



**PORT of TOWNSVILLE**  
Nexus North Queensland

## **Appendix D Marine Precincts EPBC Referral**

**Townsville Marine Precinct Project**  
Environmental Impact Statement





## Australian Government

### Department of the Environment, Water, Heritage and the Arts

Referral of proposed action

What is a referral?

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) protects matters of national environmental significance (NES), and the environment, in relation to Commonwealth actions, and actions on (or impacting upon) Commonwealth land. The purpose of a referral is to determine whether your proposed action will need formal assessment and approval under the EPBC Act.

Your referral will be the principal basis for the Minister for the Environment, Heritage and the Arts' decision as to whether approval is necessary and, if so, the type of assessment that will be taken. These decisions are made within 20 business days.

When do I need to make a referral?

A referral must be made for actions that are likely to have a significant impact on matters protected by Part 3 of the EPBC Act:

- World Heritage (sections 12 and 15A)
- National Heritage places (sections 15B and 15C)
- Wetlands of international importance (sections 16 and 17B)
- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A)
- Protection of the environment from nuclear actions (sections 21 and 22A)
- Marine environment (sections 23 and 24A)
- Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
- Protection of the environment from Commonwealth actions (section 28)

OR

- actions that may have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land)

- actions taken on Commonwealth land that may have a significant impact on the environment generally
- actions by Commonwealth Authorities that are likely have a significant impact on the environment require approval.

You may still make a referral if you believe your action is not going to have a significant impact, or if you are unsure.

To help you decide whether or not your proposed action requires approval (and, therefore, if you should make a referral), read the following documents, available from the Department web site:

- the Policy Statement titled *Principle Significance Guidelines 1.1 – Matters of National Environmental Significance*. Additional sectoral guidelines are also available.
- the Policy Statement titled *Principle Significance Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies*.
- the interactive map on the web site—enter a location to obtain a report on what matters of NES may occur in that location.

A staged or component action

An action that is a component of a larger action may not be accepted separately and may require referral of the larger action for consideration under the EPBC Act. Refer to *Fact Sheet 6: Staged Developments/Split Referrals*.

If you want to make a referral for a staged or component referral, contact the EPBC Act Referrals Section (1800 803 772).

Permits

Some activities may also require a permit under other sections of the EPBC Act, whether or not approval is required. Information is available on the Department web site.

Completing the referral form

Completing this form will help ensure that you submit the information required by the EPBC Regulations.

All referrals MUST be published on the Department's web site for public comment (the Department will arrange this) and should generally be:

- readily understood by the public
- no longer than 25 A4-sized, single-sided pages
- typed (main text no smaller than 11 points)
- have clearly legible maps and diagrams
- supplied unbound or electronically.

Provide supporting documentation, such as environmental reports or surveys, as attachments. However, the referral form must contain the core information, so that it provides an adequate basis for public comment and decision-making.

Provide coloured maps, figures or photographs to help explain the project and its location. Aerial photographs, in particular, can provide a useful perspective and context. Figures should be good quality as they may be scanned and viewed electronically as black and white documents. Maps should be of a scale that clearly shows the location of the proposed action and any environmental aspects of interest.

Using the MS Word file to enter your information

You can complete your referral by entering your information into this Word file.

Instructions are provided in green text. If you do not see the instructions you need to reveal 'hidden' text. A toolbar with buttons to turn the instructions on and off should be visible when you open the file.

Normally the instruction text will not print. (If you wish to print a copy of the form with the instructions you will need to select the Options button in the Print dialog and select Hidden text.)

Submitting the referral form

By mail to

EPBC Act Referrals Section  
Environment Assessment Branch  
Department of the Environment,  
Water, Heritage and the Arts  
GPO Box 787  
CANBERRA ACT 2601

By fax to 02 6274 1789

- Referrals must be of sufficiently clear quality to be scanned into electronic format.
- Address the fax to the mailing address, and clearly mark it as a 'Referral under the EPBC Act'.
- Follow up with a mailed hardcopy including copies of any attachments or supporting reports.

By email to

[epbc.referrals@environment.gov.au](mailto:epbc.referrals@environment.gov.au).

- Clearly mark the email as a 'Referral under the EPBC Act'.
- Attach the referral as a Microsoft Word file and, if possible, a PDF file.
- To ensure file sizes are not too large (below two megabytes), enclose maps and figures as separate files if necessary. If unsure, send a question to the email address.
- Follow up with a mailed hardcopy including copies of any attachments or supporting reports.
- What happens next?

The Department will write to you at the end of the 20 business day period to advise you of the outcome of your referral and whether or not formal assessment and approval under the EPBC Act is needed. There are three types of decisions about the referral.

The proposed action is NOT LIKELY to be significant and does NOT NEED approval

No further consideration is required under the environmental assessment provisions of the EPBC Act and the action can proceed (subject to any state or local government requirements).

The proposed action is NOT LIKELY to be significant IF undertaken in specified manner

The specified manner in which you must carry out the action will be identified as part of the final decision. You must report your compliance with the specified manner to the Department.

The proposed action is LIKELY to be significant and does NEED approval

The proposed action is subject to a public assessment process before it can be considered for approval. The level of assessment will be decided at the same time. (Further information about the levels of assessment and basis for

deciding the approach are available on the web site.)

If the action is likely to be significant it is called a *controlled action* and the particular matters upon which the action may have a significant impact (such as World Heritage or threatened species) are known as the *controlling provisions*.

#### Compliance audits

The Department may audit your project at any time to ensure that it was completed in accordance with the information provided in the referral or the stated particular manner. If the project changes, such that the degree of significance could vary, you should write to the Department to advise of the changes, and likely significance, or discuss with the EPBC Act Referrals Section (1800 803 772).

#### For more information

- call the Department of the Environment, Water, Heritage and the Arts Community Information Unit on 1800 803 772 or
- visit the web site [www.environment.gov.au/epbc](http://www.environment.gov.au/epbc)

All the information you need to make a referral, including documents referenced in this form, can be accessed from this web page.

## Referral of proposed action

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Project title	Port of Townsville: Marine Precinct
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### 1 Contacts

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1.1 Referring party	Person, agent or agency who is making the referral  Townsville Port Authority Benwell Road, South Townsville PO Box 1031, Townsville QLD 4810 (07)4781 1500 <a href="mailto:info@townsville-port.com.au">info@townsville-port.com.au</a>
1.2 Responsible party	Person responsible for or who will carry out the proposed action. If same as 1.1, write 'as above' Barry Holden Chief Executive Officer Townsville Port Authority As Above
1.3 Proponent	Person responsible for preparing assessment documentation, if approval is required. If same as 1.2, write 'as above' Julie Keane Senior Environmental Planner GHD Pty Ltd PO Box 668, Brisbane QLD 4000 (07) 3316 3940 <a href="mailto:julie.keane@ghd.com.au">julie.keane@ghd.com.au</a>

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## 2 Summary of proposed action

**NOTE: You must attach an A4 size map/plan(s) showing the location and approximate boundaries of the area in which the project is to occur. The summary below should encompass any alternative locations, timeframes or activities that are listed in Section 3.2.**

- 2.1 Short description Through development of a commercial and recreational marine precinct at the mouth of Ross River (hereafter referred to as the Marine Precinct), Townsville Port Authority (TPA) seeks to provide an opportunity to:
- › Relocate commercial marine facilities away from expanding inner city residential precincts;
  - › Provide alternative mooring space for private and commercial vessels currently moored upstream of the proposed Port Access Road bridge;
  - › Co-locate marine-related commercial industries in a purpose-built facility with best-practice environmental management infrastructure;
  - › Relocate the recreational boat ramp facility currently on Sir Leslie Thies Drive.

The proposed Marine Precinct will require the reclamation of Lot 773 on EP2211 and provision of a breakwater at the eastern channel entrance to Ross River (Figure 1).

