the ground layer.

No threatened ecological communities or species were identified on site.

4.4 Results of likelihood assessment

4.4.1 Listed threatened ecological communities

No threatened ecological communities were identified on or adjacent to the proposed site. The vegetation of the site and immediate surrounds were characterised as coastal fore dunes and not suitable for establishment or recovery of such ecological communities.

An action will require approval if the action will have or is likely to have a significant impact on an ecological community listed as critically endangered or endangered. As indicated in Section 4.2.3, the protected matters search (Appendix B) identified two threatened ecological communities as potentially occurring within the search area, including:

- Critically endangered Lowland Rainforest of Subtropical Australia
- Vulnerable Subtropical and Temperate Coastal Saltmarsh.

The proposal area does not contain critically endangered Lowland Rainforest of Subtropical Australia community or provide suitable habitat for its establishment; consequentially the proposed action is considered unlikely to have a significant impact on the critically endangered Lowland Rainforest of Subtropical Australia. As the ecological community does not occur within, or adjacent to, the proposed site, there is no chance or possibility that the proposed action will reduce the extent, substantially change or fragment the quality or integrity of the ecological community.

The exposed high energy coastal location of the proposal area does not contain or provide suitable habitat for the establishment of the vulnerable Subtropical and Temperate Coastal Saltmarsh community. The coastal vegetation is relatively tall and tolerant of high winds, not dominated by salt tolerant vegetation, including grasses, herbs, sedges, rushes and shrubs, less than 0.5 m in height. As a result, the proposed action is considered not expected to have any impact on the extent, quality or integrity of the ecological community in the region.

4.4.2 Conservation significant flora species

The desktop assessment indicated that 17 species had potential to occur on site; however no critically endangered, endangered or vulnerable flora species were recorded during the site inspection.

No conservation significant flora species were identified during the site inspection. However observations of site conditions and habitat made during site inspection were used to inform the likelihood assessment for each of the threatened flora species identified by the protected matters search (Appendix B) as potentially occurring on site.

The likelihood assessment indicated that suitable habitat exists for vulnerable flora species to possibly occur within the proposed site, including:

- *Acacia attenuata* (no common name recorded)
- *Cryptocarya foetida* (Stinking cryptocarya)
- *Cryptostylis hunteriana* (Leafless tongue-orchid)
- *Thesium australe* (Austral toadflax).

Of these species, historical records of *Acacia attenuata* and *Cryptocarya foetida* are mapped on Atlas of Living Australia (ALA) within 10 km of the proposed site; however the mapping is of low spatial accuracy. Given the proximity of previous records, it is considered possible that these species may occur within suitable habitat on the proposed site.

The likelihood and significant impact criteria triggers for conservation significant flora species are assessed and summary presented in Table 4.

Table 4 Likelihood of conservation significant flora species potentially occurring

Scientific name	Common Name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria
Acacia attenuata	-	V, V	Occurs on flat coastal lowland plains, at altitudes of lower than 30 m above sea level. Typically occurs in seasonally waterlogged areas of wet heathland or heathland margins, open forest and woodland communities, specifically on sandy poorly drained soils or peat swamps which are infertile.	Possible. Suitable habitat does exist within the proposed site and several historical records are available from ALA within 10 km.	Proposed action will require removal of some vegetation on site; however it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal due to lack of presence of this species on site and records in the vicinity of the proposal.
Arthraxon hispidus	Hairy-joint grass	V, V	Found in or on the edges of rainforest and in wet eucalypt forest, often near creeks or swamps or freshwater springs on coastal foreshore dunes, in shaded gullies, on creek banks and on sandy alluvium in creek beds in open forests.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal due to lack of suitable habitat in the area.
Baloghia marmorata	Marbled balogia	V, V	Found in subtropical rainforest/notophyll vine forest and wet sclerophyll forest (brush box woodland) with rainforest understorey with rich black or dark brown clay and loam soils derived from basalt between 150 m and 550 m above sea.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal due to lack of suitable habitat in the area.

Scientific name	Common Name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria
Bosistoa transversa	Three-leaved bosistoa	-, V	Grows in lowland subtropical rainforest up to 300 m above sea level.	Unlikely. No suitable habitat exists within or adjacent to the proposed site. One record is available on ALA within 10 km, however the location is considered to have a spatial inaccuracy of 10 km and the record is more than 20 years old.	Proposed action will require removal of some vegetation on site; however it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal due to lack of suitable habitat in the area.
Cryptocarya foetida	Stinking cryptocarya	V, V	Restricted to coastal sands or close to the coast, occurring in littoral rainforest on old sand dunes and subtropical rainforests over slate and occasionally on basalt up to an altitude of 150 m.	Possible. Suitable habitat does exist within the proposed site and several historical records are available from ALA within 10 km.	Proposed action will require removal of some vegetation on site; however it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal due to lack of presence of this species on site and records in the vicinity of the proposal.
Cryptostylis hunteriana	Leafless tongue-orchid	V, V	Occurs in moist sandy soils in a wide variety of habitats including heathlands, heathy woodlands, sedgelands, dry sclerophyll forests, forested wetlands, freshwater wetlands, grasslands, grassy woodlands, rainforests and wet sclerophyll forests.	Possible. Potential habitat does exist within the proposed site, however no database records or individuals or populations are available from within 50 km.	Proposed action will require removal of some vegetation on site; however it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal due to lack of presence on site or surrounding area.

Scientific name	Common Name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria
Endiandra floydii	Floyd's walnut	E, E	Found in warm-temperate and subtropical rainforest up to 430 m above sea level.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.
Hicksbeachia pinnatifolia	Monkey nut	V, V	Occurs as an understorey tree in subtropical rainforest, regrowth rainforest, moist eucalypt forest and Brush Box forest up to 500 m altitude.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.
Macadamia integrifolia	Macadamia nut	V, V	Grows in remnant rainforest, preferring partially open areas such as rainforest edges in mild frost-free areas with a reasonably high rainfall.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.
Macadamia tetraphylla	Rough-shelled bush nut	V, V	Restricted habitat, growing on moderate to steep hillslopes on alluvial soils at well-drained sites, generally occurs in subtropical rainforest and complex notophyll vineforest, at the margins of these forests and in mixed sclerophyll forest.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.

Scientific name	Common Name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria
Persicaria elatior	Knotweed	V, V	Normally grows in damp places, including coastal swampy areas, along watercourses, streams and lakes, swamp forest and disturbed areas.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.
Phaius australis	Lesser swamp-orchid	E, E	At swamp-forest margins commonly associated with coastal wet heath/sedgeland wetlands, swampy grasslands or forest and often where broad-leaved paperbark or swamp mahogany are found.	Unlikely. No suitable habitat exists within or adjacent to the proposed site. One specimen has been identified from database records approximately 10 km from the proposed site (ALA) where suitable habitat may occur.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.
Phebalium distans	Mt Berrryman phebalium	E, CE	Found in semi-evergreen vine thicket on red volcanic soils, or in adjacent communities in deeply weathered basalt with undulating to hilly terrain. Has a severely fragmented distribution and is known from only three locations (Mt Berryman, Kingaroy and Mt Walla).	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km. Populations of this species are not known from the area.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.

Scientific name	Common Name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria
Samadera bidwillii	Quassia	V, V	Commonly occurs adjacent to temporary or permanent watercourses in lowland rainforest or on rainforest margins, but can also be found in other forest types, such as open forest and woodland in locations up to 510 m altitude. Occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.
Syzygium hodgkinsoniae	Smooth-bark rose apple	V, V	Grows in riverine subtropical or gallery rainforest on deep rich alluvial and basalt soils at altitudes of up to 300 m above sea level.	Unlikely. No suitable habitat exists within or adjacent to the proposed site. One specimen has been identified from database records approximately 10 km from the proposed site (ALA) where suitable habitat may occur.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.

Scientific name	Common Name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria
Thesium australe	Austral toadflax	V, V	Semi-parasitic on roots of a range of grass species on damp soils derived from sedimentary, igneous and metamorphic geology on a range of soils including black clay loams to yellow podzolics and peaty loams. Occurs in a range of vegetation types including open grassy heathland with dominant tree species swamp myrtle, small-fruit hakea, alpine bottebrush, woolly grevillea, and coral heath; Grasslands dominated by kangaroo grass or barbed-wire grass. Known from a coastal site dominated by coastal banksia and coastal wattle.	Possible. A population is known to occur in similar habitat at a NSW coastal site. However, no database records from ALA or WL are available from within 10km.	Proposed action will require removal of some vegetation on site; however it is not considered to have a significant impact on regional scale, or availability or quality of habitat in the vicinity of the proposal due to lack of presence on site or surrounding area.
Zieria collina	-	V, V	Grows at an altitude in the range of 550 m where it forms thickets in light rainforest, and often a dominant shrub in regrowth.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as there is no suitable habitat onsite, it is not considered to have a significant impact on regional scale, availability or quality of habitat in the vicinity of the proposal.

[1] EPBC Act: CE – Critically endangered, E – Endangered, V – Vulnerable, Mi – Migratory, M – Marine; NC Act: E – Endangered, V – Vulnerable, NT – Near threatened

[2] Habitat: Description sourced from DoEE Species Profile and Threats Database and relevant literature.

[3] Likelihood: Unlikely – site does not support suitable habitat for the species, Possible – suitable habitat for the species is mapped on site, Confirmed – species previously recorded on site. Assessment informed from Atlas of Living Australia and Wildlife Online databases and other relevant literature.

[4] Significant impact criteria: MNES Significant impact guidelines 1.1 (DoEE, 2013)

4.4.3 Conservation significant fauna species

For the conservation significant fauna identified in the protected matters search (Appendix B), the likelihood of potential occurrence has been assessed against known habitat values within the proposed site and available literature.

No critically endangered, endangered or vulnerable terrestrial fauna species were recorded during the site inspection. Although disturbed the continuous stand of continuous vegetation along the coast provided some habitat values for foraging, nesting, roosting and connectivity for movement to the northern extent of the Spit.

For assessment of likelihood of occurrence of marine species, it is consider that substantial literature and database resources available are sufficient information at this stage; however a detailed site-specific survey of marine environment will be undertaken as part of further detailed environmental assessment for the proposal.

4.4.3.1 Birds

The results of this assessment, detailed in Table 5, identified 13 conservation significant bird species as a known or possible occurrence within the proposal area, including:

- *Calidris canutus* (Red knot)
- *Calidris ferruginea* (Curlew sandpiper)
- *Calidris tenuirostris* (Great knot)
- *Charadrius leschenaultia* (Greater sand plover)
- *Charadrius mongolus* (Lesser sand plover)
- *Diomedea antipodensis* (Antipodean albatross)
- *Limosa lapponica bauera* (Bar-tailed godwit)
- *Limosa lapponica menzbieri* (Northern Siberian bar-tailed godwit)
- *Macronectes giganteus* (Southern giant petrel)
- *Macronectes halli* (Northern giant petrel)
- *Numenius madagascariensis* (Eastern curlew)
- *Thalassarche melanophris* (Black-browed albatross)
- *Turnix melanogaster* (Black-breasted button-quail).

The proposal will preserve coastal vegetation where practical and the extensive coastal vegetation adjacent to and surrounding the proposal offers equivalent foraging and roosting habitats for shorebird and wetland species such that the proposal is unlikely to have a significant impact on the availability or quality of habitat, or long term size of regional populations. Introduction of jetty and terminal infrastructure is likely to present additional roosting opportunities onsite. Biosecurity control measures will ensure no weeds or pests are introduced to the detriment of these species or their habitat.

4.4.3.2 Marine species

The likelihood and significant impact criteria trigger assessment, detailed in Table 5, identified two conservation significant marine species as a known or possible occurrence within the proposal area:

- *Carcharias taurus* (grey nurse shark)
- *Carcharodon carcharias* (great white shark).

There is potential that the vulnerable great white shark and critically endangered grey nurse shark may at times transit through the proposal footprint.

Construction activities are expected to cause increased marine vessel traffic and involve short term temporary noise-generating activities (e.g. piling) and dredging that may generate potential impacts on water quality during construction. Construction will be managed to minimise the extent and duration of

noise-generating construction activities (e.g. marine traffic, piling) and dredging that may generate potential impacts on water quality such that these activities are considered unlikely to have a significant impact on marine species habitat or feeding behaviour. Further discussion of specific avoidance and mitigation measures is provided in Section 5.0.

4.4.3.3 Mammals

The likelihood and significant impact criteria trigger assessment, detailed in Table 5, identified three conservation significant mammals as a known or possible occurrence within the proposal area:

- *Pseudomys novaehollandiae* (New Holland mouse)
- *Pteropus poliocephalus* (grey-headed flying fox)
- *Megaptera novaeangliae* (humpback whale).

The proposal will preserve the majority of coastal vegetation and fore dunes that offer suitable habitat for the vulnerable New Holland mouse and marginal habitat for the vulnerable grey-headed flying fox; existing habitat on Philip Park is likely to be disturbed as a result of short term temporary activities during construction. However, given the suitable habitat available onsite, adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.

The Humpback whale is likely to pass through or near to the proposal footprint and construction-related underwater noise propagation zone during southern migration from September through to November or to access resting areas with their calves.

DoEE (2017) have indicated that the southern right whale may be encountered within or near to the proposal footprint and construction-related underwater noise propagation zone during its migration; however the likelihood is considered very low and any interactions will be effectively managed in the same way as interactions with other marine fauna such as turtles and humpback whales.

Construction activities are expected to cause increased marine vessel traffic and potential for strike and involve short term temporary noise-generating activities (e.g. piling) and dredging that may generate potential impacts on water quality during construction. Construction will be managed to minimise the extent and duration of noise-generating construction activities (e.g. marine traffic, piling) and dredging that may generate potential impacts on water quality such that these activities are considered unlikely to have a significant impact on marine species habitat or feeding behaviour. Further discussion of specific avoidance and mitigation measures is provided in Section 5.0.

4.4.3.4 Reptiles

The likelihood and significant impact criteria trigger assessment, detailed in Table 5, identified one conservation significant reptile as possibly occurring within the proposal area:

- *Dermochelys coriacea* (leatherback turtle).

There is a potential for leatherback turtles to pass through or near to the proposal area and associated underwater noise propagation zone in a transitory capacity.

Accessed via Seaway, more than 2 km to the north of the proposal, this assessment recognises that nearby Moreton Bay supports appreciable numbers of the vulnerable green and hawksbill turtles, and the endangered loggerhead turtle; however the likelihood of occurrence of these species in the proposal footprint are considered to be very low and any interactions effectively managed in the same way as interactions with other marine fauna such as turtles and humpback whales.

Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Effective management of marine traffic, noise-generating activities and monitoring of the underwater noise propagation zone will reduce the risk of any significant impact on turtle species or their habitat.