2.2 Latitude and longitude	location point	Latitude			Longitude		
		degrees	minutes	seconds	degrees	minutes	seconds
	Centre of Site	19	15	48	146	50	11
	Mouth of Ross River	19	16	13.4	146	50	03.8
	Archer Street/ Benwell Road Juncture	19	15	48.9	146	50	0.85
	Boundary Street Carpark	19	16	03	146	50	06.2

2.3	Locality	The Port of Townsville is located within the dry tropics of the north Queensland coast. Townsville's Port represents a gateway facility not only for the adjoining Great Barrier Reef World Heritage Area (GBRWHA), Magnetic Island and the surrounding coastal environments, but also inland northern Australia. The Port of Townsville is situated at the mouth of the Ross River in Cleveland Bay, an area that is defined by Cape Pallarenda, Cape Cleveland and includes Magnetic Island. The proposed Marine Precinct will be situated at the mouth of the Ross River in Cleveland Bay.	
2.4	Size of the development footprint or work area (hectares)	The proposed Marine Precinct will require the reclamation of lands on Lot 773 on EP2211. The total area of development on this Lot will be approximately 34 hectares (ha), extending south from the Benwell Road Beach.	
2.5	Street address of the site	The proposed Project area runs parallel with Benwell Road, South Townsville and incorporates Lot 773 on EP2211 as well as vacant land across the mouth of Ross River. All the proposed works lie within the declared Port Limits of the TPA.	
2.6	Lot description	Lot 773 on EP 2211 (Leasehold Land). This site is designated for marine facilities by TPA. An area across the mouth of Ross River will also be required for a breakwater and pile moorings (Figure 1).	
2.7	Local Government Area and Council contact (if known)	Townsville City Council	
2.8	Project life	The construction of the Project is proposed to begin in 2010. The operational life of the Project is expected to be 25 years +.	
2.9	Alternatives	<input type="checkbox"/>	No
		<input checked="" type="checkbox"/>	Yes, complete section 3.2
2.10	State assessment	<input type="checkbox"/>	No
		<input checked="" type="checkbox"/>	Yes, complete Section 3.5
2.11	Component of larger action	<input checked="" type="checkbox"/>	No
		<input type="checkbox"/>	Yes, complete Section 3.6

### 3 Detailed project description

**NOTE:** The proposal described here is the action(s) on which ALL subsequent decisions under the EPBC Act will be made, including decisions on significance, level of assessment (if needed) and approval (if needed). It is therefore important that the description is complete and includes all components and activities associated with the action, as well as any specific alternatives to be assessed. If certain related components are not intended to be included within the scope of the referral, this should be clearly explained in Section 3.6.

### 3.1 Description of proposal

The concept of a marine precinct centred on a new slipway at the mouth of Ross River has been proposed in various forms since 1977. With increasing trade, commercial and residential growth in Townsville, strategic planning activities for the city have focussed on providing opportunities to relocate existing old commercial marine facilities spread around Ross Creek and South Townsville into a new, purpose-built facility on Ross River, which will incorporate current best practice environmental management.

In 1991 the first environmental studies commenced to examine the potential impacts of developing a Marine Precinct in the eastern port area. An EIS was finalised in 1995. More recent strategic planning activities in Townsville (Port Development Plan, Townsville City-Port Strategic Plan, TPA Draft Land Use Plan) focus on the Port Interface Area and provide a coordinated vision for the provision of key infrastructure in a timely manner.

TPA has justified capital investment in the proposed development on the basis that the following benefits will be derived:

- » Provision of a Marine Precinct sheltered from prevailing wind and waves where commercial marine activities in Townsville can be consolidated;
- » Provision of a sheltered swing basin for commercial vessels;
- » Provision of an area in Ross River for relocation of the existing trawler fleet and private vessels on upstream pile moorings and for future growth (pile moorings) which is expected to be substantial. The relocation of trawlers and private vessels on pile moorings needs to occur prior to completion of the bridge linking the Port Access Road to Townsville Port;
- » Restriction of westward longshore sediment transport into the navigation channel and subsequent reduction in the requirement to dredge in the longer term;
- » Provision of a mooring area for vessels currently on buoy moorings in Ross Creek and at anchor in the 'duckpond'; and
- » Relocation of recreational boat ramp facilities and parking from Sir Leslie Thiess Drive and consequent reduction of non-commercial vessel traffic through the harbour.

The concept master plan for the proposed Marine Precinct incorporates onshore and offshore elements, which are listed below. A concept layout is depicted in Figure 1. The two breakwater options represent putative maximum and minimum configurations of a protective breakwater. Hydrological and sediment transport investigations during the EIS phase will assist in the location and configuration of a final breakwater design.

**Access to the Precinct:** A dedicated access point will be provided from Benwell Road. The final design of the access is still under negotiation with the QLD Department of Main Roads in relation to the Port Access Road/Benwell Road interface.

**Volunteer Coastguard:** The relocation of the Coastguard office and mooring is proposed for this area, providing an opportunity for the public to log their trips before departure and efficient departure in the event of an emergency.

**Private pile moorings:** The inside of the breakwater will accommodate a minimum of 53 pile moorings relocated from upstream in Ross River. There will be the opportunity for provision of additional pile moorings at a later date should demand arise.

**Trawler berths:** Approximately 40 trawler berths and two trawler maintenance berths are proposed for the marine precinct.

**Boat ramps and car/trailer parking bays:** Public boat ramps and a 200-space parking area will be provided to replace those on Sir Leslie Thiess Drive. The new boat ramp will provide a sheltered environment for recreational boats entering Cleveland Bay.

**Marine industry allotments:** A commercial slipway, barge ramp, ship-lift, docking facility and associated marine facilities are proposed for the Marine Precinct. An area at the northern end of the precinct will allow for access and manoeuvrability of large vehicles (including delivery vehicles

and straddle lifts). A swing basin will be central to the industry allotments. A rack and stack vessel storage system is being considered as an option by one of the commercial operators.

Services: The full range of site services including power, water, sewerage, stormwater drainage and telecommunications will be provided to the proposed development. Due to evolving legislative changes to wastewater requirements in the GBRWHA, a sullage pump out facility may be required.

Breakwater: Putative maximum and minimum configurations are illustrated in the concept layout (Figure 1). Hydrological, sediment transport and other investigations to be undertaken during the EIS phase will inform the design process and allow the best possible final configuration to be determined. A breakwater is needed to:

- » Provide shelter for the commercial marine area and pile moorings from prevailing wind and waves;
- » Provide a sheltered swinging area for commercial vessels;
- » Provide a sheltered departure point to Cleveland Bay for smaller recreational boats;
- » Restrict westward longshore sediment transport into the navigation channel and reduce the requirement to dredge the Ross River channel in the longer term;
- » Provide an effective barrier between the common use areas and the sensitive environmental areas to the east; and
- » Allow sand to accrete on the eastern side of the wall to provide an alternative migratory bird roosting and nesting area.

Dredging: TPA undertakes an approved program of maintenance dredging to maintain the navigability of channels, within the Port area, including Ross River. The Ross River channel dredging program is sufficient to provide access for the commercial, Defence and recreational vessels that currently use Ross River. It is not anticipated that development of the Marine Precinct will increase the requirement for maintenance dredging. On the contrary, provision of a breakwater on the eastern side of the development is expected to reduce the requirement for maintenance dredging of the Ross River channel in the longer term.

Potential dredge volumes are presented in Figure 2. Capital dredging will be required for the initial development of the Marine Precinct to obtain the necessary depth for vessel movements. Capital dredging will also be required to provide a swing basin and mooring area for the pile moorings adjacent to the breakwater. The depth and volume of dredge material will be determined by final design after further investigation during the EIS phase. Dredging will vary across the hatched areas i.e. there will be a channel, swing basin and pile mooring area dredged initially to cater for existing vessels on pile moorings relocated from upstream. The requirement for further capital dredging will be driven by demand for additional pile moorings.

Dredge spoil will be used as reclaim fill for the Marine Precinct (Lot 773). The preferred method of dredging to reclaim would be to use a cutter suction dredge discharging through pipes directly into the reclamation area. Any material that is determined unsuitable as engineering fill may be extracted with an excavator rather than cutter suction dredge.

Offshore dumping may be considered for the disposal of unsuitable fill though this is not a preferred option. The EIS will include a review of both onshore and offshore disposal options, with the potential impacts of both options feeding into the considerations for the preferred breakwater configuration.

3.2 Alternative locations, time frames or activities that form part of the referred action  
Design options for the breakwater will be investigated further during the EIS investigation phase. Alternatives considered to date are outlined below.

If the Marine Precinct is to proceed, the 'no breakwater' option is not an acceptable option for the following reasons:

- » No protected anchorage in which to moor boats from upstream on pile moorings;
- » No protection for pile moorings from flood flows in Ross River;
- » No protection for the Marine Precinct from wind and waves;
- » No protection for the navigation channel from longshore sediment flow; and
- » No barrier to increased access to the sensitive environmental areas in eastern Cleveland Bay

#### *Option 1: Longer more distant breakwater option*

This is the preferred option but it will be investigated fully during the EIS process along with other options. Potential advantages of this option include:

- » A large area available for pile moorings (for upstream vessels) including an allowance for growth;
- » Protection for moored vessels during flood events in Ross River (pile moorings would be located out of the main flow channel);
- » Protection for moored vessels from boat wash from vessels motoring up Ross River;
- » Channel width sufficient for a swing circle by large vessels that may use the Marine Precinct in the future (not including ships); and
- » Potential to provide a sandy beach adjacent to the shore on the east bank, as a replacement dog walking/recreation area for Lot 773.

#### *Option 2: Shorter, closer breakwater option*

Option 2 has a number of limitations/disadvantages but it will be investigated fully during the EIS process. Potential disadvantages of this option include:

- » Limited allowance for increased demand for pile moorings;
- » Decreased protection (less than option 1) for moored vessels during flood events in Ross River, as they would be moored closer to the main flow channel;
- » Less protection from boat wash from vessels motoring up Ross River;
- » Channel width too small for a swing circle by larger vessels that may use the Marine Precinct in the future (not including ships); and
- » Limited or no potential to provide a sandy beach area adjacent to the shore on the east bank, as a replacement dog walking/recreation area for Lot 773.

### 3.3 Previously considered alternatives and the 'do nothing' case

The industries which will be given the opportunity to relocate to the Marine Precinct are currently scattered around South Townsville and Ross Creek. Since the Project was first envisaged, new environmental management and Marine Park legislation has been gazetted, and trade and commercial activities in Townsville have grown considerably. Many of the older facilities are now situated in inner city and residential areas as the city has grown. A new purpose-built facility will provide an opportunity to co-locate similar marine-dependent industries and enable the provision of best practice environmental management infrastructure.

The 'do nothing' option increases the potential for social and environmental conflict between land uses. Many of these industries are no longer compatible with inner city residential lifestyles and the potential for conflict between land uses will only increase the longer they remain in the old locations. Requirements for more stringent environmental management will continue to increase.

Alternatives to the location of a public boat ramp were considered in the report SKM 1988 Public boat Ramps North Queensland; Strategic Plan Vols 1 and 2. Recommendations in the report include upgrades to existing boat ramps in the area (which have largely been completed since 1988) and consideration of a new recreational boat ramp location on the leeward side of Kissing Point, a location likely to involve much greater environmental impact than the proposed project location, including potential impact on the Kissing Point Fort, which is listed on the National Heritage Register.

Alternatives to the location of the breakwater are presented in Section 3.2, including the 'do nothing' option.

### 3.4 Context, planning framework and state/local government requirements

The area proposed for the Marine Precinct (Lot 773) is identified as Strategic Port Land in the current (1996) Port Land Use Plan. The area proposed for location of the breakwater and pile moorings on the eastern side of Ross River is identified as proposed future Strategic Port Land in the Statement of Proposal for review of the Port Land Use Plan released for public comment in 2007. Strategic Port Land is under the jurisdiction of the Townsville Port Authority. Consistent with the *Transport Infrastructure Act 1994*, Townsville City Council City Plan 2005 designates Strategic Port Land as 'not subject to Planning Scheme'.

### 3.5 Environmental impact assessments under Commonwealth, state or territory legislation

The TPA will seek Significant Project status under the *State Development and Public Works Organisation Act 1971* (SDPWOA). An EIS will be prepared for assessment under the conditions of the Bilateral agreement with the Commonwealth.

### 3.6 A staged development or component of a larger project

**NOTE: The Minister for the Environment, Heritage and the Arts may not accept a referred action that is a component of a larger action and may request the person proposing to take the action to refer the larger action for consideration under the EPBC Act (Section 74A, EPBC Act).**

**If you wish to make a referral for a staged or component referral, read 'Fact Sheet 6 Staged Developments/Split Referrals' and contact the EPBC Act Referrals Section (1800 803 772).**

The proposed Project is not a component of a larger action.

TPA is in the early planning stages for a project proposed to expand Port berths and loading/operational areas to the north of the current Port operational boundary. The Marine Precinct project (the subject of this referral) relates to Port interface activities such as slipping and maintenance and is not linked to the Port Expansion project by direct adjacency, commercial dependency, timeframe or intended operational focus. That is, the Marine Precinct project is not a component of nor a stage of the Port Expansion project. A separate EPBC Referral will be prepared for the Port Expansion project in 2009 once planning has advanced beyond broad concept stage. That Referral and EIS process will incorporate consideration of potential cumulative impacts of both projects.

## 4 Affected environment

**NOTE: You must attach a map(s)/plan(s) clearly showing the location of the action in relation to any matters of national environmental significance**

Refer to Figure 3 for the location of the project with respect to matters of national environmental significance.

#### 4.1 Matters of national environmental significance

##### 4.1 (a) World Heritage Properties

The Project site is not within the boundaries of the Great Barrier Reef Marine Park (GBRMP), but is located within the boundaries of the Great Barrier Reef World Heritage Area (GBRWHA). The World Heritage Values of the Great Barrier Reef are extensive and not all apply to the Project area and the wider Cleveland Bay area. The habitats of highest environmental sensitivity in Cleveland Bay are the seagrass beds and the coral reefs and both currently exist in an area already subject to significant anthropogenic impacts. The specific criteria for which the GBRWHA was listed are those that are inclusive of elements throughout the Cleveland Bay area, these include:

##### Coral reefs

There are no coral reefs that have been identified within the immediate Project area. Coral reefs in Cleveland Bay are located at Middle Reef and Virago Shoals, both more than six km north-west of the existing Port eastern reclaim area. Magnetic Island also supports numerous fringing reefs (Kaly *et al.* 1994, Stafford-Smith *et al.* 1994). TPA has undertaken research at these sites as part of their capital dredging program and they have been regularly monitored since by AIMS and GBRMPA in response to various projects. This data should provide an indication of trends in these habitats relative to impacts such as dredging, thus informing potential risks and appropriate management. The EIS will include measures to mitigate potential impacts to these vulnerable habitats if modelling indicates they may be at risk.

##### Inter-reefal and lagoonal benthos

Cleveland Bay is not considered to be an inter-reefal lagoonal area; such areas are defined as being the seabed found between coral reefs at the outer edge of the lagoon and the reefs at the edge of the continental shelf; and the continental slope and associated habitats. The Project is highly unlikely to impact on this offshore area.

##### Coastal/continental islands (Magnetic Island) of exceptional natural beauty

Magnetic Island is located approximately 8 km off the coast of Townsville. It is the only island on the North Queensland Coast with a blend of National Park, a resident population of approximately 2,500 and a variety of holiday resorts. There is a regular ferry service to the island and it is a popular destination for local, regional and international visitors. The development of this Project is highly unlikely to impact upon the qualities of the Island.

Many species of coral, macroalgae crustaceans, polychaetes, molluscs, phytoplankton, fish, seabirds, mammals and reptiles

Species of significance that may occur within the project area include inshore-dolphins and other cetaceans, dugongs, turtles, migratory birds; and their relative prey species or habitat.

The most commonly reported sensitive species from Cleveland Bay are dugongs, turtles, snubfin dolphins, Indo-Pacific humpback dolphins, humpback whales and various species of shark. Dugong populations are monitored by aerial survey along the Queensland coast every five years. This data collection also records turtles and inshore dolphin species where possible. The inshore dolphin species have been observed in the Port area as well as turtles and dugongs. Large aggregations of dugongs have been recorded outside of the Project area near Cape Cleveland where an extensive seagrass habitat is known to occur.