Table 5 Likelihood of conservation significant fauna species potentially occurring

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Birds					
Anthochaera phrygia	Regent honeyeater	CE, E	Mostly occur in dry box-ironbark eucalypt woodland and dry sclerophyll forest in areas of low to moderate relief. Prefer moister more fertile sites.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.
Botaurus poiciloptilus	Australasian bittern	E, -	Occurs mainly in densely vegetated freshwater wetlands and rarely in estuaries or tidal wetlands.	Unlikely. No suitable habitat exists within or adjacent to the proposed site. One specimen has been identified from database records approximately 10km from the proposed site (ALA) where suitable habitat may occur.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Calidris canutus	Red knot	E/M, -	Mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. Roosts on sandy beaches, spits and islets, and mudflats; also in shallow saline ponds of saltworks.	Possible. Potential roosting habitat does occur within and adjacent to the proposed site and several database records are available from ALA within 2 km.	Proposed action will require removal of some vegetation on site, potentially resulting in removal of roosting sites; however, given the roosting habitat available adjacent to and surrounding the proposal, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.
Calidris ferruginea	Curlew sandpiper	CE/M, -	Mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. Also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. Generally roost on bare dry shingle, shell or sand beaches, sandspits and islets in or around coastal or near-coastal lagoons and other wetlands, occasionally roosting in dunes during very high tides.	Possible. Potential roosting habitat does occur within and adjacent to the proposed site and several database records are available from ALA within 2 km.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the roosting habitat available adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Calidris tenuirostris	Great knot	CE/M, -	Typically prefers sheltered coastal habitats, with large intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons. Typically, roosts in large groups in open areas, often at the waters' edge or in shallow water close to feeding grounds.	Possible. Potential roosting habitat does occur within and adjacent to the proposed site and several database records are available from ALA within 2 km.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the similar habitat available adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.
Charadrius leschenaultii	Greater sand plover	V/M, -	Usually feed from the surface of wet sand or mud on open intertidal flats of sheltered embayments, lagoons or estuaries. Usually roost on sand-spits and banks on beaches or in tidal lagoons, and occasionally on rocky points (Bamford, 1988; Ewart, 1973; Pegler, 1983; Sibson, 1948, 1953 in DoE, 2016), or in adjacent areas of saltmarsh (Gosper and Holmes, 2002 in DoE, 2016) or claypans (Collins et al., 2001 in DoE, 2016) further up the beach than other waders, sometimes well above high-tide mark.	Possible. Potential roosting habitat does occur within and adjacent to the proposed site and several database records are available from ALA within 2 km.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the similar habitat available adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Charadrius mongolus	Lesser sand plover	E/M, -	Feeds mostly on extensive, freshly-exposed areas of intertidal sandflats and mudflats in estuaries or beaches, or in shallow ponds in saltworks. Roost near foraging areas, on beaches, banks, spits and banks of sand or shells (McGill and Keast, 1945; Pegler, 1983), and occasionally on rocky spits, islets or reefs; rarely roosts on mangroves (DoE, 2016).	Possible. Potential roosting habitat does occur within and adjacent to the proposed site and several database records are available from ALA within 2 km.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the similar habitat available adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.
Dasyrnmis brachypterus	Eastern bristlebird	E, E	Inhabits low dense vegetation in sedgeland, heathland, swampland, shrubland, schlerophyll forest and woodland and rainforest.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Diomedea antipodensis	Antipodean albatross	V/Mi/M, -	Marine bird that breeds on the islands south of New Zealand and forages widely in open water in the south-west Pacific Ocean, Southern Ocean and the Tasman Sea, notably off the coast of NSW.	Possible. Suitable foraging habitat exists within open water of the proposal area; however, no database records exist within 10 km. Records do exist from similar habitat on the south east Queensland and northern NSW coastline.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality and disturb foraging habitat. However, given the similar foraging habitat available in the coastal waters, the proposed action is not considered likely to have a significant impact on availability or quality of foraging habitat.
Diomedea antipodensis gibsoni	Gibson's albatross	V/Mi/M, V	Marine bird occurring in open subtropical and occasionally Antarctic water and breeding on islands south of New Zealand. This species has been recorded foraging between Coffs Harbour and Wilson's Promontory. No breeding colonies exist within Australian territory.	Unlikely. Breeding does not occur within Australian territory. No records exist of this species foraging north of Coffs Harbour (approximately 250 km south of the proposed site).	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Diomedea epomophora (sensu stricto)	Southern royal albatross	V/Mi/M, -	Marine bird occurring in open water and breeding on islands south of New Zealand. The extent of its range to the north is 35°S and is common in offshore waters of southern Australia.	Unlikely. The proposed proposal is at the northernmost extent of its range and no database records are available within 300 km.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.
Diomedea exulans (sensu lato)	Wandering albatross	V/Mi/M, V	Marine bird, habitat is open oceans, edge of packice; feeds over both deep pelagic and shallower continental shelf waters. Occurring in open subtropical and Antarctic water and breeding on Antarctic and sub-Antarctic islands.	Unlikely. Habitat present within the proposed area is considered marginal, with few records of the species at this extent of their range.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Erythrotriorchis radiatus	Red goshawk	V, E	Occurs in coastal and sub-coastal forests and riverine forests. Requires large trees for nesting, generally the tallest and largest in a tall stand. Nesting trees are always situated within 1 km of permanent water (Aumann And Baker-Gabb 1991). Foraging habitat requirements include areas open enough for manoeuvring in flight when hunting but with sufficient cover for ambushing prey. Such habitat would include intermediately dense forest/woodland or ecotones between communities of different densities.	Unlikely. Suitable nesting habitat is unlikely to occur within the proposed site or surrounding area. No database records are available from ALA or WL within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.
Fregetta grallaria grallaria	White-bellied storm petrel	V, -	The white-bellied storm-petrel breeds in Australian territory, on offshore islets and rocks in the Lord Howe Island group. The pelagic distribution of the species is poorly understood however it has been recorded north and east of its breeding islands to the tropics, in the Tasman Sea, Coral Sea, and north of New Zealand (DoE, 2016). In Australian waters found along the edge of the continental shelf and further out; only occasionally over inshore waters.	Unlikely. The proposal extends into coastal waters where this species is rarely sighted and suitable breeding habitat is not available.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Geophaps scripta scripta	Squatter pigeon (southern)	V, V	Occurs mainly in grassy woodlands and open forests dominated in the overstorey by *Eucalyptus*, *Corymbia*, *Acacia* or *Callitris* species.	Unlikely. No suitable habitat exists within or adjacent to the proposal footprint and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.
Lathamus discolor	Swift parrot	CE, E	Breeds in Tasmania and migrates north to the mainland during winter where it disperses widely and forages on flowers and psyllid lerps in eucalypts. Although typically found on inland slops, they are known to occur on the coast. They prefer mature old growth forests with abundant hollows within proximity to forage trees.	Unlikely. Very few eucalypts on site, with no hollows available. Not ideal foraging habitat. Database records do exist from approximately 3 km inland where suitable foraging habitat may exist.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Limosa lapponica baueri	Bar-tailed godwit	V/M, -	Usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. They appear not to forage at high tide and prefer exposed sandy substrates on intertidal flats, banks and beaches. Prefer soft mud; often with beds of Zostera or other seagrasses. Occasionally known to forage among mangroves, or on coral reefs or rock platforms among rubble, crevices and holes. Usually roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh (DoE, 2016).	Possible. Potential foraging and roosting habitat is available within the proposal footprint. One record is available from ALA within 1 km.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the similar habitat available adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.
Limosa lapponica menzbieri	Northern Siberian bar-tailed godwit	CE, -	Usually forages near the edge of water or in shallow water, mainly in tidal estuaries and harbours. Appear not to forage at high tide and prefer exposed sandy substrates on intertidal flats, banks and beaches. Prefer soft mud; often with beds of Zostera or other seagrasses. Occasionally known to forage among mangroves, or on coral reefs or rock platforms among rubble, crevices and holes. Usually roosts on sandy beaches, sandbars, spits and also in near-coastal saltmarsh (DoE, 2016).	Possible. Suitable roosting and foraging habitat exists within the proposal footprint.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the similar habitat available adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Macronectes giganteus	Southern giant petrel	E/Mi/M, E	Marine bird occurring in open seas and inshore waters, favouring pack-ice and the edge of the continental shelf. Its distribution within Australia includes breeding sites on six subantarctic and Antactic islands in Australian territory. It is widespread throughout the Southern Ocean	Possible. The proposed site is within the foraging range of this species and several records exist from within 10 km.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the similar habitat available adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.
Macronectes halli	Northern giant petrel	V/Mi/M, V	Marine bird which breeds in Antarctic waters and is known in offshore and inshore waters from around Fremantle to Sydney during winter months. The range extends into subtropical waters between winter and spring.	Possible. The proposed site is at the northern extent of its range. One record does exist approximately 20 km northeast of the site.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality and disturb foraging habitat. However, given the similar foraging habitat available in surrounding coastal waters, the proposed action is not considered likely to have a significant impact on availability or quality of foraging habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Numenius madagascariensis	Eastern curlew	CE/M, V	Mainly forages on soft sheltered intertidal sandflats or mudflats, open and without vegetation or covered with seagrass, often near mangroves, on saltflats and in saltmarsh, rockpools and among rubble on coral reefs, and on ocean beaches near the tideline. Roosts on sandy spits and islets, especially on dry beach sand near the high-water mark, and among coastal vegetation including low saltmarsh or mangroves. It occasionally roosts on reef-flats, in the shallow water of lagoons and other near-coastal wetlands.	Known. Several records exist for this species directly adjacent to the proposed site on sheltered intertidal sandflats and coastal fore dunes. Suitable habitat exists for roosting and foraging within the proposal footprint.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the similar habitat available adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.
Pachyptila turtur subantarctica	Fairy prion	V/M, -	Marine bird found mostly in temperate and subantarctic seas, feeding in deep coastal waters and breeding on islands and rock stacks. Often beachcast on the south-eastern coast of Australia as well as offshore over the continental shelf. Beachcast birds are found along the NSW coast.	Unlikely. No database records are available within several hundred kilometres of the proposed site. No suitable habitat exists.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Phoebetria fusca	Sooty albatross	V/Mi/M, V	Occurs in subtropical and subantarctic waters and breeds on islands in Indian and Atlantic Ocean on sheltered cliffs and slopes. Occasionally observed foraging in inshore waters of southern Australia. Uses open oceans beyond the continental shelf.	Unlikely. The proposed site is at the northernmost extent of the species range and it does not extend into open oceans towards or beyond the continental shelf. No database records exist within 10 km.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.
Poephila cincta cincta	Southern black-throated finch	E, E	The black-throated finch (southern) occurs mainly in grassy, open woodlands and forests, typically dominated by *Eucalyptus, Corymbia and Melaleuca*, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.
Pterodroma neglecta neglecta	Kermadec petrel	V, -	Seabird of tropical and subtropical water of south Pacific Ocean, breeding on islands, atolls and islets. Pelagic species which rarely reaches the coast of mainland Australia.	Unlikely. No records within broader area. Habitat suitable within proposed site, however marginal.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Rostratula australis	Australian painted snipe	E, V	Inhabits shallow terrestrial freshwater (occasionally brackish) wetlands and waterlogged grasslands or saltmarsh or drains.	Unlikely. No suitable habitat exists within the proposed site. Several specimens have been identified from database records within 10 km from the proposed site (ALA), however these primarily occur in suitable wetland habitat.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.
Thalassarche cauta cauta	Shy albatross	V/Mi/M, -	Marine species occurring in subantarctic and subtropical waters, nesting on level or gently sloping ledges, summits, slopes and caves of rocky islets and stacks, usually in broken terrain with little soil and vegetation.	Unlikely. One record within broader area, approximately 12 km offshore. Habitat suitable within proposed site, however marginal.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.
Thalassarche cauta steadi	White-capped albatross	V/Mi/M, V	Marine species occurring in subantarctic and subtropical waters. Birds nest on slopes vegetated with tussock and succulents.	Unlikely. No records within broader area. Habitat suitable within proposed site, however marginal.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Thalassarche eremita	Chatham albatross	E/Mi/M, -	Marine species occurring in subantarctic and subtropical waters, nesting on level or gently sloping ledges, summits, slopes and caves of rocky islets and stacks, usually in broken terrain with little soil and vegetation. It has been observed over continental shelves and also enters harbours and bays and is uncommon in pelagic waters. Breeding habitat is restricted to Pyramid Rock, Chatham Islands and off the New Zealand coast. The primary foraging range is within New Zealand waters and waters off Tasmania.	Unlikely. No records within broader area. Habitat suitable within proposed site, however marginal.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.
Thalassarche impavida	Campbell albatross	V/Mi/M, -	Marine seabird occurring in Antarctic and sub-Antarctic waters, and in the subtropical South Pacific Ocean. Nest on summits of rocky islets or tussock-covered ledges and terraces of cliffs, slopes and hills overlooking the sea or valleys. Most commonly seen foraging over the oceanic continental slopes off southern Australia	Unlikely. One record within broader area, approximately 50 km offshore. Habitat suitable within proposed site, however marginal.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Thalassarche melanophris	Black-browed albatross	V/Mi/M, -	Marine species that inhabits Antarctic, subantarctic and temperate waters and occasionally tropics. Breeds on coastal cliffs of subantarctic islands.	Possible. Records do exist within the broader area, the closest within 2 km of the proposed site. Habitat suitable within proposed site, however marginal.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.
Thalassarche salvini	Salvin's albatross	V/Mi/M, -	Marine species occurring in subantarctic and subtropical waters. Nest on level or gently sloping ledges, summits, slopes and caves of rocky islets and stacks, usually in broken terrain with little soil and vegetation.	Unlikely. No records within broader area. Suitable habitat does not exist within the proposed site.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however these activities are considered unlikely to have a significant impact on this species or species habitat.
Turnix melanogaster	Black-breasted button-quail	V, V	Restricted to rainforests and drier low closed forests, mostly in areas with 770-1,200 mm rainfall per annum. This species has also been found in low dense acacia thickets and in littoral areas and in the vegetation behind sand dunes.	Possible. Some potential habitat is available within the proposed site including *Acacia sophorae* thickets behind sand dunes. Several records are available from ALA within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Fish/Sharks					
Carcharias taurus	Grey nurse shark	CE, E	Known to occur on the continental shelf mostly from the surf zone down to approximately 190 m in depth. In Australia, the grey nurse shark is now restricted to two populations, one of which occurs on the east coast of Australia from southern NSW to southern Queensland. Evidence suggests that grey nurse sharks migrational movements are likely to be in response to water temperatures up and down the eastern extent of the population range.	Possible. There is potential that the grey nurse shark may be present in the proposal footprint during migrational movements; however it is anticipated that any occurrence would be short term in duration.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Construction will provide for traffic management (speed limits), noise attenuation (slow-start, up to 4 piles every 3-5 days, 1-2 hours per pile) and monitoring of the underwater noise propagation zone – refer Section 5.0).

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Carcharodon carcharias	Great white shark	V, -	Often occurs close inshore near the surf-line, and may move into shallow bays. Often found in regions with high prey density, such as pinniped colonies (DSEWPaC 2013). Recorded in all coastal areas across Australia, with the exception of the Northern Territory and is primarily an inhabitant of continental and insular shelf waters but is also known to inhabit the open ocean.	Possible. There is a potential that great white sharks may be recorded within the proposal area and the associated underwater noise propagation zone during construction; however any occurrences are likely to be short term in duration as the animal transits through the area.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Construction will provide for traffic management (speed limits), noise attenuation (slow-start, up to 4 piles every 3-5 days, 1-2 hours of impact driving per pile and monitoring of the underwater noise propagation zone – refer Section 5.0).

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Epinephelus daemelii	Black rockcod	V, -	Black rockcod are known to occur in caves, gutters and on rocky reefs from near shore to depths of at least 50 m, usually in warm temperate and subtropical waters of the South-western Pacific Ocean.	Unlikely due to lack of suitable habitat and the absence of recordings in the area in recent years. In Australia, the species' range extends from south Queensland to Kangaroo Island off South Australia. Black rockcod are found along the entire NSW coast and are most common in waters off northern NSW. A few individuals have been recorded from southern Queensland waters (e.g. off Flinders Reef); however, they are considered to be uncommon in the waters of Queensland (Harasti et al., 2004).	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient nature of migratory movement. Due to lack of suitable habitat, these activities are considered unlikely to have a significant impact on this species or species habitat.
Pristis zijsron	Green sawfish	V/Mi/M, -	Green sawfish are generally found in muddy substrate habitats, however has been recorded in inshore marine waters, estuaries, river mouths, embankments and along sand and muddy beaches (Stevens et al., 2005).	Unlikely due to lack of suitable habitat and the absence of recordings in the area in recent years. Historically green sawfish have been recorded in coastal waters off Broome (WA), northern Australia and down the east coast as far as Jervis Bay, NSW (Stevens et al., 2005); however it is believed that they no longer inhabit waters in NSW or southern Queensland (Stevens et al 2005).	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient nature of migratory movement. Due to lack of suitable habitat, these activities are considered unlikely to have a significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Rhincodon typus	Whale shark	V/Mi/M, -	Inhabit oceanic and coastal waters in tropical to warm-temperate regions. Migratory and undergo seasonal movements that have been associated with productivity pulses, ocean circulation and water temperatures, and regularly appear where seasonal food pulses are known to occur (DSEWPaC 2012). In Australia, known to aggregate in coastal waters off Ningaloo Reef (WA) between March and July each year, at Christmas Island between December and January and in the Coral Sea between November and December.	Unlikely due to lack of suitable habitat, and any occurrences would be transitory in nature and therefore short term in duration.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient nature of migratory movement. Due to lack of suitable habitat, these activities are considered unlikely to have a significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Mammals					
Balaenoptera musculus	Blue whale	E/Mi/M, -	Use Australian continental shelf and coastal waters for migration and opportunistic feeding. Generally migrate between (low-latitude) breeding grounds where both mating and calving take place during the winter and (high-latitude) feeding grounds during the summer; however no migration routes are known on the east coast of Australia. The only known areas of significance to the Blue Whale are feeding areas around the southern continental shelf, notably the Perth Canyon, in WA, and the Bonney Upwelling and adjacent upwelling areas of South Australia and Victoria (DEH, 2005).	Unlikely. Prefer deeper waters. No known migration routes known on the east coast of Australia.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Due to lack of suitable habitat and sightings, these activities are considered unlikely to have a significant impact on this species or species habitat.
Chalinolobus dwyeri	Large-eared pied bat	V, V	Sandstone cliffs and fertile woodland valley habitat within close proximity to higher fertility sites (particular box gum woodlands or river/rainforest corridors) used for foraging. In south east Queensland it has primarily been identified in higher altitude moist tall open forest adjacent to rainforest. The range of this species is poorly understood and it has been suggested that the range is far more restricted than previously understood.	Unlikely. No sandstone cliffs, woodland valleys or moist tall open forest habitat is available within the proposed site. No database records area available from ALA or WL within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Dasyurus maculatus maculatus	Spot-tailed quoll	E, V	Preference for mature wet forest habitat especially in areas with rainfall 600 mm per annum, including temperate and subtropical rainforests, lowland forests, open and closed eucalypt woodlands, riparian forests and coastal heathlands. Requires hollow logs, tree hollows, rock outcrops or caves for den sites. Also a requirement for ample food sources and large areas of contiguous vegetation for foraging.	Unlikely. Prefer wet forest habitat, and large tracts of adjoining forest or suitable den sites are not available at the proposed site. No database records are available from ALA or WL within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.
Eubalaena australis	Southern right whale	E/Mi/M, -	Seasonally present in Australian coastal waters between May and November for migration and opportunistic feeding. Generally southern right whales are only recorded on the east coast of Australia as far north as Sydney New South Wales; however there have been rare sightings as far north as Hervey Bay.	Unlikely based on available information, distribution patterns and lack of suitable habitat. There are no aggregation areas for the southern right whale recorded on the east coast of Australia. However DoEE reported a previous fatal vessel strike of this species in Moreton Bay in 2015.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Effective management of marine traffic, noisy activities and monitoring of the underwater noise propagation zone will prevent any significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Megaptera novaeangliae	Humpback whale	V/Mi/M, V	Seasonally present in Australian coastal waters between April and December for migration and opportunistic feeding. Generally, northbound migration takes place throughout May to July where whales tend to remain in deeper waters. During the southern migration, from September through to November, whales tend to migrate in close proximity to the coast, more than likely to access resting areas with their calves. Gold Coast region has been identified as one of three major aggregation areas ha for the eastern Australian population in Queensland (DEH, 2005b).	Likely transit through or near to the proposal footprint during southern migration from September through to November to migrate south or access resting areas with their calves.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Fauna interaction guidelines, management plans and vessel speeds will ensure effective management of marine traffic, noisy activities and monitoring of the underwater noise propagation zone will prevent any significant impact on this species or species habitat.
Petauroides volans	Greater glider	V, -	Typically favours taller, montane, moist eucalypt forests with relatively old trees and abundant hollows for sheltering during the day. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe.	Unlikely. Available habitat does not include hollows for shelter and few eucalypts are available for feeding. Several database records (ALA) do exist from within 10 km of the proposed site where suitable habitat may occur.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Petrogale penicillata	Brush-tailed rock wallaby	V, V	Prefers rocky habitats, including loose boulder-piles, rocky outcrops, steep rocky slopes, cliffs, gorges and isolated rock stacks within a range of vegetation types, including dense rainforest, wet sclerophyll forest, vine thicket, dry sclerophyll forest and open forest.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.
Phascolarctos cinereus	Koala	V, V	Inhabit moist forests and woodlands mostly dominated by *Eucalyptus* species, and also found in vegetation communities dominated by *Melaleuca* or *Casuarina* species. Forests or woodlands must contain species that are known koala food trees.	Unlikely. No suitable habitat for koala available within the proposed site. Several database records are available within 10 km where suitable habitat may occur.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.
Potorous tridactylus tridactylus	Long-nosed potoroo	V, V	Can be found in wet eucalypt forests to coastal heaths and scrubs with access to some form of dense vegetation for shelter and the presence of an abundant supply of fungi for food.	Unlikely. No suitable habitat exists within or adjacent to the proposed site and no database records from ALA or WL are available from within 10 km.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Pseudomys novaehollandiae	New Holland mouse	V, -	Inhabits open heathland, open woodland and vegetated sand dunes within coastal areas and up to 100 km inland on sandstone country with deeper top soils and softer substrates being preferred for digging burrows typically near water such as lakes, rivers or the coast.	Possible. Suitable vegetated sand dune habitat does exist within the proposed site. No database records from ALA or WL are available within 10 km.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable habitat. Given the habitat available onsite, adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.
Pteropus poliocephalus	Grey-headed flying fox.	V, -	Requires foraging habitat and roosting sites. Foraging and roosting in rainforests, open forests, closed and open woodlands, *Melaleuca* swamps and *Banksia* woodlands. Primary food sources is nectar from *Eucalyptus,* fruit from rainforest species are also utilised. This species has a large range however, as it forages selectively where food resources are available, only a small portion of the range is inhabited at any one time. Occurrence within an area is intermittent and the species has complex migration patterns based on availability of food resources.	Possible that the habitat is used for foraging and dispersal activities. A record of this species is available from ALA adjacent to the proposed site and more records are available within the greater area. Given the extent of suitable foraging and dispersal habitat within the area, and highly mobile nature of this species, potential impacts for this species are considered to be minimal. The proposed site has few suitable feed trees and roost sites, so habitat is considered to be marginal.	Proposed action will require removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the habitat available onsite, adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Xeromys myoides	Water mouse	V, V	In south-east Queensland, habitat requirements include mangrove communities and the associated sedge lands, clay pans, saltmarsh, heathlands and freshwater wetlands.	Unlikely. No mangrove habitat exists within or adjacent to the proposed site. Records are available from ALA within the wider area where suitable habitat occurs.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.
Reptiles					
Caretta caretta	Loggerhead turtle	E, E	Occur in the waters of coral and rocky reefs, seagrass beds and muddy bays, nesting on open sandy beaches throughout eastern, northern and western Australia (Limpus et al., 1994b). Low density and sporadic nesting also occurs along the Sunshine Coast beaches and on the northern ends of Fraser, Moreton and North Stradbroke Islands and southwards into northern NSW (Limpus, 2008a).	Unlikely. Proposal is not situated within a known foraging area or important habitat area for loggerhead turtles, or in proximity to a nesting beach. Turtles may pass through or near to the proposal area and associated underwater noise propagation zone in a transitory capacity. Research suggests that sporadic nesting may occur, such that there is a low possibility that nesting females may be present in the area during the nesting season (October to March).	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Effective management of marine traffic, noisy activities and monitoring of the underwater noise propagation zone will prevent any significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Chelonia mydas	Green turtle	V, V	Drift on ocean currents feeding on *Sargassum* (floating marine plant) then settle in shallow benthic foraging habitats such as tropical tidal and sub-tidal coral and rocky reef habitat or inshore seagrass beds. Typically nest, forage in seaweed-rich coral reefs and coastal seagrass pastures, and migrate across tropical northern Australia and have key nesting sites within Queensland, Northern Territory and Western Australia. In Queensland key nesting sites have been recorded on nearshore islands and at the Cape York Peninsula.	Unlikely due to lack of suitable or known green turtle habitat; however may pass through or near to the proposal area and associated underwater noise propagation zone in a transitory capacity.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Effective management of marine traffic, noisy activities and monitoring of the underwater noise propagation zone will prevent any significant impact on this species or species habitat.
Delma torquata	Collared delma	V, V	Normally inhabits eucalypt-dominated woodlands and open-forests in the presence of rocks, logs, bark and other coarse woody debris, and mats of leaf litter.	Unlikely. No suitable habitat exists within or adjacent to the proposed site. There are no records available from ALA within a 10 km range of the proposal.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Dermochelys coriacea	Leatherback turtle	E, E	Highly pelagic species, foraging in Australian waters over Australian continental shelf waters, venturing close to shore in tropical, subtropical and temperate waters to nest on sandy beaches. The species is commonly reported in from coastal waters from the Sunshine Coast in southern Queensland to central NSW; however it is believed that no nesting has occurred in these regions since 1996 (Hamann et al., 2006).	Possible. There is a potential for leatherback turtles to pass through or near to the proposal area and associated underwater noise propagation zone in a transitory capacity.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Effective management of marine traffic, noisy activities and monitoring of the underwater noise propagation zone will prevent any significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Eretmochelys imbricata	Hawksbill turtle	V/Mi/M, -	Drift on ocean currents feeding on *Sargassum* (floating marine plant) then settle in shallow benthic foraging habitats such as tropical tidal and sub-tidal coral and rocky reef habitat or inshore seagrass beds along the tropical coast of northern and eastern Australia. Australia contains the largest remaining nesting populations of hawksbill turtles globally and the largest rookeries (Limpus, 1995b), with large nesting populations recorded on the Great Barrier Reef, other nesting activities have been recorded on near shore islands and the Western Cape York Peninsula.	Unlikely due to lack of suitable or known green turtle habitat; however may pass through or near to the proposal area and associated underwater noise propagation zone in a transitory capacity.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Effective management of marine traffic, noisy activities and monitoring of the underwater noise propagation zone will prevent any significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Lepidochelys olivacea	Olive Ridley turtle	E, -	Pelagic species, foraging in Australian waters over Australian continental shelf waters, nesting on mainland or island sandy beaches throughout the northern territory and on offshore islands and along the north-western coast of the Cape of York Peninsula in Queensland. No nesting records have been collected for the eastern Australian coast (Limpus, 2008). Immature and adult populations are believed to forage over shallow benthic habitats from northern Western Australia to south-east Queensland.	Unlikely due to lack of suitable or known green turtle habitat; however may pass through or near to the proposal area and associated underwater noise propagation zone in a transitory capacity.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Effective management of marine traffic, noisy activities and monitoring of the underwater noise propagation zone will prevent any significant impact on this species or species habitat.
Natator depressus	Flatback turtle	V/Mi/M, -	Inhabit soft bottom habitat in the Australian continental shelf and require sandy beaches to nest. In Queensland, nesting occurs between Bundaberg and Torres Strait, with a majority of nesting occurring in the Southern Great Barrier Reef (Limpus 1983b).	Unlikely due to the lack of suitable habitat (nesting and foraging); however may pass through or near to the proposal area and associated underwater noise propagation zone in a transitory capacity.	Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Effective management of marine traffic, noisy activities and monitoring of the underwater noise propagation zone will prevent any significant impact on this species or species habitat.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]	Significant impact criteria[4]
Saiphos reticulatus	Three-toed snake-tooth skink	V, -	Found in loose, well mulched friable soil, in and under rotting logs and forest litter, in rainforest, closed forest, wet sclerophyll forest, tall layered open eucalypt forest and closed Brush Box (*Lophostemon confertus*) forest.	Unlikely. No suitable habitat exists within or adjacent to the proposed site. There are no records available from ALA within a 10 km range of the proposal.	Proposed action will require removal of some vegetation on site; however, as no suitable habitat was identified, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.

[1] EPBC Act: CE – Critically endangered, E – Endangered, V – Vulnerable, Mi – Migratory, M – Marine; NC Act: E – Endangered, V – Vulnerable, NT – Near threatened

[2] Habitat: Description sourced from DoEE Species Profile and Threats Database and relevant literature.

[3] Likelihood: Unlikely – site does not support suitable habitat for the species, Possible – suitable habitat for the species is mapped on site, Confirmed – fauna species previously recorded on site. Assessment informed from Atlas of Living Australia and Wildlife Online databases and other relevant literature.

[4] Significant impact criteria: MNES Significant impact guidelines 1.1 (DoEE, 2013)

4.4.4 Migratory species

The desktop assessment (Appendix B) indicated that 80 conservation significant migratory species that have the potential to occur in the vicinity of the proposed action, including 20 migratory marine birds, 21 migratory marine species, 6 migratory terrestrial species and 33 migratory wetland species. No critically endangered, endangered or vulnerable migratory species were recorded during the site inspection.

4.4.4.1 Migratory marine birds

In addition to the marine birds discussed in Section 4.4.3, the protected matters search (Appendix B) identified nine species or species habitat of migratory marine birds that may occur within the vicinity of the proposal. These species are reviewed in Table 6.

Of those species, five migratory marine birds were considered to be 'possible' occurrences in the vicinity of the proposal for roosting, foraging or nesting; although the habitat . Those species include:

- *Anous stolidus* (common noddy)
- *Apus pacificus* (fork-tailed swift)
- *Fregata ariel* (lesser frigatebird, Least frigatebird)
- *Fregata minor* (great frigatebird, greater frigatebird)
- *Sterna albifrons* (little tern).

The proposal will result in the removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the habitat available onsite, and similar or better habitats adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.

Table 6 Likelihood of conservation significant migratory marine bird species potentially occurring

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]
Anous stolidus	Common noddy	Mi/M, -	Usually occurs on or near islands, on rocky islets or on shoals or cays of coral or sand. May nest in bushes, saltbush or other low vegetation.	Possible. Records found on ALA in the vicinity of the proposal.
Apus pacificus	Fork-tailed swift	Mi/M, -	Almost exclusively aerial. Mostly occur over inland plains but sometimes above foothills or in coastal areas. Often occur over cliffs and beaches and also over islands.	Possible. Records found on ALA in the vicinity of the proposal.
Calonectris leucomelas	Streaked shearwater	Mi/M, -	Nests in open patchy vegetation, such as among tussock grassland or shrubs on ridges, slopes and plateaus. It is marine, pelagic and aerial.	Possible. Known to use open ocean habitat.
Diomedea gibsoni	Gibson's albatross	Mi/M, V	It is marine, pelagic and aerial. Nests on coastal or inland ridges, slopes and plains, often on marshy ground.	Possible. No sightings in Queensland.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]
Fregata ariel	Lesser frigatebird, Least frigatebird	Mi/M, -	Inhabits remote islands in tropical and sub-tropical seas	Possible. Records found on ALA in the vicinity of the proposal.
Fregata minor	Great frigatebird, greater frigatebird	Mi/M, -	Tropical seas.	Possible. Records available from ALA within the vicinity of the proposal.
Puffinus carneipes	Flesh-footed shearwater, fleshy-footed shearwater	Mi/M, -	Mainly occurs in the subtropics over continental shelves and slopes and occasionally inshore waters.	Unlikely. No records in the vicinity of the proposal.
Sterna albifrons	Little tern	Mi/M, -	Inhabit sheltered coastal environments, including lagoons, estuaries, river mouths and deltas, lakes and harbours.	Possible. Recorded in the vicinity of the proposal. Scattered dunal areas found within the proposal site may accommodate breeding colonies.
Thalassarche steadi	White-capped albatross	Mi/M, V	Occurs in subantarctic and subtropical waters. Noted in self-waters around breeding islands and over adjacent rises.	Unlikely. No records in the vicinity of the proposal.

4.4.4.2 Migratory marine species

The protected matters search (Appendix B) identified nine species of migratory mammals (whale, dolphins and dugongs) as species or species habitat that may occur within the vicinity of the proposal. This includes one additional species of whale, dugongs and four species of dolphin.

Construction of the proposal will involve increased marine vessel traffic, noise-generating construction activities (e.g. piling) and dredging that may generate potential impacts on water quality; however, any impacts would be short term due to the short term temporary nature of activities and transient movement of this species. Effective management of marine traffic, noisy activities and monitoring of the underwater noise propagation zone will prevent any significant impact on this species or species habitat.

Whales

Bryde's whales occur in temperate to tropical waters, both oceanic and inshore, and have been recorded in all Australian states except the Northern Territory; however only one sighting has been recorded in Queensland (DEW, 2007). Insufficient information exists in relation to feeding or breeding grounds in Australia as none have been recorded in Australia to date. Due to the limited sightings recorded in Queensland, it is unlikely that Bryde's whale will be encountered in the proposal area.

Dugongs

Dugongs occur in coastal and island waters from Shark Bay in Western Australia across the northern coastline to Moreton Bay in Queensland (Marsh et al, 2002, 2011). Occasional sightings have been recorded as far south as Newcastle (NSW) during summer months (Allen et al., 2004). Dugongs feed on seagrass and the distribution of dugongs is generally correlated with the presence of seagrass. Major concentrations of dugongs along the Queensland coast occur in wide, shallow, protected bays

and mangrove channels, in areas of significant seagrass beds. The location of the proposal is considered to be on the southern tip of the dugongs usual distribution range; however there is a possibility that dugongs may transit through the area in search of seagrass beds and may transit through the underwater noise propagation zone of the proposal.

Dolphins

Four species of dolphin identified as migratory marine species likely to occur in the proposal area include dusky Dolphin, Irrawaddy Dolphin, killer Whale and the Australian humpback dolphin.