All the listed species are vulnerable to pollution and habitat destruction, and have varying tolerances to water quality. Dolphins, dugongs and turtles are considered to be the most sensitive of these species in the Project area due to their dependence on vulnerable food resources (seagrass and invertebrates) and susceptibility to boat strike in shallow water.

Many fish and invertebrate species are likely to occur within the Project area. It is likely that the presence of such species is not restricted to the Project area as they occur in various locations throughout the Bay. Investigation of the use of the Project Area by these species will occur during the EIS phase.

## Seagrass meadows and mangrove ecosystems

The distribution, community composition and density of seagrass meadows in Cleveland Bay fluctuate seasonally and in response to a range of environmental influences (Lee Long *et al.* 1993). The seagrass habitats within this region are of high ecological significance and provide a regionally important foraging habitat for threatened species as noted above and economically important fishery species. The primary locations within Cleveland Bay for seagrasses tend to be in areas that are less than 4 m in depth, between the mainland and Magnetic Island, and adjacent to Cape Cleveland (Lee Long *et al.* 1993, Lee Long *et al.* 1996). Most research has been focussed on intertidal species within the Bay; however, sub-tidal seagrasses have previously been mapped.

A survey commissioned by TPA and undertaken by DPIF in October-December 2007 indicated that the closest seagrass beds were four kilometres east of the mouth of Ross River (pers comm. to TPA, Dr Michael Rasheed DPIF). During construction and operation of the Marine Precinct, careful management of Port activities (i.e. sedimentation from dredging) will aid in preventing damage to seagrasses in the Bay. The proposed inclusion of a breakwater with a return at the northern end will also act as a barrier to any sediment mobilisation eastwards and northwards into Cleveland Bay from within the footprint of the project area, once the development is complete.

The Project area (Lot 773), like most of the Port area is reclaimed land. The eastern precinct was largely reclaimed between 1951 and 1980 (Pringle 1989). Mangroves have subsequently grown on the landward margin of this site. Removal of some mangrove species will be required for further reclamation and development of the project area.

Investigation of the ecological value of subsurface habitats on the eastern side of Ross River (the area proposed for the breakwater and pile moorings) will be undertaken during the EIS phase.

A narrow fringe of mangroves lines the upper shore of the proposed Project area (Lot 773). This shoreline strip is not sufficiently wide to enable zonation characterising the mangrove communities. Mangrove habitats can be highly productive environments that support a diversity of species. It is anticipated that the mangroves on Lot 773 (which have grown since earlier reclamation of this site in the late 1960s) and on the eastern side of the Ross River mouth will require removal for the construction of a breakwater and Marine Precinct facilities.

## Habitats for species of conservation significance

Habitats that support species of significance occur within the Project area and area adjacent to it. A sandbank of significance presently occurs where the proposed breakwater may be located (adjacent to the Ross River mouth) although examination of historical aerial photographs indicates that this sandbank is temporary in nature and has accreted/eroded considerably over time. This sandbank has been observed to support migratory marine birds that are listed under JAMBA and CAMBA. Other migratory bird species have been recorded to utilise the mangroves along the Ross River mouth as a roosting site. The mangroves in the Project area are unlikely to support a roosting habitat, though this will be investigated fully during the EIS phase. Seagrass habitats and coral reefs are unlikely to occur within the Project area though they are present throughout the Bay and have the potential to be indirectly impacted.

### 4.1 (b) National Heritage Places

Kissing Point Fort is located north of the Townsville Port. This site was first coastal defence structure to be built in Queensland outside Brisbane. It is one of a small group of coastal defence structures constructed in the Australian colonies in the late 19th Century. The Fort will not be impacted by the Project.

### 4.1 (c) Wetlands of International Significance (Ramsar)

The Bowling Green Bay Ramsar wetland area is located approximately 52 km southeast of Townsville and is listed on the Department of Environment, Water, Heritage and the Arts, 'Directory of Important Wetlands'. Under this directory the Project area falls adjacent to: the Ross

River Reservoir – QLD008 and Bowling Green Bay – QLD002 ([www.environment.gov](http://www.environment.gov)). The distance from the Project to wetland areas of significance make it extremely unlikely they will be impacted by the project.

#### 4.1 (d) Listed threatened species and ecological communities

No threatened ecological communities have been identified within the Project area.

The DEWHA Protected Matters Search Tool identified threatened species that occur, or are likely to occur within the Project area. These include:

- » Threatened plants: 1 species
- » Threatened birds: 5 species
- » Threatened terrestrial fauna: 5 species
- » Threatened marine mammals: 1 species
- » Threatened reptiles: 8 species

See the following table for threatened flora and fauna species potentially occurring in the Project area.

## Listed threatened flora and fauna species

Species	EPBC status	Comments
THREATENED FLORA		
Frogbit <i>Hydrocharis dubia</i>	V	An aquatic plant found in freshwater lagoons. It is unlikely this plant occurs in the Project area.
THREATENED BIRDS		
Red Goshawk <i>Erythrotriorchis radiatus</i>	V	The Red Goshawk has a large home range spanning between 50 and 220 square kilometres. The species is commonly found inhabiting mixed vegetation types, including tall open forest, woodland, lightly treed savannah and the edge of rainforest (Queensland Parks and Wildlife, 2006).
Australian Painted Snipe <i>Rostratula australis</i>	V	The Australian Painted Snipe is usually found in either permanent or temporary shallow inland wetlands, generally freshwater although brackish wetlands are also utilised. It nests on the ground amongst tall reed-like vegetation near water, and feeds near the water's edge and on mudflats, taking invertebrates, such as insects and worms, and seeds. Although the Australian Painted Snipe can occur across Australia, the areas of most sensitivity to the species are those wetlands where the birds frequently occur and are known to breed. ( <a href="http://www.environment.gov.au">www.environment.gov.au</a> ).
Squatter Pigeon (southern) <i>Geophaps scripta scripta</i>	V	The species prefer to inhabit areas with access to water, commonly in the grassy understorey of eucalypt woodland. Gravel ridges with sandy areas are also a preferred habitat. Their southern habitat has become fragmented. It is not known whether the subspecies occurs past their usual range.
Black-Throated Finch (southern) <i>Poephila cincta cincta</i>	E	During the wet season this species ranges between a variety of habitats, it has been recorded in 17 different regional ecosystems. Generally occupying grassy woodland made up of eucalypts, paperbarks and acacias gaining access to grasses in seed and water ( <a href="http://www.environment.gov.au">www.environment.gov.au</a> ). The finch feeds almost exclusively on native grasses however will use exotic grasses for nesting or shelter only. In the dry season is only found close to freshwater (A. Small – pers. comm.).
Star Finch (eastern and southern) <i>Neochmia ruficauda ruficauda</i>	E	Star Finches (endangered under the EPBC Act and the NCA) are commonly found near water on grassy woodlands. These finches are relatively sedentary and build domed nests. Historical records state that the species has been identified in Cardwell (north) and also Blackall (west). Since 1990 only four definite sightings of the star finch have been recorded.
TERRESTRIAL MAMMALS		

Northern quoll <i>Dasyurus hallucatus</i>	E	Northern quolls live in a range of habitats, but prefer rocky areas and eucalypt forests. The quoll is a good climber but spends most of its time foraging and sleeping on the ground. During the day it likes to hide in hollow logs, rock crevices, caves and hollow trees.
Semon's leaf-nosed bat <i>Hipposideros semoni</i>	E	The habitat used for foraging include rainforest and savannah woodland.
Spectacled flying-fox <i>Pteropus conspicillatus</i>	V	The spectacled flying fox inhabits rainforest regions and can be found along the north-eastern coast of Queensland.
Water mouse <i>Xeromys myoides</i>	V	The False Water Rat or Water Mouse can be found near shallow water holes close to the coastline. Commonly feeding on small crabs, shellfish and worms found in the mangrove forests.
Greater large-eared horseshoe bat <i>Rhinolophus philippinensis</i>	E	Found in North Queensland, from Townsville to Cape York. Often inhabits mine sites and caves. This species occurs in rainforest, gallery forest, tropical eucalypt woodland, Melaleuca forest with rainforest understorey, and open woodland. They forage within vegetation, at the edge of vegetation, and in gaps. Not likely to be impacted by the proposed Project.
MARINE MAMMAL		
Humpback whale <i>Megaptera novaeangliae</i>	V/M	Deep ocean species with seasonal migration to feeding areas. Unlikely to be affected by this Project.
REPTILES		
Yakka skink <i>Egernia rugosa</i>	V	Skinks can be found in dense ground vegetation, hollow logs, fallen trees and beneath rocks of dry open sclerophyll forest/woodland. Their presence is unlikely in the Project area.
Striped-tailed delma <i>Delma labialis</i>	V	This species is endemic to Australia. On the mainland the species is found in low open forest with a grassy understorey. It is unlikely that this species occurs in the Project area.
Loggerhead turtle <i>Caretta caretta</i>	E/M	This species is known to forage within Cleveland Bay. Consideration will be required to actively address conservation concerns relating to its habitat and to mitigate for boatstrike.
Green turtle <i>Chelonia mydas</i>	V/M	This species is known to forage and nest (low density) within Cleveland Bay. Consideration will be required to actively address conservation concerns relating to its habitat and to mitigate for boatstrike.

Leatherback turtle <i>Dermochelys coriacea</i>	V/M	This species is unlikely to inhabit the Project area. It generally feeds in pelagic waters and rarely nests along the Australian coastline.
Hawksbill turtle <i>Eretmochelys imbricata</i>	V/M	Species are not common within Cleveland Bay. However, consideration will be required to actively address conservation concerns relating to its habitat and mitigate for boatstrike.
Olive Ridley turtle <i>Lepidochelys olivacea</i>	E/M	This species may be present in low numbers in Cleveland Bay (no direct records). However, consideration will be required to actively address conservation concerns relating to its habitat and to mitigate for boatstrike.
Flatback turtle <i>Natator depressus</i>	V/M	This species is known to forage and nest within Cleveland Bay. Consideration will be required to address conservation concerns relating to its habitat and to mitigate for boatstrike.
<b>SHARK</b>		
Whale shark <i>Rhincodon typus</i>	V/M	The proposed development is unlikely to affect this species significantly as they are widespread and migratory. Found most often in Western Australia. Unlikely to be impacted by this Project.

Note: (EPBC) *Environment Protection and Biodiversity Conservation Act, 1999*: E – Endangered, V – Vulnerable, M – Migratory

#### 4.1 (e) Listed migratory species

- » Migratory birds (marine/terrestrial/wetland): 20 species
- » Migratory mammals: 6 species
- » Migratory reptiles: 7 species
- » Threatened/migratory sharks: 1 species

#### Listed migratory fauna species

Species	EPBC status	Comments
<b>MIGRATORY BIRDS (TERRESTRIAL/WETLAND/MARINE)</b>		
Australian Painted Snipe <i>Rostratula australis</i>	V/M	The Australian Painted Snipe is usually found in either permanent or temporary shallow inland wetlands, generally freshwater although brackish wetlands are also utilised. It nests on the ground amongst tall reed-like vegetation near water, and feeds near the water's edge and on mudflats, taking invertebrates, such as insects and worms, and seeds. Although the Australian Painted Snipe can occur across Australia, the areas of most sensitivity to the species are those wetlands where the birds frequently occur and are known to breed. ( <a href="http://www.environment.gov.au">www.environment.gov.au</a> ).

Species	EPBC status	Comments
Little Tern <i>Sterna albifrons</i>	M	The Little Tern prefers coastal habitats and inshore waters, especially the mouths or downstream reaches of rivers. This species takes fish by aerial dives, and breeds on islands and beaches. Four individuals have previously been recorded by the Qld EPA within /adjacent to the Project area.
Eastern Curlew <i>Numenius madagascariensis</i>	M	Its breeding habitat is comprised of marshy and swampy wetlands and lakeshores. Most individuals winter in coastal Australia. It uses its long, curved bill to probe for invertebrates in the mud. It may feed in solitary but it generally congregates in large flocks to migrate or roost. The bird not well-known, but it is uncommon at best and may be declining. As of 2006, it was n estimated that there are 38,000 individuals in the world.
White-Bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	M	The eagle is a resident from India through southeast Asia to Australia on coasts and major waterways. It feeds mainly off aquatic animals, such as fish, turtles and sea snakes, but it takes birds and mammals as well. Impacts to this species are likely to occur through bioaccumulation of prey species or reduced foraging habitat.
White-Throated Needletail <i>Hirundpus caudacutus</i>	M	They build their nests in rock crevices in cliffs or hollow trees. They never settle voluntarily on the ground and spend most of their lives in the air, living on the insects they catch in their beaks. These swifts breed in rocky hills in central Asia and southern Siberia and migrate in the winter to Australia.
Barn Swallow <i>Hirundo rustica</i>	M	The preferred habitat of the Barn Swallow is open country with low vegetation, such as pasture, meadows and farmland, preferably with nearby water. This swallow avoids heavily wooded or precipitous areas and densely built-up locations. Four are strongly migratory, and their wintering grounds cover much of the Southern Hemisphere as far south as central Argentina, the Cape Province of South Africa, and northern Australia.
Rainbow Bee-Eater <i>Merops ornatus</i>	M	Rainbow Bee-Eaters are a common species and can be found during the summer in un-forested areas in most of southern Australia and Tasmania, however they are becoming increasingly rare in Suburban parks. They migrate north during the winter into northern Australia, 27 individuals have previously been recorded by the Qld EPA within or adjacent to the Project area.
Black-Faced Monarch <i>Monarcha melanopsis</i>	M	The Black-Faced Monarch is found along the entire eastern seaboard of Australia. It is unlikely that the proposed development will impact this species.
Spectacled Monarch <i>Monarcha trivirgatus</i>	M	Is found in Australia, Indonesia, and Papua New Guinea. Its natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montanes. It is unlikely that the proposed development will impact this species.
Satin Flycatcher	M	Its habitats are temperate forests and subtropical or tropical moist lowland forests, one species has been recorded by the Qld

Species	EPBC status	Comments
<i>Myiagra cyanoleuca</i>		EPA to occur within or adjacent to the Project area.
Rufous Fantail <i>Rhipidura rufifrons</i>	M	They are found in rainforests, wet forests, swamp woodlands and mangroves in the northern and eastern coastal Australia. During migration, the Rufous Fantail moves northward in winter, disappearing from Victoria (Australia) and New South Wales.
Great Egret <i>Ardea alba</i>	M	The Great Egret is partially migratory, with northern hemisphere birds moving south from areas with cold winters. It breeds in colonies in trees close to large lakes with reed beds or other extensive wetlands. The Great Egret feeds in shallow water or drier habitats, spearing fish, frogs or insects with its long, sharp bill. 33 individuals have previously been recorded by the Qld EPA within or adjacent to the Project area.
Cattle Egret <i>Ardea ibis</i>	M	The Cattle Egret is often found in dry grassy habitats, unlike most herons which are associated with shallow water. It feeds on insects, especially grasshoppers, and is usually found with cattle and other large animals which disturb small creatures which the egrets then catch. 14 individuals have previously been recorded by the Qld EPA within or adjacent to the Project area.
Australian Cotton Pygmy-Goose <i>Nettapus coromandelianus albipennis</i>	M	Although once found from north Queensland to the Hunter River in NSW, the Cotton Pygmy-Goose is now only a rare visitor to NSW. Uncommon in Queensland. Freshwater lakes, lagoons, swamp and dams, particularly those vegetated with waterlilies and other floating and submerged aquatic vegetation. The Cotton Pygmy-Goose uses standing dead trees with hollows close to water for roosting and breeding. It is unlikely that this species is present in the Project area.
Lesser Sand Plover <i>Charadrius mongolus</i>	M	It nests in a bare ground scrape, laying three eggs. This species is strongly migratory, wintering on sandy beaches in east Africa, south Asia and Australasia. The Lesser Sand Plover's food is insects, crustaceans and annelid worms, which are obtained by a run-and-pause technique, rather than the steady probing of some other wader groups. 11 individuals have previously been recorded by the Qld EPA within or adjacent to the Project area.
Latham's Snipe <i>Gallinago hardwickii</i>	M	Non-breeding habitat in Australia: shallow freshwater wetlands of various kinds with bare mud or shallow water for feeding, with good nearby vegetation cover for shelter. The entire population migrates and spends the non-breeding season principally in eastern Australia. 3 individuals have previously been recorded by the Qld EPA within or adjacent to the Project area.
Little Curlew <i>Numenius minutus</i>	M	This wader bird is a strongly migratory species, wintering in Australasia. It is gregarious, forming sizeable flocks. This species feeds by probing soft mud for small invertebrates. 1 individual has previously been recorded by the Qld EPA within or adjacent to the Project area.
Whimbrel	M	This species feeds by probing soft mud for small invertebrates and by picking small crabs and similar prey off the surface. This