Dusky dolphin: Very little is known in relation to the distribution of the dusky dolphin in Australia, due to limited observations in Australian waters. It is believed that dusky dolphins are resident inshore for much of year but are known to seek out colder water (<18^{o}C) as inshore temperatures rise in summer. Research suggests that dusky dolphin distribution could be related to oceanographic features, such as the position of the Subtropical Convergence, resulting in cold surface waters. The information available suggests that it is unlikely that the dusky dolphin would be encountered in the proposal area.

Irrawaddy dolphin (*Orcaella brevirostris*): Reclassified in Australia as the Australian snubfin dolphin (*Orcaella heinsohni*) in 2005, the Australian snubfin dolphin has a poorly documented distribution in Australia; however all available data on the distribution and habitat preferences indicate that they mainly occur in one location: shallow coastal and estuarine waters of Queensland, Northern Territory and north Western Australia (Beasley et al., 2002). Due to the preference for shallow coastal habitats, there is a chance that the Australian snubfin dolphin could transit through the proposal area; however it would be anticipated that any occurrence is likely to be short in duration.

Killer whales: The largest member of the dolphin family, in Australia killer whales are most often seen along the continental slope and on the shelf, particularly near seal colonies have been recorded in all state waters; however concentrations have been recorded around Tasmania, sightings are also frequent in South Australia and Victoria. Killer whales are known to make seasonal movements and probably follow regular migratory routes; however there is little information available in Australia on killer whale movements. It is unlikely that killer whales would be recorded in the proposal area; however there is a possibility they may follow humpback whale southern migrations and therefore may transit through the underwater noise propagation zone of the project.

Indo-Pacific humpback dolphin (*Sousa chinensis*): The Indo-Pacific humpback dolphin (*Sousa chinensis*) was reclassified in Australia as the Australian humpback dolphin (*Sousa sahulensis*). The Australian humpback dolphin is an inshore species that inhabits coastal waters of northern Australia, in tropical and subtropical regions. Resident populations have been recorded in Moreton Bay to Shark Bay (Western Australia). The species usually occurs within 5 km of the coast, generally in depths of less than 15 m, but they have been seen 55 km offshore in shallow water (Corkeron et. al., 1997, Jefferson 2000, Parra et al. 2006). Key localities in Queensland, closest to the Project include: Moreton Bay and the Great Sandy Strait (EHP, 2017). There is a possibility that this species may occur within the proposal area.

Sharks and rays

The porbeagle sharks as well as the reef and giant manta rays are likely to occur in the proposal area.

The porbeagle shark primarily inhabits oceanic waters and areas around the edge of the continental shelf and has been recorded in waters from southern Queensland to south-west Australia (Last and Stevens, 2009). The porbeagle shark only occasionally traverses coastal waters and therefore there is a low possibility of the species being recorded in the proposal area.

The reef and giant manta ray inhabit warm, tropical or sub-tropical waters and is often resident in or along productive near-shore environments, such as island groups, atolls or continental coastlines (Marshall et al., 2011). In Australia, these rays have been seen making seasonal and daily migrations and are commonly sighted inshore, but also found around offshore coral reefs, rocky reefs and seamounts. There is a possibility that both the reef manta ray and giant manta ray may traverse through the proposal area as part of their seasonal and daily migrations; however any occurrence is likely to be short in duration.

4.4.4.3 Migratory terrestrial species

The protected matters search (Appendix B) identified six species of migratory terrestrial species (birds) reviewed in Table 7 that are not listed as conservation significant fauna assessed in Section 4.4.3. Of these species, none were considered likely to occur or find suitable habitat on the site.

Table 7 Likelihood of conservation significant migratory terrestrial species potentially occurring

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]
Cuculus optatus	Oriental cuckoo	Mi, -	Mainly inhabiting forests.	Unlikely. No records in the vicinity of the proposal.
Hirundapus caudacutus	White-throated needletail	Mi, -	Exclusively aerial. Commonly occur over heathland, grassland or swamps.	Unlikely. No records in the vicinity of the proposal.
Monarcha melanopsis	Black-faced monarch	Mi, -	Occurs in rainforest ecosystems.	Unlikely. No suitable habitat onsite; however records found on ALA within 10 km of the proposal.
Monarcha trivigatus	Spectacled monarch	Mi, -	Prefers thick understorey in rainforest, wet gullies and waterside vegetation and mangroves.	Unlikely. No records in the vicinity of the proposal.
Myiagra cyanoleuca	Satin flycatcher	Mi, -	Inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands.	Unlikely. No suitable habitat onsite; however records found on ALA within 10 km of the proposal.
Rhipidura rufifrons	Rufous fantail	Mi, -	Inhabits wet sclerophyll forests, often in gullies dominated by eucalypts.	Unlikely. No suitable habitat onsite; however records found on ALA within 10 km of the proposal.

4.4.4.4 Migratory wetland species

The protected matters search (Appendix B) identified 23 species of migratory wetland species (birds) reviewed in Table 8 that are not listed as conservation significant fauna assessed in Section 4.4.3. Of these species, the following species were considered 'possible' to occur or find suitable roosting or foraging habitat within the proposal area:

- *Actitis hypoleucos* (common sandpiper)
- *Arenaria interpres* (ruddy turnstone)
- *Calidris acuminate* (sharp-tailed sandpiper)
- *Calidris alba* (sanderling)
- *Calidris ruficollis* (red-necked stint)
- *Charadrius bicinctus (*double banded plover)
- *Gallingo hardwickii* (Latham's snipe)
- *Limicola falcinellus* (broad-billed sandpiper).

The proposal will result in the removal of some vegetation on site; however the landside development will preserve the majority of fore dunes that may offer suitable roosting habitat. Given the habitat

available onsite, and similar or better habitats adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations. Biosecurity control measures will ensure no weeds or pests are introduced.

Table 8 Likelihood of conservation significant migratory wetland species potentially occurring

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]
Actitis hypoleucos	Common sandpiper	Mi, -	Uses a wide range of coastal and some inland wetlands.	Possible. Records found on ALA in the vicinity of the proposal.
Arenaria interpres	Ruddy turnstone	Mi, -	Coastal regions with exposed rock coast lines or coral reefs.	Possible. Records found on ALA in the vicinity of the proposal.
Calidris acuminata	Sharp-tailed sandpiper	Mi, -	Muddy edges of shallow fresh or brackish wetlands.	Possible. Records found on ALA in the vicinity of the proposal.
Calidris alba	Sanderling	Mi, -	Usually on well-drained ridge tops, gentle slopes or level plains with sparse vegetation	Possible. Records found on ALA in the vicinity of the proposal.
Calidris melanotos	Pectoral sandpiper	Mi, -	Prefers fresh to saline wetlands. Found at coastal lagoons, estuaries, bays, swamps, lakes.	Unlikely. No records in the vicinity of the proposal.
Calidris ruficollis	Red-necked stint	Mi, -	Coastal areas, including sheltered inlets, bays, lagoons and estuaries.	Possible. Records found on ALA in the vicinity of the proposal.
Charadrius bicinctus	Double banded plover	Mi, -	Found on littoral, estuarine and fresh or saline terrestrial wetlands and also saltmarsh, grasslands and pasture.	Possible. Records found on ALA in the vicinity of the proposal.
Charadrius veredus	Oriental plover	Mi, -	Coastal habitats such as estuarine mudflats and sandbanks, on sandy or rocky ocean beaches or nearby reefs.	Unlikely. No records in the vicinity of the proposal.
Gallingo hardwickii	Latham's snipe	Mi, -	Occurs in permanent and ephemeral up to 2000 m above sea level	Possible – not suitable habitat; however, there are records on ALA of the species being present in the vicinity of the proposal.
Gallingo megala	Swinhoe's snipe	Mi, -	Edge of wetlands, such as wet paddy fields, swamps and freshwater streams. Also known to occur in grasslands	Unlikely. No records in the vicinity of the proposal.
Gallingo stenura	Pin-tailed snipe	Mi, -	Most often occur in or at the edge of shallow freshwater swamps, ponds and lakes with emergency, spare to dense cover of grass/sedge or other vegetation.	Unlikely. No records in the vicinity of the proposal.

Species name	Common name	Status[1] (EPBC Act, NC Act)	Habitat[2]	Likelihood of occurrence[3]
Heteroscelus brevipes	Grey-tailed tattler	Mi, -	Found on sheltered coasts with reefs and rock platforms or with intertidal mudflats.	Unlikely. No records in the vicinity of the proposal.
Heteroscelus incanus	Wandering tattler	Mi, -	Generally found on rocky coasts with reefs and platforms.	Unlikely. No records in the vicinity of the proposal.
Limicola falcinellus	Broad-billed sandpiper	Mi, -	Occurs in sheltered parts of the coast, favouring estuarine mudflats but also occasionally occur on saltmarshes, shallow freshwater lagoons.	Possible. Records found on ALA in the vicinity of the proposal.
Limnodromus semipalmatus	Asian dowitcher	Mi, -	Sheltered coastal environments, such as coastal lagoons, estuaries and tidal creeks.	Unlikely. No records in the vicinity of the proposal.
Pandion haliaetus	Osprey	Mi, -	Occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands.	Unlikely. No records in the vicinity of the proposal.
Philomachus pugnax	Ruff (reeve)	Mi, -	Generally found on fresh, brackish or saline wetlands with exposed mudflats at the edge.	Unlikely. No records in the vicinity of the proposal.
Pluvialis fulva	Pacific golden plover	Mi, -	Coastal habitats, including beaches, mudflats and sandflats.	Unlikely. No records in the vicinity of the proposal.
Pluvialis squatarola	Grey plover	Mi, -	Coastal areas, including sheltered estuaries, lagoons with mudflats.	Unlikely. No records in the vicinity of the proposal.
Tringa glareola	Wood sandpiper	Mi, -	Well-vegetated, shallow, freshwater wetlands such as swamps, billabongs, lakes, pools and waterholes.	Unlikely. No records in the vicinity of the proposal.
Tringa nebularia	Common greenshank	Mi, -	Sheltered coastal habitats, typically with large mudflats and saltmarsh, mangroves or seagrass.	Unlikely. No records in the vicinity of the proposal.
Tringa stagnatilis	Marsh sandpiper	Mi, -	Permanent or ephemeral wetlands including swamps, lagoons, saltmarshes, estuaries and mudflats.	Unlikely. No records in the vicinity of the proposal.
Xenus cinereus	Terek sandpiper	Mi, -	Intertidal mudflats or in sheltered estuaries, embayments, harbours or lagoons.	Unlikely. No records in the vicinity of the proposal.

4.4.5 Introduced species

Introduced flora

The field survey recorded *Lantana camara* (lantana), a Weed of National Significance (WONS), which is also listed as a Category 3 Restricted Matter under the *Biosecurity Act 2015* (Cth). Whilst not

observed, several other WONS are known within the region and are considered as a possible occurrence (Appendix B). These include:

- *Alternanthera philoxeroides* (alligator weed)
- *Asparagus aethiopicus* (asparagus fern)
- *Cabomba caroliniana* (climbing asparagus)
- *Chrysanthemoides monilifera* (bitou bush)
- *Chrysanthemoides monilifera* subsp. *rotundata* (bitou bush)
- *Cryptostegia grandiflora* (rubbervine)
- *Dolichandra unguis-cati* (cat's claw vine)
- *Hymenachne amplexicaulis* (hymenachne)
- *Optunia* spp. (prickly pears)
- *Parthenium hysterophorus* (parthenium weed)
- *Sagittaria platyphylla* (arrowhead)
- *Salix* spp. except S.babylonica, S.x calondendron and S.x reichardtii (willow except weeping willow, pussy willow and sterile pussy willow)
- *Salvina molesta* (salvinia)
- *Senecio madagascariensis* (fireweed)

Introduced fauna

The following feral animals are reported in the region (Appendix B), and are considered possible occurrence.

- Birds
  - *Acridotheres tristis* (common myna, Indian myna)
  - *Anas platyrhynchos* (mallard)
  - *Columba livia* (rock pigeon)
  - *Lonchura punctulata* (nutmeg mannikin)
  - *Passer domesticus* (house sparrow)
  - *Pycnonotus jocosus* (red-whiskered bulbul)
  - *Streptopelia chinensis* (spotted turtle dove)
  - *Sturnus vulgaris* (common starling)
- Frogs
  - *Rhinella marina* (cane toad)
- Mammals
  - *Bos taurus* (domestic cattle) – not likely
  - *Canis lupus familiaris* (domestic dog)
  - *Felis catus* (domestic cat)
  - Feral deer – not likely
  - *Lepus capensis* (brown hare)
  - *Mus musculus* (house mouse)
  - *Oryctolagus cuniculus* (European rabbit)

- *Rattus norvegicus* (brown rat)
- *Rattus rattus* (black rat)
- *Sus scrofa* (pig)
- *Vulpes vulpes* (red fox)

· Reptiles

- *Hemidactylus frenatus* (Asian house gecko).

5.0 Potential impacts and specific avoidance, mitigation and management measures

5.1 Flora values

There were no threatened flora species or threatened ecological communities listed under the EPBC Act recorded during the site visit; however suitable habitat exists for four vulnerable flora species to possibly occur onsite.

The proposal lies 3 km south of the offshore waters of the Moreton Bay Marine Park, South Stradbroke Island and Gold Coast Seaway (to the Ramsar wetland within the Bay), all of which maintain conservation significant flora species. The proposal will not directly impact on these environmentally significant areas; however there may be indirect impacts due to marine vessel traffic associated with equipment and materials transport during the construction phase and fuel transport during the operations phase.

5.1.1 Permanent loss of coastal vegetation

The proposal will result in minor loss of already degraded native vegetation on the coastal fringe of Philip Park to accommodate the jetty landing, vehicle and passenger access, terminal building, logistics and laydown areas. The layout of the landside development will retain as much of the existing vegetation in the coastal stand and fore dunes as possible; therefore the area to be impacted is relatively small. The loss of vegetation is not considered detrimental to the overall ecological values of the area, given similar and higher quality vegetation and habitats are available immediately to the north, south and west of the proposed site. Supplementary planting and revegetation as part of final landscaping of the site will enhance native species populations and reduce weed infestation in the vicinity of the proposal.

5.1.2 Loss of landscape vegetation

Planted landscape vegetation within and around the existing car parking areas is likely to be temporarily disturbed or removed by construction activities onsite. Landscaping of the site will use similar local native species to replace landscape vegetation disturbed during the construction works. This is considered to be a minor and temporary impact, offset by planting of native species in landscaping the area.

5.1.3 Weed spread

Declared and environmentally significant weeds were observed to occur at Philip Park. However the proposal is not considered likely to exacerbate the existing presence of the known declared weed *Lantana camara*.

Lantana spreads in two ways, by layering, a form of vegetation reproduction which allows the plant to spread short distances, and by birds and other animals such as foxes consuming reproductive parts of the plant and spreading it potentially large distances when the seed is passed. The proposed impact should not increase the availability of appropriate habitat or growing conditions for lantana nor will the species be more accessible to fauna capable of dispersing seeds.

The coastal vegetation and its habitat value are susceptible to introduction and spread of weeds. A Weed Management Plan and weed hygiene procedures will be developed and implemented to ensure weeds are not introduced to the site or spread to the surrounding area during clearing and construction activities. Cleared vegetation management and vehicle wash down procedures will be central to any weed management strategy.

5.1.4 Recommended management and mitigation measures

Additional survey and assessment of flora values will be undertaken to identify specimens that can be retained or reused as part of the proposal.

Preparation and implementation of a Vegetation Management Plan, including:

- Minimise disturbance footprint and vegetation clearing requirement. No unnecessary clearing outside of development footprint.

- Weed Management Plan to ensure new weeds are not introduced or spread to other areas.
- Rehabilitation strategy detailing local native species and areas for revegetation and supplementary plantings.

5.2 Fauna values

There were no threatened fauna species listed under the EPBC Act recorded during the site visit. The critically endangered Eastern curlew and vulnerable Grey-headed flying-fox are known to occur in the vicinity of the proposal. The proposal area is considered likely or possibly providing suitable roosting or foraging habitat for a further 12 threatened migratory or resident shorebirds and one vulnerable terrestrial mammal. Four marine species, including critically endangered grey nurse shark, endangered leatherback turtle, vulnerable great white shark and vulnerable humpback whale, are considered likely or possibly occurring in the proposal area.

The bay and offshore waters of the Moreton Bay Marine Park maintain high value habitats for feeding and breeding conservation significant marine fauna and migratory and resident shorebird and wetland bird populations. The proposal will not directly impact on these environmentally significant areas; however there may be indirect impacts due to marine vessel traffic associated with equipment and materials transport during the construction phase and fuel transport during the operations phase.

5.2.1 Loss of habitat

The vegetation in this area represents a very narrow band and contains weeds; however, it is recognised as habitat that has the potential to provide connectivity along the eastern coast to the Spit, and potential roosting and foraging habitat to grey-headed flying-fox, New Holland mouse and birds, including resident and migratory shorebirds, wetland birds and raptors.

Given the highly modified nature of the site (mainly used for car parking), vicinity to large man made establishments (Sheraton, Seaworld, etc.) and exposed coastal location, the site is considered unlikely to provide core habitat for any of the threated or migratory species. Removal of mature vegetation may reduce perching opportunities for birds, as well as foraging and nesting resources for terrestrial mammal species.

Layout of landside development will retain existing native vegetation as much as possible to minimise the permanent loss of native vegetation and disruption to habitat connectivity. The proposal will retain and reinstate these habitat values to encourage local wildlife in the final landscaping of the site.

Availability of similar habitat values immediately adjacent to Philip Park and in the surrounding area indicates that the proposed vegetation clearing and temporary disturbance of habitats during construction will not have a significant impact on populations or availability of habitat for birds or terrestrial mammal species during construction.

5.2.2 Fauna spotter

Prior to and during clearing, a qualified fauna spotter-catcher will inspect the vegetation to detect presence of fauna. Any fauna present will be translocated to a suitable nearby habitat (not long distances).

5.2.3 Fauna strike

All vessel operations will be managed in accordance with regulatory requirements and within the required operational management systems in place where working in the vicinity of coastal infrastructure installations.

During construction, all vehicles and equipment will keep to designated traffic routes and observe traffic controls (e.g. speed limits) to minimise risk of fauna strike.

Increased marine traffic and ocean-based activities may result in vessel strike, when vessels are transiting to and from the works area during construction or cruise ship or ancillary vessel traffic during operation. The risk of vessel strike whilst transiting to site would be managed through the implementation of vessel speed restrictions.

Interaction between vessels and cetaceans within the proposal area will be consistent with EPBC Regulations 2000 – Part 8 Division 8.1 (Regulation 8.04 – Interacting with cetaceans) which are as follows:

- Vessels will not travel at greater than 6 knots within 300 m of a cetacean (caution zone) and minimise noise.
- Vessels will not approach closer than 50 m for a dolphin and/or 100 m for a whale (with the exception of animals bow riding).

5.2.4 Fuel transport – operation

Operation of a base port will require facilities and fuel supply for refuelling cruise ship vessels. Fuel is likely to be transported from Brisbane either by road (same as all fuel bought on the Gold Coast) or via barge. Refuelling at the cruise ship terminal or transport via or near to Moreton Bay Marine Park and Ramsar wetland presents a risk that a plume resulting from a loss of containment may impact on the adjacent coast or sensitive areas.

Research indicates spill plumes in open coastal waters will be predominantly influenced by winds, as the majority of heavy fuel floats on the surface of the water; however waves and currents also influence spill plume trajectory. Further assessment of spill behaviour in the coastal setting relevant to the proposal, particularly the Gold Coast Seaway and Moreton Bay Marine Park, will be undertaken as part of detailed environmental assessment for the proposal.

The likelihood and magnitude of a spill event is controlled by the emergency and spill response capabilities of the cruise ship terminal and visiting vessels. The cruise ship terminal will be set up with modern equipment suited to a coastal environment. All visiting vessels will be fitted with mandatory emergency response equipment and procedures consistent with international ship pollution regulations.

Vessels and machinery can be maintained in accordance with the manufacturer's specifications to reduce underwater noise and chemical leakages to marine waters.

5.2.5 Noise and vibration – construction

Terrestrial noise

Construction and minor levelling at the site will potentially cause a temporary disturbance to all groups of fauna, especially birds. This will most likely result in temporary avoidance of the area for the duration of these activities.

As alternative habitats are available in close proximity, an overall loss of diversity as a result of construction is considered unlikely. Upon the cessation of peak noise levels and construction activity, many, if not all species are likely to resume activities around the facility. Few long-term impacts are anticipated.

Underwater noise

Construction of the jetty, wharf and mooring/berthing dolphins will involve installation of a number of raked piles – concept design indicates 3- 4 piles per bent, up to 220 piles in total. Piling activities during construction are estimated to take 1-2 hours per pile in a series of 3-4 piles, every 3-5 days.

Piling is known to generate underwater noise that has the potential for direct impacts to species; these may be physiological or behavioural effects on cetaceans, marine reptiles and fish. Piling methods will be designed to minimise unnecessary noise and procedures such as slow-start will be employed to reduce the risk of impacts due to sudden changes in noise and vibration levels.

Physiological effects of underwater noise relate to effects on the auditory system; exposure to high level sound for a specific duration can damage animals hearing and result in either temporary threshold shift (TTS) or permanent threshold shift (PTS), which corresponds to either temporary or permanent damage to the animals hearing.

Marine mammal behavioural responses to noise include changes in vocalisation, resting, diving and breathing patterns, changes in mother-infant spatial relationships and avoidance of the noise source (NRC, 2005) masking of biologically important sounds may interfere with communication and social interaction, and cause changes in behaviour as well (DPTI, 2012).

Baleen whales are classified as low-frequency cetaceans. There are known criteria for behavioural and physiological impacts on cetaceans from impact pilling published by National Oceanic and Atmosphere Administration (NOAA) (2011). Further assessment of underwater piling noise propagation will determine zones of impact.

Zones of impact can be applied to define the likely environmental footprint of a noise source and indicate how far away a noise source is likely to have an impact on marine mammal species. These zones of impact have been defined (by Richardson et al. 1995) as:

- Zone of audibility – extent to which an animal may hear the noise source but not show any behavioural response.
- Zone of responsiveness – area within which the animal might react behaviourally to the noise source.
- Zone of hearing injury – area closest to the noise source that may cause TTS or PTS.

These zones can vary depending on ambient noise. As part of the detailed environmental assessment for the proposal, an investigation will be conducted by a specialist underwater acoustics consultant to identify the site-specific underwater noise propagation zone for piling in an open ocean environment.

To maximise safety and effectiveness of the monitoring zone, piling will not occur at night. It is unlikely to be feasible to install piles outside of the three months period of the southern humpback whale migration (September to November), which will result in the possibility of mother and calves being present in the works area. Observations with safety zones (based on the zones of impact) will be used to identify approaching marine mammals to minimise impacts and operational procedures will be implement ted to minimise the risk of impacts upon them.

5.2.6 Sediment and turbidity – construction

At this preliminary business case stage, dredging is one option being considered to fill caissons. If required, dredging is likely to occur at or near to the site of the caisson breakwater, i.e. at approximate depth of 18 m, and water-logged material would be directly placed into the caisson limiting potential for increased levels of turbidity or dust. Experience of similar activities in the general area indicates that sand is general clean, with reduced silt or muddy deposits and has limited plume generation capability.

It is recommended that methods such as the use of silt curtains are investigated to ascertain their likely practicality and effectiveness in reducing the migration of disturbed sediments and plumes from dredging.

5.2.7 Lighting – construction and operation

Anthropogenic lighting can attract and disorientate turtle hatchlings and can result in hatchlings pooling under artificial lights; this can increase the likelihood of predation and interfering with hatchlings natural nearshore orientation and swimming movements. Lighting can also deter female turtles from nesting in an area.

Sporadic nesting of Loggerhead turtles has been recorded along the coast where the proposal is located therefore there is a potential that nesting female turtles may be recorded in the proposed area. If turtle nests are recorded than appropriate lighting management and mitigation measures, such as low sodium lights, light shades and directing lights away from the beach may need to be implemented. It is suggested that the beach adjacent to the proposed area is scanned for any nesting activity daily (by the Marine Fauna Observer), between October and March.

It is not anticipated that works will be undertaken on a 24 hour basis during the construction phase, due to the requirement to be able to observe the distances of marine fauna from piling activities therefore lighting impacts on turtle populations is likely to be minimal, if construction lighting is turned off at night.

5.2.8 Pest and feral animals

It is unlikely that the proposed works will result in further introductions of feral vertebrate species. Furthermore the proposal is not considered likely to exacerbate current populations of pest animals given they are already established in the region.

The introduction of exotic ant fauna is a risk to the proposal. Yellow crazy ants (*Anoplolepis gracilipes*) and fire ants (*Solenopsis invicta*) are exotic ants that have the potential to seriously impact native flora, fauna and ecological communities. They are capable of being transported from infested sites to new construction sites on equipment or within materials. Whilst many colonies of both species have been eradicated, spreading ants to new areas is a potential issue and needs to be managed during construction.

5.2.9 Recommended management and mitigation measures

Mitigation measures are detailed in the EPBC Policy Statement 2.1 (Interaction between offshore seismic exploration and whales) and within the South Australian Government Underwater Piling Noise Guidelines (DPTI, 2012). These mitigation measures include:

- Establishment of appropriate safety zones (based on the zones of impact) – including observational zones and shut down zones to allow the animal to move away from the noise source and to minimise the likelihood of behavioural and physiological effects.
- Implementation of standard management and mitigation measures including planning of piling activities (piling method, timing and duration).
- Use of marine mammal observers during piling operations.
- Implementation of standard operational procedures such as pre-start, soft start, standby and shut down.

5.3 Impacts to sensitive areas

Marine traffic in Moreton Bay – construction

Indirectly, there is potential for marine vessel traffic (delivering equipment or materials) passing through the Moreton Bay Marine Park and Ramsar wetland to increase during construction phase. Increased marine vessel traffic to/from the proposed site increases the potential of vessel strike to marine species with potential risk of death, injury or stress to these species. Where possible, marine vessel traffic through protected waters will be minimised by launching vessels into the Broadwater and exiting through the Gold Coast Seaway to the work area.

At this stage, it is envisaged that some materials such as caisson blocks manufactured at a wharf in Brisbane River will be transported via barge. Where vessels are required to travel through the Moreton Bay Marine Park, these vessels will observe multi-use zones and corresponding speed limits with the Moreton Bay Marine Park.

Marine traffic in Commonwealth Marine Reserves – operation

The proposal will facilitate additional cruise ship traffic to the area that may pass through the Central Eastern Marine Reserve on its way to or from the base port. Vessels will respect marine navigation routes and controls such as speed limits in these areas to reduce the potential to strike or disturb protected marine species in the region. Any marine fauna interactions would be reported as required.

Increased traffic – construction and operation

With increased traffic movements to/from the proposed site along Seaworld Drive during construction and also during operation of the terminal, there will be an increased potential of vehicle strike to terrestrial fauna species. Vehicle strike may result in death, injury or stress to these species. The traffic assessment indicates an approximate increase of % in vehicle traffic. Given the low abundance of terrestrial fauna in this already developed and highly modified area, the increase in traffic volumes is considered unlikely to have a significant impact on terrestrial species.

5.4 Heritage

The Scottish Prince historic shipwreck is listed in the Australian National Shipwrecks Database (Shipwreck Id Number: 3107). This ship wreck is protected under the Commonwealth Historic Shipwrecks Act 1976; however does not lie within a protected or no-entry zone.

Section 23 of the *Aboriginal Cultural Heritage Act 2003* (Qld) places all persons in Queensland under a duty of care to take all reasonable and practicable measures to ensure they do not harm Aboriginal cultural heritage (tangible and intangible) whenever they undertake an activity. An unexpected finds protocol will be implemented to provide guidance to site personnel in the event that an unexpended heritage find is encountered.

6.0 Conclusions

The purpose of this assessment was to provide supporting information to assist the DoEE to assess the proposal and potential impacts on MNES.

A desktop assessment was undertaken to identify EPBC Act listed species and/or their habitat that may occur within the vicinity of the proposal. Available literature and databases on regional and environmental context and observations made during site inspection informed the assessment of the likelihood of occurrence of MNES within the area of the proposal. For those species with potential to occur onsite, a preliminary indication of whether the action is likely to have a significant impact on MNES was assessed as per the MNES Significant Impact Guidelines 1.1 (DoEE, 2013).

Based on the conservative description of the proposal and associated construction and operation activities, the following potential impacts were identified and considered to have potential impacts on MNES:

- Increased marine vessel traffic with potential to increase interactions with marine fauna and risk of fauna strike causing stress, injury or fatality in proposal area and on associated cruise ship and supply vessel routes through Moreton Bay Marine Park or Commonwealth marine areas.
- Marine transport of fuel and refuelling activities, and potential risk that a plume resulting from a loss of containment may impact on the adjacent coast or sensitive areas.
- Construction activities, particularly piling, generating a noise propagation zone underwater that introduces short term temporary risks for marine species.
- Construction activities, particularly dredging, in the marine environment are expected to generate sediment plumes that have the potential to impact on water quality.
- Anthropogenic lighting during construction and operation of the cruise ship terminal.
- Increased traffic and noisy activities during landside construction has the potential to cause a temporary disturbance to the ambient acoustic and air environments and local habitats.
- Minor loss of already degraded native vegetation on the coastal fringe of Philip Park and temporary disturbance of coastal habitats.
- Introduction of weed and pest species.

Where a MNES has been identified as having potential to occur in the vicinity of the proposal, potential impacts of the proposal were identified and assessed to evaluate and effectively mitigate the risk that the proposal will have, or is likely to have, a significant impact on MNES. Specific avoidance, mitigation and management measures have been nominated to address the identified potential impacts.

This assessment concludes that the proposed action is not considered to trigger related controlling provisions under the EPBC Act and the proposed action is not a controlled action based on the following:

- The proposed site has been substantially modified by development and ongoing beach nourishment programs; permanent loss of coastal vegetation and fore dune habitats will be minimised.
- The proposed action is not within a Commonwealth marine area or reserve, and potential facilitated impacts of increased traffic on marine fauna will be managed in:
    - Regard to conditions under general approval for commercial vessel transit (shortest direct route) and regulatory requirements for interactions between vessels and cetaceans (EPBC Regulations 2000 – Part 8 Division 8.1 (Regulation 8.04 – Interacting with cetaceans) i.e.
        - § Vessels will not travel at greater than 6 knots within 300 m of a cetacean (caution zone) and minimise noise.
        - § Vessels will not approach closer than 50 m for a dolphin and/or 100 m for a whale (with the exception of animals bow riding).

- Proposed action is not within proximity of any World Heritage or National Heritage, and is therefore not expected to impact on such values. Historic 'Scottish Prince' ship wreck will be clearly demarcated within an exclusion zone to avoid interference so as not be impacted by the proposal.
- The proposed action is not expected to have a significant impact on a wetland of international importance or migratory species – potential for indirect impacts as a result of pollution (loss of containment) or increased traffic on Ramsar wetland or associated migratory species in Moreton Bay will be managed so as not to impact on such values, in accordance with:
  - Regard to designated shipping routes and vessel speed restrictions specified in the Moreton Bay Marine Park User Guide (2015).
  - Further detailed assessment of worst case loss of containment event and potential plume trajectory in local conditions as part of future environmental impact assessment process.
  - Maintain comprehensive emergency response systems and loss of containment controls, including state of the art equipment and trained personnel.
- The proposed action is not expected to have a significant impact on any listed threatened species or ecological communities – where interactions with terrestrial, marine and migratory fauna have been identified, specific avoidance, mitigation and management measures have been identified so as not to have a significant impact on populations or habitats, including:
  - Minimise disturbance of existing vegetation and habitats, and implement rehabilitation strategy prioritising revegetation with local native species.
  - Implementation of traffic controls such as designated routes and speed limits for terrestrial and marine vehicle movements.
  - Adopt sensitive design principles and selective construction methods to minimise potential environmental impacts (sediment and turbidity, noise, etc.) on terrestrial and marine environments and fauna.
  - Further detailed environmental assessment of the proposal will involve an investigation conducted by a specialist underwater acoustics consultant to identify the site-specific underwater noise propagation zones for piling in an open ocean environment.
  - Monitor safety zones to identify approaching marine mammals and implement operational procedures to minimise the risk of impacts upon them.
- Further site-specific environmental assessments will be undertaken as part of a State assessment process for project approval.