Species	EPBC status	Comments
<i>Numenius phaeopus</i>		is a migratory species wintering on coast of Australia amongst other places. 32 individuals have previously been recorded by the Qld EPA within or adjacent to the Project area.
Painted Snipe <i>Rostratula benghalensis s. lat.</i>	M	This species lives in reedy swamps, and their diet consists of annelid worms and other invertebrates. Their presence in the Project area is unknown, though possible.
Fork-Tailed Swift <i>Apus pacificus</i>	M	This species is migratory, wintering south to Australia. They never settle voluntarily on the ground. Pacific Swifts spend most of their lives in the air, living on the insects they catch in their beaks.
<b>MIGRATORY MAMMALS</b>		
Humpback Whale <i>Megaptera novaeangliae</i>	V/M	Deep ocean species with seasonal migration to feeding areas. Unlikely to be affected by this Project.
Bryde's Whale <i>Balaenoptera edeni</i>	M	Bryde's whales feed on pelagic schooling fish, such as anchovy and herring. They are distributed widely throughout tropical and subtropical waters. The Project is unlikely to impact this species as they inhabit predominantly offshore waters.
Dugong <i>Dugong dugong</i>	M	The dugong is a marine mammal that has its population stronghold within Australian waters. This species is heavily dependent on seagrass for subsistence and is thus restricted to the coastal habitats where they grow. Dugong concentrations typically occurring in wide, shallow, protected areas such as bays, mangrove channels and the lee sides of large inshore islands. They are known to occur in the Project area further investigation will be required as to their appropriate conservation relative to the Project impacts.
Australian snubfin dolphin <i>Orcaella heinsohni</i> , Irrawaddy dolphin <i>Orcaella brevirostris</i>	M	This species was recently described in 2005. Research indicates that Australian snubfin and Indo-Pacific humpback dolphins occur in small, localised populations close to coastal and estuarine environment. This information suggests that populations of both species are vulnerable to anthropogenic mortality and potentially rapid population declines. They are not thought to be common and are being given a high conservation priority. 2 individuals have previously been recorded by the Qld EPA within or adjacent to the Project area.
Indo-Pacific humpback dolphin <i>Sousa chinensis</i>	M	Inhabits coastal tropical and subtropical waters. Indo-Pacific humpback dolphins are referred to as an 'inshore' species as they occur in shallow (less than 20 m) near-shore waters, often near river mouths, and are rarely sighted more than 1 km off shore. Indo-Pacific humpback dolphins have only been recorded feeding in shallow waters. They have a varied diet consisting of fish, molluscs, crustaceans (such as prawns and crabs), and some cephalopods (such as squid and octopus).

Species	EPBC status	Comments
Killer whale (Orca) <i>Orcinus orca</i>	M	Orcas are found in all oceans and most seas; however, they prefer cooler temperate and polar regions. Although sometimes spotted in deep water, coastal areas are generally preferred to pelagic environments. The orca is uncommon in the Project area and is not likely to be impacted by the proposed development.
<b>MIGRATORY REPTILES</b>		
Estuarine crocodile <i>Crocodylus porosus</i>	M	Saltwater crocodiles generally spend the tropical wet season in freshwater swamps and rivers, moving downstream to estuaries in the dry season, and sometimes traveling far out to sea. This species is known to occasionally inhabit the Project area though is unlikely to be impacted by the Project. 1 individual has previously been recorded by the Qld EPA within or adjacent to the Project area.
Loggerhead turtle <i>Caretta caretta</i>	E/M	This species is known to forage within Cleveland Bay. Consideration will be required to actively address conservation concerns relating to its habitat and mitigating for boatstrike.
Green turtle <i>Chelonia mydas</i>	V/M	This species is known to forage and nest (low density) within Cleveland Bay. Consideration will be required to actively address conservation concerns relating to its habitat and mitigating for boatstrike.
Leatherback turtle <i>Dermochelys coriacea</i>	V/M	This species is unlikely to inhabit the Project area. It generally feeds in pelagic waters and rarely nests along the Australian coastline.
Hawksbill turtle <i>Eretmochelys imbricata</i>	V/M	Species are not common within Cleveland Bay. However, consideration will be required to actively address conservation concerns relating to its habitat and mitigating for boatstrike.
Olive Ridley turtle <i>Lepidochelys olivacea</i>	E/M	This species may be present in low numbers in Cleveland Bay (no direct records). However, consideration will be required to actively address conservation concerns relating to its habitat and mitigating for boatstrike.
Flatback turtle <i>Natator depressus</i>	V/M	This species is known to forage and nest within Cleveland Bay. Consideration will be required to actively address conservation concerns relating to its habitat and mitigating for boatstrike.
<b>SHARK (1 Species)</b>		
Whale shark <i>Rhincodon typus</i>	V/M	This proposal is unlikely to affect this species significantly as they are widespread and migratory. Found most often in Western Australia. Unlikely to be impacted by this Project.

#### 4.1 (f) Nuclear actions

The action is not considered to be a nuclear action and does not involve any nuclear activity.

#### 4.1 (g) Commonwealth marine areas

The Project is not within the boundaries of any commonwealth marine areas other than those described in section 4.1(a).

#### 4.2 Important or unique aspects of the environment, if relevant

##### 4.2 (a) Soil and vegetation characteristics

The geology of the area is generally Quaternary Period alluvium and colluvium, Toomba basalt from the Cainozoic Era. The soils of the area are described as alluvial delta plains with a complete pattern of present and prior stream channels and levees. The dominant soils consist of loamy or fine sandy brown earths, which occur on the older flatter levees (Murtha, 1975). Coastal tidal flats, mangrove flats, saltpans and grasslands - silt, mud, sand and minor salt pans characterise the Project area.

The eastern Port precinct has been progressively reclaimed since approximately 1965 (Pringle, 1989). Between 1968 and 1970, 150 acres of industrial land was reclaimed on the north east bank of the Ross River estuary by pumping ashore over three million cubic yards of sand from the adjacent intertidal zone. Further developmental (capital) dredging occurred up to the late 1980s. Most of the sand was pumped ashore for land reclamation at the Port (Pringle, 1989). Since that time TPA has continued a program of regular maintenance dredging to keep the Ross river channel navigable.

The result of all the dredging and reclamation work at the mouth of the Ross River has been to move the main channel westward from its former position across the intertidal zone so it now lies almost due north of the mouth (Pringle, 1989).

The Project area (Lot 773) is identified as a 'remnant not of concern' Regional Ecosystem (RE) by the Queensland EPA. Within the Project area, riparian mangrove vegetation is present. Mangroves form extensive stands on the southern portion of Cleveland Bay and also occur on the Ross River. The Marine Precinct development will require the removal of mangrove species, which will require a permit under the *Old Fisheries Act 1994*.

##### 4.2 (b) Water flows, including rivers, creeks and impoundments

The Project site is located at the mouth of the Ross River and is adjacent to the main Townsville Port. This area is highly modified.

##### 4.2 (c) Outstanding natural features, including caves

No outstanding natural features occur within the Project area. This area is largely reclaimed land and is a highly modified environment.