7.0 References

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Appendix A

General Arrangement

AECOM

STAFF PARKING

DUNE VEGETATION

BUS PORT

FORECOURT

TERMINAL HALL

BUS PORT

FORECOURT

DUNE VEGETATION

LOGISTICS

CAD REF:\\AUBNE1FP003\PROJECTS\60517891\4 TECH WORK AREA\4.11 LANDSIDE LAYOUTS\CAD\60517891-SK-0316.DWG

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OCEAN-SIDE CRUISE SHIP TERMINAL
LANDSIDE LAYOUT OPTIONS

60517891-SK-0316

AECOM

-19
-18
-17
-16
-15
-14
-13
-12
-11
-10
-5
0

WAVE RIDER BUOY
860m
80m
780m
CAISSON OR RUBBLE MOUND BREAKWATER
40m
450m
750m
450m DIAMETER SWING BASIN
450m DIAMETER SWING BASIN
WHARF
360m CRUISE SHIP
SCOTTISH PRINCE WRECK
235m
JETTY
PHILIP PARK

CH 1200m
CH 1100m
CH 1000m
CH 900m
CH 800m
CH 700m
CH 600m
CH 500m
CH 400m
CH 300m
CH 200m
CH 100m
CH 0m
CH -50m

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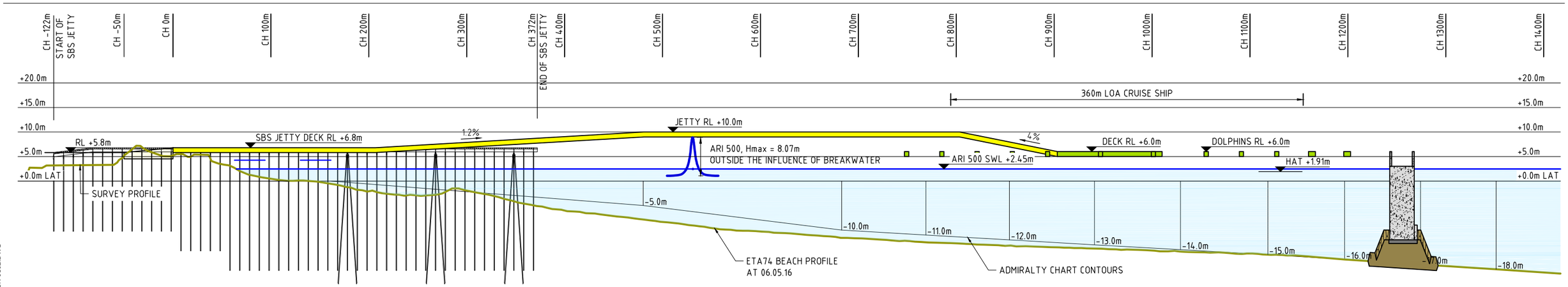
GENERAL ARRANGEMENT
PREFERRED LAYOUT - VISITING PORT OPTION
60517891-SK-0301



LONG SECTION - OPTION 3A

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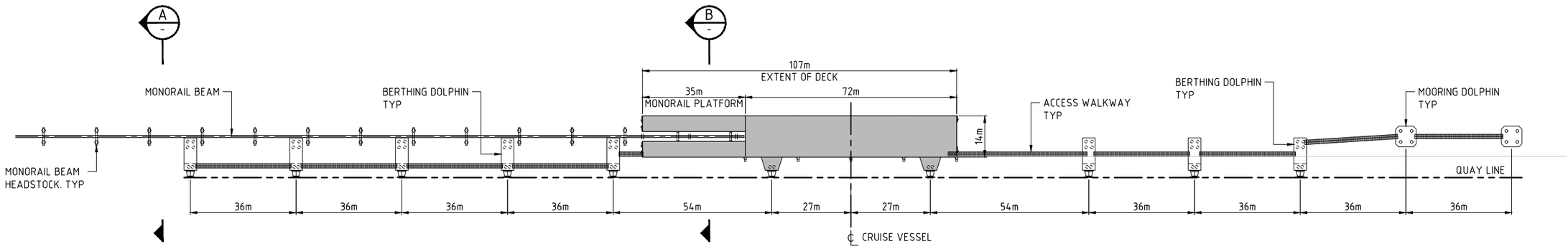
OCEAN-SIDE CRUISE SHIP TERMINAL
LONG SECTION
PREFERRED LAYOUT - VISITING PORT OPTION
60517891-SK-0302



PLAN - WHARF STRUCTURE

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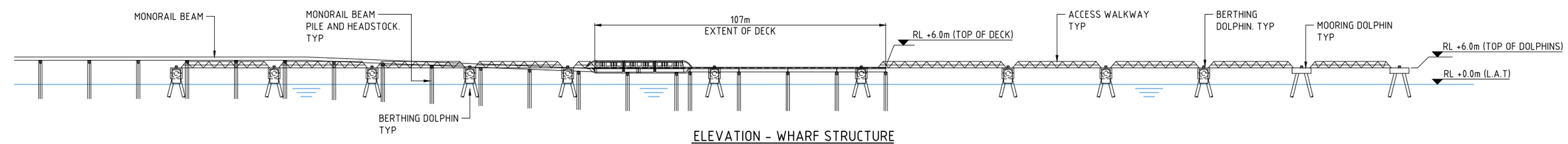
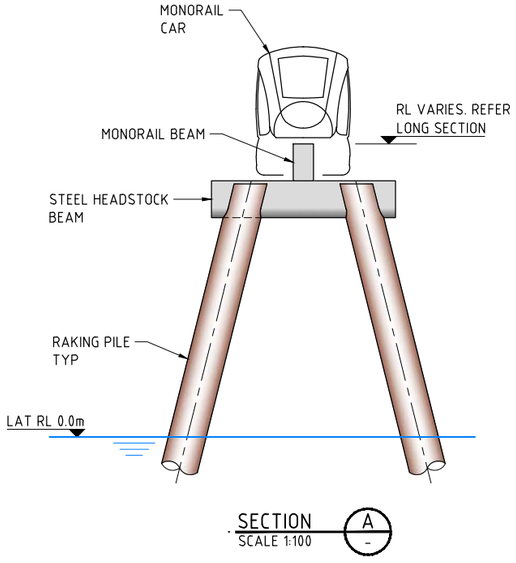


ELEVATION - WHARF STRUCTURE

SCALE 1:750



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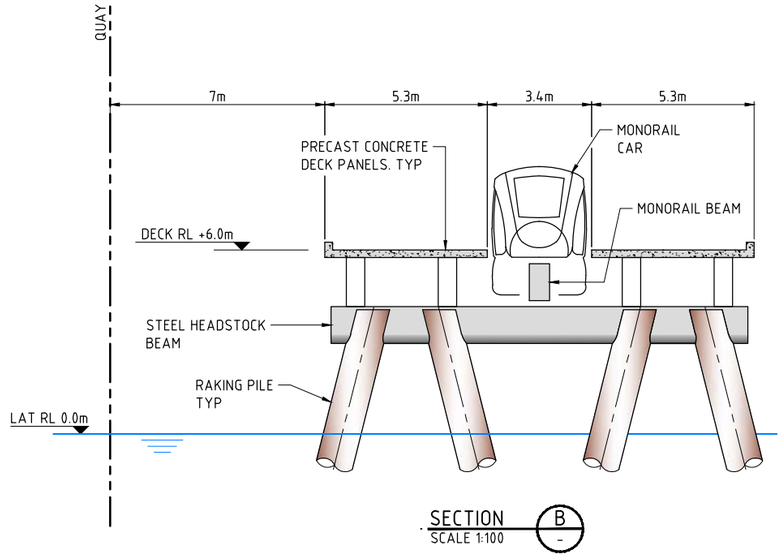

TYPICAL SECTION - MONORAIL PLATFORM

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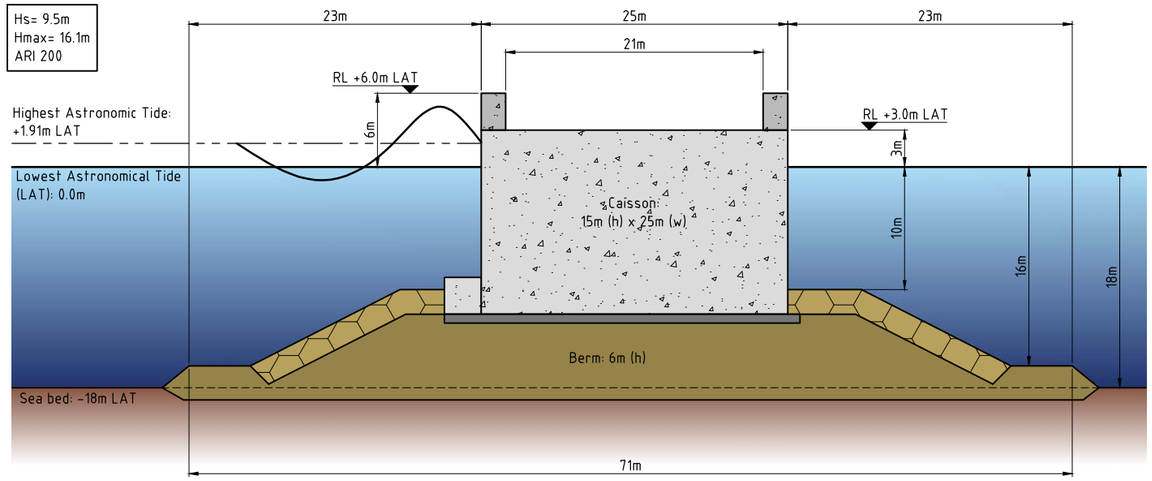
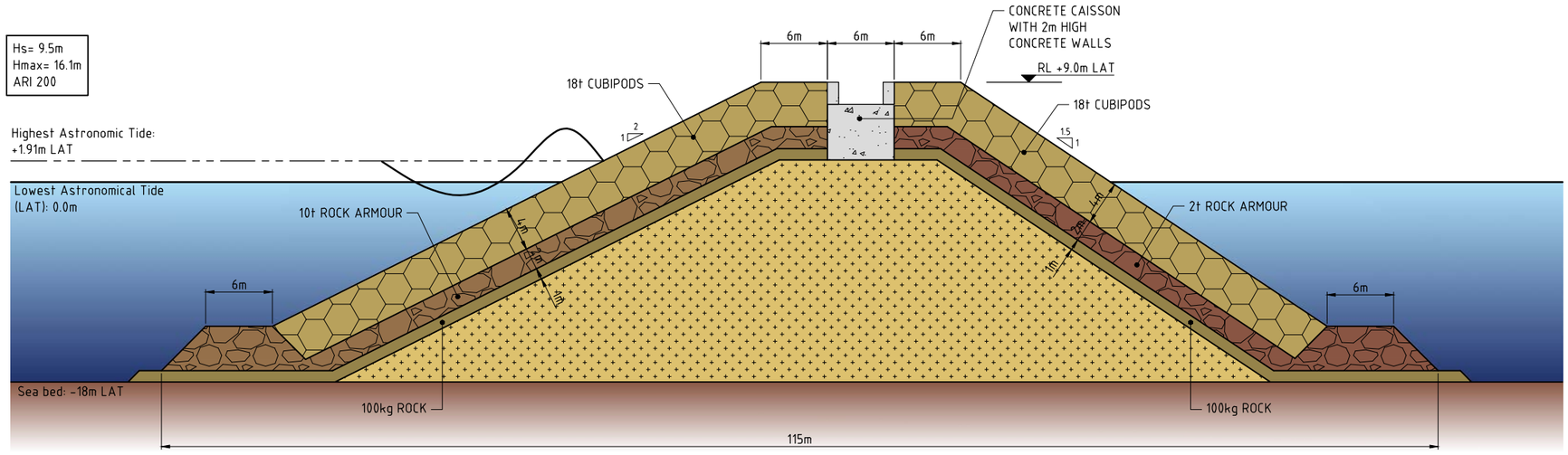
OCEAN-SIDE CRUISE SHIP TERMINAL
PLAN & SECTIONS
PREFERRED LAYOUT - VISITING PORT OPTION
60517891-SK-0303



PREFERRED OPTION: DETACHED BREAKWATER - CAISSON WITH DOUBLE CROWN WALL



ALTERNATIVE OPTION: DETACHED BREAKWATER - RUBBLE MOUND BREAKWATER

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SCALE C

0 5 10 12.5m

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OCEAN-SIDE CRUISE SHIP TERMINAL
BREAKWATER OPTIONS

60517891-SK-0304

AECOM

-19
-18
-17
-16
-15
-14
-13
-12
-11
-10
-5
0

N

860m
80m
780m
WAVE RIDER BUOY
CAISSON OR RUBBLE MOUND BREAKWATER
40m
450m
450m DIAMETER SWING BASIN
450m DIAMETER SWING BASIN
WHARF
360m CRUISE SHIP
750m
SCOTTISH PRINCE WRECK
235m
JETTY
PHILIP PARK

CH 1200m
CH 1100m
CH 1000m
CH 900m
CH 800m
CH 700m
CH 600m
CH 500m
CH 400m
CH 300m
CH 200m
CH 100m
CH 0m
CH -50m

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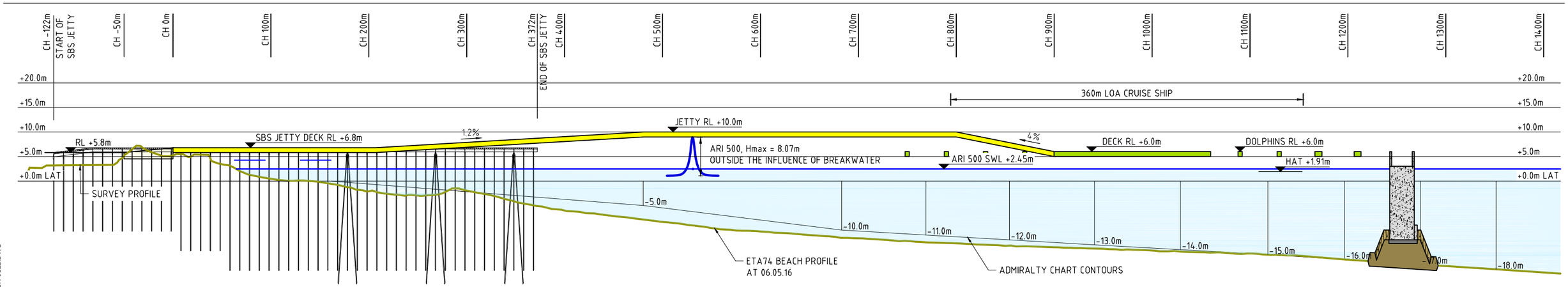
OCEAN-SIDE CRUISE SHIP TERMINAL
GENERAL ARRANGEMENT
PREFERRED LAYOUT - HOMEPORT OPTION
60517891-SK-0311



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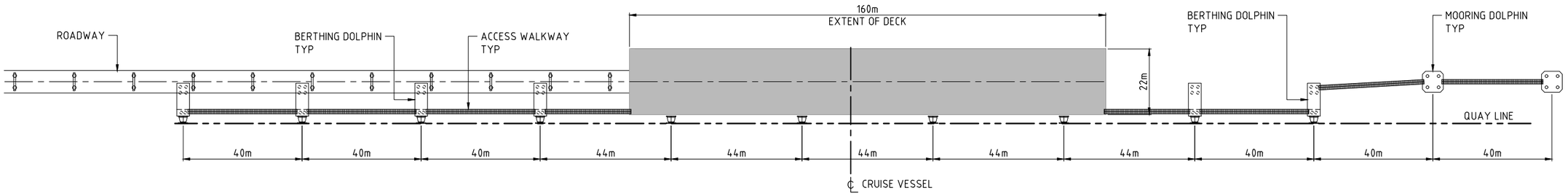
OCEAN-SIDE CRUISE SHIP TERMINAL

LONG SECTION

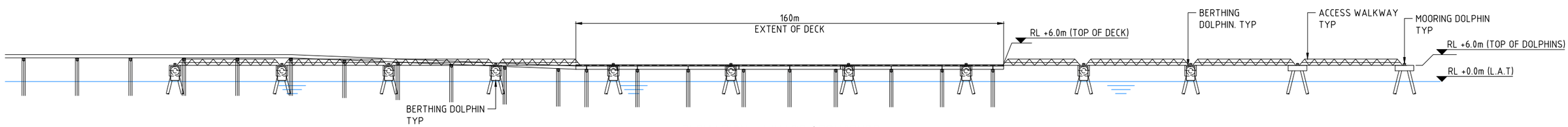
PREFERRED LAYOUT - HOMEPORT OPTION

60517891-SK-0312



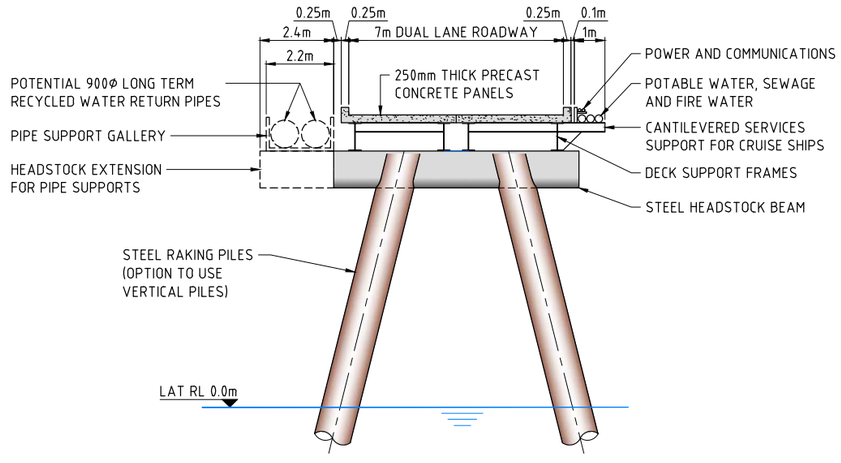
PLAN - WHARF STRUCTURE

SCALE 1:750



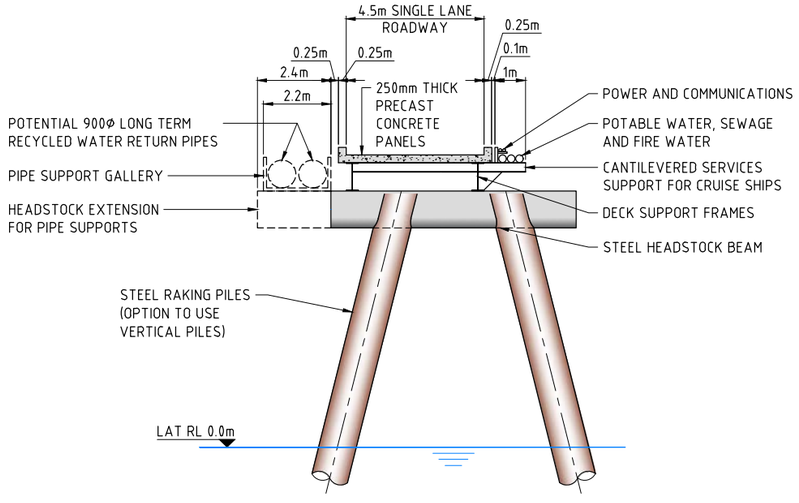
ELEVATION - WHARF STRUCTURE

SCALE 1:750



CROSS SECTION - JETTY ROADWAY 7m WIDE ROADWAY

SCALE 1:100



CROSS SECTION - JETTY ROADWAY 4.5m WIDE ROADWAY

SCALE 1:100

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SCALE E 0 1 2 3 4 5m
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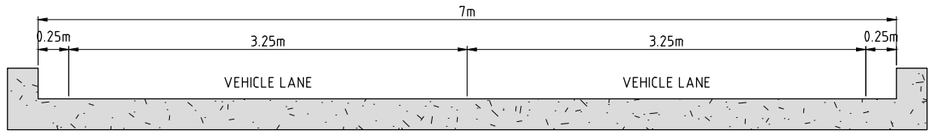
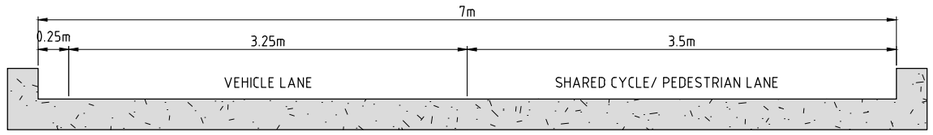
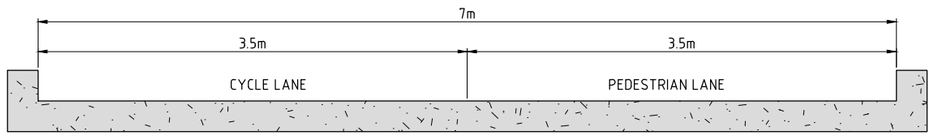
OCEAN-SIDE CRUISE SHIP TERMINAL
PLAN & SECTIONS
PREFERRED LAYOUT - HOMEPORT OPTION
60517891-SK-0314



7m WIDE ROADWAY JETTY USE - CRUISE SHIP AT BERTH



7m WIDE ROADWAYJETTY USE OPTION - NO CRUISE SHIP



7m WIDE ROADWAY JETTY USE OPTION - NO CRUISE SHIP

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OCEAN-SIDE CRUISE SHIP TERMINAL
ROADWAY USE OPTIONS
PREFERRED LAYOUT - HOMEPORT OPTION
60517891-SK-0315

Appendix B

Protected Matters Search

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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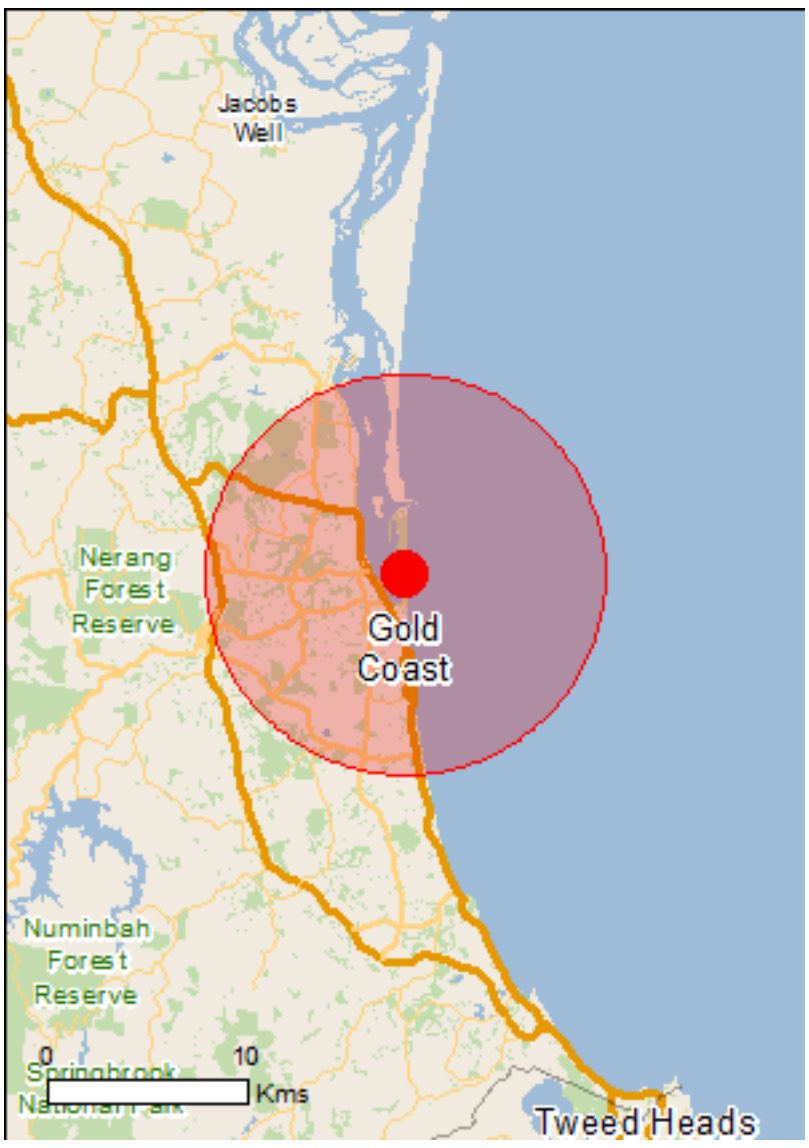

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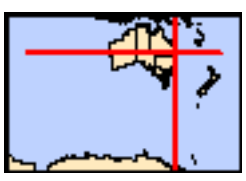

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	1
Listed Threatened Ecological Communities:	2
Listed Threatened Species:	75
Listed Migratory Species:	80

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	114
Whales and Other Cetaceans:	14
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	4
Regional Forest Agreements:	None
Invasive Species:	39
Nationally Important Wetlands:	2
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Moreton bay	Within Ramsar site

Commonwealth Marine Area [Resource Information]

Approval is required for a proposed activity that is located within the Commonwealth Marine Area which has, will have, or is likely to have a significant impact on the environment. Approval may be required for a proposed action taken outside the Commonwealth Marine Area but which has, may have or is likely to have a significant impact on the environment in the Commonwealth Marine Area. Generally the Commonwealth Marine Area stretches from three nautical miles to two hundred nautical miles from the coast.

Name
EEZ and Territorial Sea

Marine Regions [Resource Information]

If you are planning to undertake action in an area in or close to the Commonwealth Marine Area, and a marine bioregional plan has been prepared for the Commonwealth Marine Area in that area, the marine bioregional plan may inform your decision as to whether to refer your proposed action under the EPBC Act.

Name
Temperate East

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur

Name	Status	Type of Presence within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Fregetta grallaria grallaria White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian) [64438]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Pterodroma neglecta neglecta Kermadec Petrel (western) [64450]	Vulnerable	Foraging, feeding or related behaviour may occur within area

Name	Status	Type of Presence
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat may occur within area
Mammals		
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within

Name	Status	Type of Presence
		area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat known to occur within area
Plants		
Acacia attenuata [10690]	Vulnerable	Species or species habitat likely to occur within area
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area
Baloghia marmorata Marbled Balogia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat may occur within area
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area
Endiandra floydii Floyd's Walnut [52955]	Endangered	Species or species habitat likely to occur within area
Hicksbeachia pinnatifolia Monkey Nut, Bopple Nut, Red Bopple, Red Bopple Nut, Red Nut, Beef Nut, Red Apple Nut, Red Boppel Nut, Ivory Silky Oak [21189]	Vulnerable	Species or species habitat likely to occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area
Persicaria elatior Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat known to occur within area
Phebalium distans Mt Berryman Phebalium [81869]	Critically Endangered	Species or species habitat may occur within area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Syzygium hodgkinsoniae Smooth-bark Rose Apple, Red Lilly Pilly [3539]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
[Thesium australe](#) Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
[Zieria collina](#) [2178]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Delma torquata](#) Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
[Lepidochelys olivacea](#) Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Saiphos reticulatus](#) Three-toed Snake-tooth Skink [88328]	Vulnerable	Species or species habitat may occur within area
Sharks		
[Carcharias taurus (east coast population)](#) Grey Nurse Shark (east coast population) [68751]	Critically Endangered	Species or species habitat likely to occur within area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
[Pristis zijsron](#) Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
[Anous stolidus](#) Common Noddy [825]		Species or species habitat likely to occur within area
[Apus pacificus](#) Fork-tailed Swift [678]		Species or species habitat likely to occur within area
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area
Sterna albifrons Little Tern [813]		Breeding known to occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Lagenorhynchus obscurus Dusky Dolphin [43]		Species or species habitat may occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area
Manta alfredi Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Orcaella brevirostris Irrawaddy Dolphin [45]		Species or species habitat likely to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Roosting known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Roosting known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area

Name	Threatened	Type of Presence
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Heteroscelus incanus Wandering Tattler [59547]		Roosting known to occur within area
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Defence - SOUTHPORT TRAINING DEPOT
Defence - Training Ship Tyalgum

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Roosting known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Breeding likely to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Roosting known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Roosting known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area
Catharacta skua Great Skua [59472]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Roosting known to occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Species or species habitat may occur within area
Diomedea epomophora (sensu stricto) Southern Royal Albatross [1072]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans (sensu lato) Wandering Albatross [1073]	Vulnerable	Species or species habitat may occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Species or species habitat may occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Heteroscelus brevipes Grey-tailed Tattler [59311]		Roosting known to occur within area
Heteroscelus incanus Wandering Tattler [59547]		Roosting known to occur within area
Himantopus himantopus Black-winged Stilt [870]		Roosting known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area

Name	Threatened	Type of Presence
Limicola falcinellus Broad-billed Sandpiper [842]		Roosting known to occur within area
Limnodromus semipalmatus Asian Dowitcher [843]		Roosting known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting known to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Philomachus pugnax Ruff (Reeve) [850]		Roosting known to occur within area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [1043]		Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Sterna albifrons Little Tern [813]		Breeding known to occur within area
Thalassarche cauta (sensu stricto) Shy Albatross, Tasmanian Shy Albatross [64697]	Vulnerable*	Species or species habitat may occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Species or species habitat may occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa glareola Wood Sandpiper [829]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area
Fish		
Acentronura tentaculata Shortpouch Pygmy Pipehorse [66187]		Species or species habitat may occur within area
Campichthys tryoni Tryon's Pipefish [66193]		Species or species habitat may occur within area
Corythoichthys amplexus Fijian Banded Pipefish, Brown-banded Pipefish [66199]		Species or species habitat may occur within area
Corythoichthys ocellatus Orange-spotted Pipefish, Ocellated Pipefish [66203]		Species or species habitat may occur within area
Festucalex cinctus Girdled Pipefish [66214]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Filicampus tigris Tiger Pipefish [66217]		Species or species habitat may occur within area
Halicampus grayi Mud Pipefish, Gray's Pipefish [66221]		Species or species habitat may occur within area
Hippichthys cyanospilos Blue-speckled Pipefish, Blue-spotted Pipefish [66228]		Species or species habitat may occur within area
Hippichthys heptagonus Madura Pipefish, Reticulated Freshwater Pipefish [66229]		Species or species habitat may occur within area
Hippichthys penicillus Beady Pipefish, Steep-nosed Pipefish [66231]		Species or species habitat may occur within area
Hippocampus kelloggi Kellogg's Seahorse, Great Seahorse [66723]		Species or species habitat may occur within area
Hippocampus kuda Spotted Seahorse, Yellow Seahorse [66237]		Species or species habitat may occur within area
Hippocampus planifrons Flat-face Seahorse [66238]		Species or species habitat may occur within area
Hippocampus trimaculatus Three-spot Seahorse, Low-crowned Seahorse, Flat-faced Seahorse [66720]		Species or species habitat may occur within area
Hippocampus whitei White's Seahorse, Crowned Seahorse, Sydney Seahorse [66240]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Micrognathus andersonii Anderson's Pipefish, Shortnose Pipefish [66253]		Species or species habitat may occur within area
Micrognathus brevirostris thorntail Pipefish, Thorn-tailed Pipefish [66254]		Species or species habitat may occur within area
Microphis manadensis Manado Pipefish, Manado River Pipefish [66258]		Species or species habitat may occur within area
Solegnathus dunckeri Duncker's Pipehorse [66271]		Species or species habitat may occur within area
Solegnathus hardwickii Pallid Pipehorse, Hardwick's Pipehorse [66272]		Species or species habitat may occur within area
Solegnathus spinosissimus Spiny Pipehorse, Australian Spiny Pipehorse [66275]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Solenostomus cyanopterus Robust Ghostpipefish, Blue-finned Ghost Pipefish, [66183]		Species or species habitat may occur within area
Solenostomus paegnius Rough-snout Ghost Pipefish [68425]		Species or species habitat may occur within area
Solenostomus paradoxus Ornate Ghostpipefish, Harlequin Ghost Pipefish, Ornate Ghost Pipefish [66184]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area
Trachyrhamphus bicoarctatus Bentstick Pipefish, Bend Stick Pipefish, Short-tailed Pipefish [66280]		Species or species habitat may occur within area
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Mammals		
Dugong dugon Dugong [28]		Species or species habitat known to occur within area
Reptiles		
Aipysurus laevis Olive Seasnake [1120]		Species or species habitat may occur within area
Astrotia stokesii Stokes' Seasnake [1122]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Breeding known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area
Hydrophis elegans Elegant Seasnake [1104]		Species or species habitat may occur within area
Laticauda laticaudata a sea krait [1093]		Species or species habitat may occur within area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Breeding likely to occur within area

Name	Threatened	Type of Presence
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus		
Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and other Cetaceans [Resource Information]

Name	Status	Type of Presence
Mammals		
Balaenoptera acutorostrata		
Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni		
Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat may occur within area
Delphinus delphis		
Common Dophin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Species or species habitat likely to occur within area
Grampus griseus		
Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area
Lagenorhynchus obscurus		
Dusky Dolphin [43]		Species or species habitat may occur within area
Megaptera novaeangliae		
Humpback Whale [38]	Vulnerable	Congregation or aggregation known to occur within area
Orcaella brevirostris		
Irrawaddy Dolphin [45]		Species or species habitat likely to occur within area
Orcinus orca		
Killer Whale, Orca [46]		Species or species habitat may occur within area
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]		Breeding known to occur within area
Stenella attenuata		
Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus		
Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str.		
Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Coombabah Lake	QLD
Nerang	QLD
Pine Ridge	QLD
South Stradbroke Island	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat likely to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus africanus Climbing Asparagus, Climbing Asparagus Fern [66907]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Protasparagus densiflorus Asparagus Fern, Plume Asparagus [5015]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area

Nationally Important Wetlands	[Resource Information]
Name	State
Lake Coombabah	QLD
Moreton Bay	QLD

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-27.96214 153.42815

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Canberra ACT 2601 Australia
+61 2 6274 1111