##### 4.2 (d) Gradient

The topography of the study area comprises a relatively flat land surface adjacent to the Ross River Channel. Landfall is from west to east, draining toward the Ross River, ultimately discharging into Cleveland Bay. The highest elevation (0.6m AHD) occurs along the existing road network (Benwell Road) of the Project area, on the edge of the existing shoreline ([www.msq.qld.gov.au](http://www.msq.qld.gov.au)).

##### 4.2 (e) Buildings or other infrastructure

The Project site is currently vacant.

##### Road Access

The proposed Marine Precinct will continue to be accessed via Benwell Road, a locally controlled road currently under jurisdiction of the TPA. The two lane bitumen sealed road provides the main access to the Port. A new access intersection from Benwell Road to the proposed public boat ramps will be constructed as part of the Benwell Road/Port Access Road interface.

## Drainage and Stormwater

The Project area is the eventual drainage location for much of the areas stormwater and overland surface water flow discharge from South Townsville and the Port. An existing stormwater pipe drains into Lot 773 on EP 2211 from Archer Street under Benwell Road. The asset was constructed in 1963 and is owned by Citiworks. There are approximately ten stormwater drains located along the length of Benwell Road adjacent to the Project site. The stormwater management needs of the Marine Precinct and interface with the existing system will be investigated during the EIS process and incorporated into a properly designed stormwater management system in compliance with the *Environmental Protection Act 1994* and the Environment Protection (Water) Policy 1997 (EPP Water).

## Water Supply

Townsville Access Mapping (TAM) (TCC's Online GIS system) indicates that potable water is supplied via a 300 mm diameter asbestos cement pipeline to the Port along Benwell Road. Citiwater owns the asset, which was constructed in 1969. The potable water needs of the Marine Precinct, and interface with the existing system, will be investigated during the EIS process and later detailed design phases.

## Transport

In 1996/97, a study into a new port access road/rail link from the eastern bank of Ross River was commissioned. This link, now known as the Port Access Road will require new road and rail links to be built over the mouth of Ross River. Both Boundary Street and Benwell Road form part of the 'Principal Road Freight Network' as defined in Townsville City Council's City Plan 2005. A future access route to the site will be via the Stuart Bypass and proposed Port Access Road. The proposed Port Access Road Corridor will provide a direct transport connection along part of Benwell Road and across Ross River to the State Development Area. No transport infrastructure currently exists on the Project site. Construction of the Stuart Bypass and Port Access Road is expected to commence in August 2008.

### 4.2 (f) Marine areas

The Project site is not within a Commonwealth marine area.

### 4.2 (g) Kinds of fauna

The kinds of threatened and migratory fauna that may occur within or adjacent to the Project area are identified within sections 4.1 (e) and 4.1 (d). In addition to these species, other matters protected by the EPBC Act that may occur within the Project area or adjacent to it are listed below.

#### LISTED OVERFLY MARINE SPECIES

- » Magpie goose *Anseranas semipalmata*

#### RAY-FINNED FISHES

- » 32 pipefish/seahorse

#### REPTILES

- » 15 seasnakes/ sea kraits

#### CETACEANS

- » Minke whale *Balaenoptera acutorostrata*
- » Common dolphin *Delphinus delphis*
- » Risso's dolphin *Grampus griseus*
- » Spotted dolphin *Stenella attenuata*

- » Bottlenose dolphin *Tursiops truncatus*
- » Indian Ocean bottlenosed dolphin, Spotted bottlenose dolphin *Tursiops truncatus*

An extensive search in the specific Project area will be undertaken during the EIS phase. Within and in areas surrounding the Project area; numerous common and invasive species are likely to occur as the habitat is a highly modified environment.

#### 4.2 (h) Current state of the environment

As a highly modified environment, invasive species are likely to occur on the Project site. Nine invasive terrestrial fauna and 35 invasive flora species have been recorded as occurring in or adjacent to the Project area. No threatening marine invasive species have been recorded within the Port area. Further investigation undertaken for the EIS will identify the extent, presence or absence of such species. Some native mangroves species are present on the site having colonised since the area was reclaimed.

#### 4.2 (i) Commonwealth Heritage Places and places on the Register of the National Estate

As previously noted, Kissing Point Fort is listed as a Commonwealth Heritage place. This site is located north of the TPA approximately 3 km north of the TPA. It is highly unlikely that this area will be impacted.

#### 4.2 (j) Known Indigenous heritage values

The land surrounding the Townsville Port has significant cultural value to indigenous communities. In particular stone artefacts and shell middens are known to exist in vicinity of the Project area, although not in the immediate Project site. There is also an indigenous burial reserve in a dune system at the eastern end of Cleveland Bay. The Ross River is also a feature in the indigenous cultures bestowing myth cycles and dreamtime creation (M. Bird pers. comm.). The TPA will directly consult with local indigenous communities and will develop a Cultural Heritage Management Plan (CHMP) in accordance with Part 7 of the *Aboriginal Cultural Heritage Act 2003*.

#### 4.2 (k) Other important or unique values of the environment

An environmental reserve has been proposed for lands adjacent to the mouth of the Ross River and Eastern Access Corridor under the Townsville State Development Area, Precinct development and land planning.

#### 4.2 (l) Tenure of the action area (eg freehold, leasehold)

Lot 773 is held by the TPA as a perpetual lease. The area across Ross River is vacant land, proposed for lease to the TPA.

#### 4.2 (m) Existing land uses

The Project area (Lot 773) currently comprises a sandy beach margin with mudflats exposed at low tide. This area is held under perpetual lease by the TPA and is identified as Strategic Port Land. The public has been allowed to access the beach and mudflats for recreation purposes until such time as the land is required for Port-related purposes. Current uses include fishing, yabbing, walking and dog exercise. TPA has commissioned an observational survey of the area in an effort to quantify public use.

#### 4.2 (n) Proposed land uses

Proposed land uses will provide an opportunity to co-locate similar marine-dependent industries in the one place. In summary these proposed land uses will include:

- » Reclamation of lands within Lot 773 on EP2211;
- » Incorporation of a compact, fully-serviced artificial harbour at the northern end of the Benwell Road beach;
- » Allocation of lands at the southern end of the beach for recreational boat ramp facilities relocated from Ross Creek;
- » Construction of a rock revetment wall at the eastern channel entrance of Ross River to reduce siltation of the entrance channel and reduce wave impacts on the Marine Precinct; and
- » Provision of public pile moorings adjacent to the rock revetment wall to replace those currently available upstream of the Port Access Road bridge and to meet a high level of demand.

## 5 Nature and extent of likely impacts

### 5.1 Likely impacts on matters of national environmental significance (NES)

#### 5.1 (a) Likely impact on the world heritage values of a declared World Heritage property

Cleveland Bay is a small area of the GBRWHA (approximately 0.07%) but contains important inshore coral reefs and seagrass beds that offer a core habitat to dugong, Indo-Pacific humpback dolphins and the Australian snubfin dolphin. Many activities associated with the Project will be contained on site; however, it is likely that some impacts may extend beyond the site. The following potential impacts should therefore be taken to apply to the Project site itself and the surrounding marine habitats within Cleveland Bay.

The specific criteria for which the GBRWHA was listed and are considered to be potentially at risk of impact include:

#### Coral reefs

There are no coral reefs that have been identified within the immediate Project area. Coral reefs in Cleveland Bay are located at Middle Reef and Virago Shoals, both more than six km north-west of the existing Port eastern reclaim area. Magnetic Island also supports numerous fringing reefs (Kaly *et al.* 1994, Stafford-Smith *et al.* 1994). TPA has undertaken research at these sites as part of their capital dredging program and they have been regularly monitored since by AIMS and GBRMPA in response to various projects. This data should provide an indication of trends in these habitats relative to impacts such as dredging, thus informing potential risks and appropriate management. The EIS will include measures to mitigate potential impacts to these vulnerable habitats if modelling indicates they may be at risk.

Many species of coral, macroalgae crustaceans, polychaetes, molluscs, phytoplankton, fish, seabirds, mammals and reptiles

Potential impacts to all species of significance that may occur within the project area include: pollution and habitat destruction. They are all likely to have varying tolerances to changes in water quality. More specifically, dugongs and turtles are considered to be the most sensitive of these species in the Project area as their dependence on vulnerable food resources (seagrass and invertebrates) and susceptibility to boat strike in shallow water are increased through the Project development.