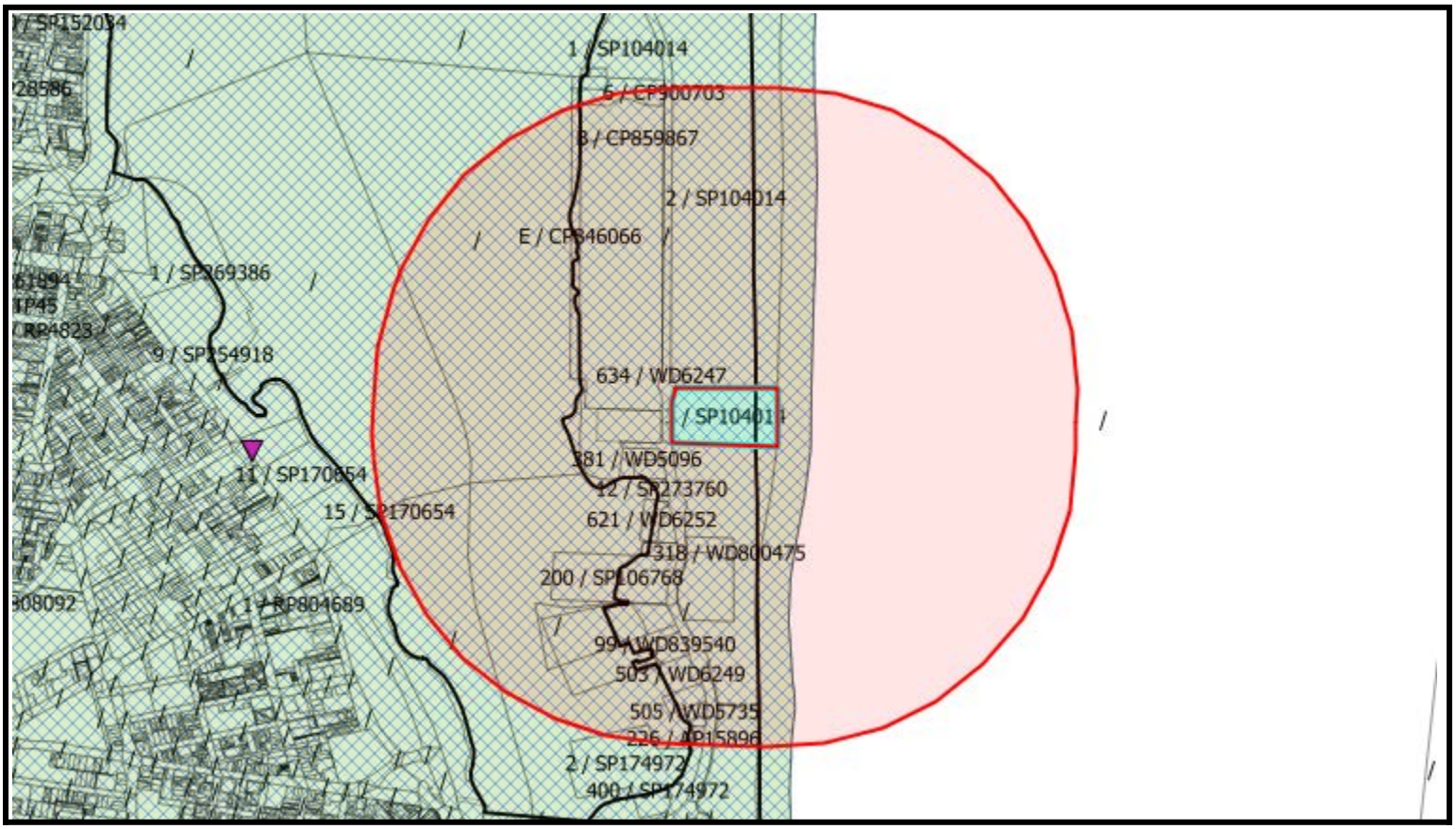
Appendix C

Cultural Heritage Search

Queensland Government
Department of Aboriginal and Torres Strait Islander Partnerships

Lot on Plan Search

Reference Number:	18294
Lot:	3
Plan:	SP104014
LGA:	Gold Coast City
Buffer Distance:	1000 metres



There are no Aboriginal cultural heritage site points recorded in your specific search area.

There are no Aboriginal cultural heritage site polygons recorded in your specific search area.

Feb 13, 2017, 12:33 PM

Queensland Government
Department of Aboriginal and Torres Strait Islander Partnerships

Lot on Plan Search

Cultural heritage party for the area is:

QC Ref Number	QUD Ref Number	Party Name	Contact Details
QC2006/010 PRC	QUD346/06	Gold Coast Native Title Group	Jabree Limited PO Box 1103 SOUTHPORT BC QLD 4215 Phone: 1300 558 923 Mobile: 0402 003 721 Email: info@gcntg.org.au

Cultural heritage body for the area is:

Body Name	Contact Details
Jabree Limited	Mr Wesley Aird Director PO Box 1103 Southport BC QLD 4215 Phone: 1300 558 923 Mobile: 0402 003 721 Email: info@gcntg.org.au

There are no cultural heritage management plans recorded in your specific search area.

There are no Designated Landscape Areas (DLA) recorded in your specific search area.

There are no Registered Study Cultural Heritage Areas recorded in your specific search area.

Regional Coordinator:

Name	Position	Phone	Mobile	Email
Andrew Rutch	Cultural Heritage Coordinator Southern Region	1300 378 401	0459 840 294	Andrew.Rutch@datsip.qld.gov.au

Queensland Government
Department of Aboriginal and Torres Strait Islander Partnerships

Lot on Plan Search

I refer to your application in which you requested advice on Aboriginal cultural heritage places recorded on the above location.

I wish to advise that no Aboriginal cultural heritage is recorded on the Cultural Heritage Database and Register in your specific search area, from the data provided by you. However, it is probable that the absence of recorded Aboriginal cultural heritage places reflects a lack of previous cultural heritage surveys of the area. Therefore, our records are not likely to reflect a true picture of the Aboriginal cultural heritage values of the area.

All significant Aboriginal cultural heritage in Queensland is protected under the Aboriginal Cultural Heritage Act 2003, and penalty provisions apply for any unauthorized harm. Under the legislation a person carrying out an activity must take all reasonable and practical measures to ensure the activity does not harm Aboriginal Cultural Heritage. This applies whether or not such places are recorded in an official register and whether or not they are located in, on or under private land.

Aboriginal cultural heritage, which may occur on the subject property, is protected under the terms of the Aboriginal Cultural Heritage Act 2003 even if the Department of Aboriginal and Torres Strait Islander Partnerships has no records relating to it.

Please refer to our website www.datsip.qld.gov.au/people-communities/aboriginal-and-torres-strait-islander-cultural-heritage for a copy of the gazetted Cultural Heritage duty of care guidelines, which set out reasonable and practical measures for meeting the duty of care.

Should you have any further queries, please do not hesitate to contact the approval officer on 1300 378 401.

Kind regards

The Director
Cultural Heritage | Community Participation | Department of Aboriginal and Torres Strait Islander Partnerships

Appendix D

Pre-referral Consultation Meeting Minutes

Minutes of meeting

Project/Client:	City of Gold Coast
Date & time:	31 January 2017
Location:	Canberra - Department of the Environment and Energy (DoEE)
Attendees:	
PwC:	Michael Hassall (PwC), Elisha Bawden (AECOM), Dylan Porter (AECOM)
Other:	Malcolm Wares, Justin Keast, Rachael Carter, Peter Benson (all DoEE).
Apologies:	Luke Adair - City Gold Coast
Subject:	Gold Coast Cruise Terminal EPBC Pre-Referral Meeting

Prior minutes
None – first meeting

Introductions and purpose of Meeting
The purpose of the meeting is to introduce the project to the DoEE and identify key issues prior to lodgement.

Summary of outcomes of Meeting
The key items that were identified as potential issues for consideration by DoEE were:

- Sea dumping and dredging
- Fuel transport and emergency spill response
- Migratory Species – terrestrial and marine
- Commonwealth Marine areas (offshore)
- Noise during construction
- Vessel movements and potential impact on.

These issues are discussed in detail below. At this stage PwC and AECOM consider that these issues can be mitigated so that there is not a significant impact on Matters of National Environmental Significance (MNES) and the referral could receive a Not Controlled Action (NCA) decision.

Background and Status of Study

PwC and AECOM provided a brief overview of the history of the project and the process to date:

- Project background including previous Government studies and private sector proposals
- ASF Proposal for Wavebreak Island
- Current State Government direction for no development on the northern end of the Spit or in Broadwater
- Revised ASF proposal at the southern end of the Spit with no cruise terminal
- City of Gold Coast commences feasibility study for Ocean-Side Cruise Terminal.

Options Assessment

PwC and AECOM provided an overview of the Options analysis undertaken for an Ocean-Side Cruise Ship Terminal:

- Location assessment and preferred location at Philip Park
- Options for jetty, wharf and breakwater arrangements
- Preferred option:
    - Jetty, in line wharf including length of Jetty
    - Berths for 2 cruise ships
    - Breakwater
    - Height of jetty in relation to wave heights
- Base port vs transit port considerations. Stating that a base port is the ultimate development outcome for the project with some staging of infrastructure to reach this outcome.

Likely triggers of MNES

AECOM spoke to the key matters that have been identified as the potential MNES through desktop searches and through previous project experience.

1. **DOEE** – Noted and agreed with the species identified. In addition the Southern Right Whale was highlighted as occurring in the area and not populations not recovering. A whale was killed in the last 24 months due to boat strike in the Moreton Bay Marine Park.

Key Issues (Questions and Answers)

The remainder of the meeting consisted of a series of questions and answers to explore the potential for impact on MNES prior to formal lodgement of the referral.

Questions and key issues

Design development and project scope change

2. DoEE – How final will the design be at the time of referral, what is the scope or possibility of changes?
    a. The intention is to lodge the referral to DoEE and seek a NCA decision prior to the Business Case being considered by the Council of the City of Gold Coast.
    b. The project scope and design is currently considered as a conservative case in terms of the impact on MNES. It therefore outlines the greatest possible extent of the project with potential staging to reach that outcome.
2. DoEE – The Department's assessment will consider how changes to the design could alter the level of impact on MNES. If there is too much change with more impact, it could invalidate the prior assessment and determination. The level of impact will be driven by the construction methodology for the key elements of the piles and breakwater.

***Port* operations**

1. DoEE – Who would control the port operations?
    a. This matter will be explored during the Business Case and further environmental assessment stage.
    b. Various options have been considered in the past including Gold Coast Waterways Authority and the Port of Brisbane.

Services and infrastructure required at facility

1. DoEE – What are the services that are required at the facility?
    a. A Base will require a full suite of services at the facility including refuelling, water supply, solid waste and sewage disposal, electricity supply
2. DoEE – How would the fuel be transported and delivered, what are the risk associated with the transport, and what emergency response procedures are available in the location in the event of a fuel spill?
    a. The fuel would be delivered by barge, which is the method of delivery in Brisbane and Sydney. It has not been established which fuel supplier in Brisbane would supply the fuel. It is expected that the operations of the barge will be controlled by an existing fuel provider (BP, Caltex) from Brisbane and would make use of existing systems, controls, and work processes.
    b. The detailed planning for a terminal would need to include controls to prevent marine fuel and oil spills and suitable emergency responses in the event of a spill. This may require dedicated facilities and materials at the terminal.
    c. The referral should consider the facilitated impacts associated with the project, for example increased risk associated with a fuel barge navigating through the Moreton Bay Marine Park to the terminal.
3. DoEE – could consider modelling of a fuel / oil spill to verify potential impacts on MNES.

Dredging and sea dumping

1. DoEE – Will there be any dredging and sea dumping?
    a. Dredging - The facility has been designed to not require any capital or operational dredging for the manoeuvring and berthing of ships. Dredging of sand is an option that may be considered for filling caissons.
    b. The City has current approvals for dredging for beach replenishment and erosion control.
    c. Sea dumping – The design includes placing rock armour as a bedding material and protection for the caisson structure and will require the caisson to be filled with material (likely sand) once in place.
2. DoEE – Sea dumping is less likely to be triggered if it is used for a specific purpose, as described for the rock armour and the caisson fill.
3. DoEE – The impact assessment will need to consider the source of the material, which is the rock and the sand fill in the example above. Assessment would also consider the type of material that is proposed to be used and whether it could be a potential source of contamination.

Vessel movements

1. DoEE – Information was requested regarding the likely increase in vessel movements associated with the terminal. This would include the operation of cruise ships and any support craft. Operational Vessels may transit through Commonwealth Marine Area and Marine reserves, if so, then it will need to be considered by the Commonwealth in the assessment.
    a. The Marine Area is located approximately 150km offshore from the Gold Coast. Would the terminal cause a greater number of ships to navigate through those waters?

Flora

1. DoEE – Is there seagrass in the area?
    a. Does not appear to be in any of the previous studies and literature. A future assessment such as an EIS would include more detailed surveys.
2. DoEE – would there be any impact on shore side flora, is there any impact on important habitat for migratory or species on the MNES?
    a. The land side site is proposed to be in Philip Park on the Spit. This site is predominantly cleared for a carpark and beach access and the remaining vegetation is of low environmental value. Any area to be cleared to construct and operate the facility would be a small portion of the Philip Park site.

Ship wreck

1. AECOM – The Scottish Prince wreck is in the vicinity of the proposed cruise terminal and the design has sought to limit any potential impact on the wreck. Is DoEE able to obtain any advice from other departments regarding conditions to protect the wreck during the construction and operations phase?
    a. DoEE (Justin Keast) undertook to make enquiries within DoEE and other agencies and provide information to AECOM if available.

Lighting

1. DoEE – What would the lighting impact be for the jetty and wharf during normal operations, and with a cruise ship docked? What lighting would the cruise ship have on for an overnight stay?
    a. The concept design includes subdued lighting for the wharf that would make it visible but would not cast light into the sea. The intent of this is to minimise any potential impact on attracting species to the area (turtles, fish, sea mammals etc.).

Construction method and noise impacts

1. DoEE – The referral and supporting studies will need to consider the noise impact of the piling and other construction activities.
    a. The referral will need to acknowledge the noise impact including the likely times of year that the piling will be completed, and outline a process to establish suitable controls and management plans.
    b. Consider scheduling works to avoid seasonal whale migration.
    c. Consider modelling underwater noise propagation to assess area of potential impact to allow for detailed risk contr0ls and mitigation strategies to be developed (e.g. monitoring zone, shutdown, etc.). Otherwise, allow for future studies as part of an EIS.
    d. AECOM – based on mitigation from other projects a spotter would be employed with activities ceasing if specimens are identified. In additional a 'slow start up' would be implemented to provide for a gradual increase in noise. Similar methods implemented in Gladstone. Stated as undesirable for all work to cease during migration season.

Potential impact on humpback whale and southern right whales

1. DoEE – The referral will need to consider the potential impact on the migration patterns of Humpback whales and Southern Right wales. This will include analysis of the potential risks and controls to prevent ships striking marine animals including whales. There is an increased focus on Southern Right wales following the ferry striking and killing one in Moreton Bay. Refer to species-specific Recovery Plans available online https://www.environment.gov.au/biodiversity/threatened/recovery-plans

Identifying mitigation strategies

1. The referral and supporting documentation should look to include detailed mitigation strategies to manage the impact on MNES. Where mitigation strategies are not in place, the referral should outline the process and level of commitment to developing the mitigation strategies.

    Refer to industry guidelines for avoiding, assessing and mitigating impacts on migratory shorebirds available online http://www.environment.gov.au/system/files/resources/67d7eab4-95a5-4c13-a35e-e74cca47c376/files/shorebirds-guidelines.pdf

Environmental Assessment Process

EPBC Act and State Assessment Process

1. DoEE – The referral will need to document the preferred assessment process and timing. DoEE decision on referral and assessment approach to confirm how the EPBC matters will be dealt with in assessment process going forward in the event of a Controlled Action decision.
2. DoEE – The DoEE will provide referral information for public comment during the assessment process.
3. DoEE – Once a decision on referral and assessment approach is made, it cannot be repealed and a new referral will be required if the assessment approach changes. If it is likely that a controlled action will be declared, there is opportunity to 'stop the clock' to allow the assessment process to be determined and coordinated with Queensland State Government.
4. PwC – Do we need to define the assessment process (EIS) as part of the referral?
    a. DoEE - if possible. There will be consultation between the State and Commonwealth Governments at the time of considering the EPBC Act referral, should it be a controlled action decision.

Next Steps

1. Any follow up questions can be directed to Justin Keast prior to lodgement.
2. AECOM and PwC will continue to prepare referral documents and will consult with the City to determine optimal strategy for environmental impact assessment and planning approvals.

Future Meetings

TBD.