In addition to the turtle and dugong, other significant species such as inshore dolphins may also potentially be impacted by:

- » Noise pollution;
- » Disturbance of foraging habitat; and

- » Increased potential for boatstrike.

Many fish and invertebrate species are likely to occur within the Project area and these species may be subject to increased recreational fishing pressure as a result of increased access from the Marine Precinct.

#### Seagrass meadows and mangrove ecosystems

Seagrass beds within Cleveland Bay support a significant dugong population and provide habitat for commercial fishing species and marine turtles. From a recent (2007) DPIF survey, the nearest seagrass beds are 4 km east (upstream) of the project site. However, impacts may extend further offshore and these may include:

- » Marine pollution;
- » Direct removal;
- » Contamination from oil, chemical or sewerage spills; and
- » Increased turbidity and sedimentation causing light attenuation, this may lead to decreased survivorship or mortality.

Even though Lot 773 is reclaimed land, mangroves have colonised the landward edge since reclamation. Likely impacts on mangrove species within the Project area include direct removal, and indirect impacts from changes in water quality. There may be opportunity for creation of new shallow tidal habitat as sand accretes on the eastern side of the proposed breakwall, which may support seagrass and mangroves in the longer term. This potential will be investigated during the EIS investigations.

#### Habitats for species of conservation significance

Habitats for species of conservation significance and their potential impacts include:

##### Coastal environment:

- » Increased noise pollution through construction and operation activities;
- » Removal of significant sand banks for migratory birds;
- » Increase in large and small vessel traffic during operation; increased potential for boat strikes (turtles, dugong and cetaceans); and
- » Changed hydrology and sedimentation may impact shorebird habitat.

##### Seagrass and benthic environment:

- » Contamination of seagrasses, corals, benthic communities and water quality from oil, chemical or sewerage spills;
- » Changed hydrology and sedimentation may impact shorebird habitat; and
- » Sedimentation and reduced light attenuation will likely impact seagrass growth.

Coral reefs: (addressed above)

5.1 (b) Likely impact on the heritage values of a listed National Heritage place  
The Project will have no impact on the Kissing Point fort because of its distance from the Project.

5.1 (c) Likely impact on the ecological character of a declared Ramsar wetland  
The Project is highly unlikely to impact upon the ecological character of the Bowling Green Bay Ramsar wetland as it is 'upstream' of the Project site approximately 52 km away. The Project site does not directly influence the Ramsar habitat.

## 5.1 (d) Likely impact on the members of a listed threatened species or ecological community, or their habitat

### Threatened Flora

The frogbit (*Hydrocharis dubia*), was the only threatened terrestrial flora species listed under the EPBC Act identified as potentially occurring within the Project area. This species is generally found in freshwater aquatic environments. It is highly unlikely that this species occurs in the Project area as it is predominantly a saline/estuarine environment and it is reclaimed land. The potential presence of this listed species will be investigated during the EIS phase.

### Threatened Fauna

#### Reptiles

Six of the seven species of marine turtle are listed species and potentially occur within the waters of Cleveland Bay (Environment Australia, 2003). Cleveland Bay is known to support a foraging, nesting, breeding and migration habitat to some or all of these species. Preferred habitat types include seagrass and reefal areas, both which occur more than four kilometres from the Project area. Nesting is not known to occur within the Project site, though does occasionally occur on The Strand beaches north of the site.

Onshore and offshore activities associated with the construction and operation of the Project such as dredging, marine construction, habitat modification and pollution run-off can impact foraging marine turtles. Direct and indirect impacts to turtles in the region as a result of the Project may include:

- » Death from dredging operations;
- » Noise and light pollution;
- » Vessel strike from increased boating traffic; and
- » Ingestion of marine pollution/rubbish.

Indirect impacts to these species may potentially include:

- » Habitat removal (seagrass extraction);
- » Sedimentation of habitat from dredging leading to die-back of seagrass and reefal habitat;
- » Reduced water quality impacting on the health of turtles; and
- » Increased vessel traffic may increase disturbance of foraging species.

Two threatened lizard species, Yakka skink (*Egernia rugosa*) and Striped-tailed delma (*Delma labialis*) are terrestrial species and have been identified as potentially occurring within the Project area. It is unlikely that the Project area provides an ideal habitat for these species; however their presence or absence will be determined during field investigations during the EIS.

#### Birds

Bird nesting and roosting sites are known to exist within the Project area. An investigation to determine the presence of threatened bird species in the Project site is currently underway. The results from this survey will be incorporated into the EIS and mitigation measures will be adopted where appropriate.

#### Fish

The whale shark, *Rhincodon typus* has been identified as potentially occurring within or adjacent to the Project site. No whale sharks have previously been recorded by the Queensland EPA within Cleveland Bay and their presence is highly unlikely. Whale sharks are filter feeders and generally prefer clearer, offshore waters. The project is unlikely to affect this species significantly as they are widespread and migratory.

## Mammals

The humpback whale *Megaptera novaeangliae* has been sighted in the waters of Cleveland Bay between October and January ([www.environment.gov.au](http://www.environment.gov.au)) from Magnetic Island. Cleveland Bay exists within the humpback's migration route. A number of animals are therefore likely to pass within 10 km of the Project site. Current pressures on humpback whales within Cleveland Bay include boat traffic, water pollution and noise pollution. These impacts may potentially increase during the construction and operational phases of the Project.

The Northern quoll *Dasyurus hallucatus*, has not been recorded by the Queensland EPA within or adjacent to the Project site. Northern quolls live in a range of habitats, but prefer rocky areas and eucalypt forests. It is likely that the Project site does not present suitable habitat for this species. The presence and absence of this species on the Project site will be investigated during the EIS.

Semon's leaf-nosed bat, *Hipposideros semoni*, has not been recorded by the Queensland EPA within or adjacent to the Project site. The preferred habitat type of this species includes rainforest and savannah woodland. These habitat types are not represented within the Project site and the presence of this species is highly unlikely. The presence or absence of this species on the Project site will be investigated during the EIS.

The greater large-eared horseshoe bat *Rhinolophus philippinensis*, is found in North Queensland, from Townsville to Cape York, often inhabiting mine sites and caves. This species occurs in rainforest, gallery forest, tropical eucalypt woodland, melaleuca forest with rainforest understorey, and open woodland. They forage within vegetation, at the edge of vegetation, and in gaps. Given the preferred habitat of this species, it is highly unlikely that it is present in the Project site. This species has not been recorded previously by the Queensland EPA though the site will be thoroughly surveyed for its presence or absence.

The spectacled flying-fox *Pteropus conspicillatus*, inhabits rainforest regions and can be found along the north eastern coast of Queensland. The Project site does not contain any rainforest habitat suggesting that it is highly unlikely for this species to occur.

The water mouse *Xeromys myoides*, can be found near mangroves and shallow water holes close to the coastline. Although the water mouse has not been recorded within the Project site, suitable habitat for this species exists. The removal of habitat from this site may potentially impact this species, however good quality habitat exists in adjacent areas where potentially displaced species may utilise. The presence or absence of this species on the Project site will be investigated during the EIS.

### 5.1 (e) Likely impact on the members of a listed migratory species or their habitat

#### Migratory birds

The Project area is known to support species that are listed under the JAMBA (Japan-Australia Migratory Bird Agreement) and CAMBA (China-Australia Migratory Bird Agreement) agreements. The habitats in which most migratory species have been recorded include mangroves, sandbanks, saltpan/saltmarsh, foredune and saltwater couch grassland. The sandbar located at the mouth of the Ross River is within the Project area and is the major roosting site documented in Cleveland Bay. A noteworthy "non-shorebird" roost site (Great Egret, Cattle Egret, Sacred Ibis) is located in the tall mangroves along the eastern bank of the Ross River estuary about 600 m upstream of the proposed site. A survey by Buosi and Adkins (2005) identified the Project area as:

- » A regionally significant migratory shorebird area (32 species identified); and
- » Internationally significant in terms of relative proportion of total East Asian-Australasian Flyway populations of Great Knot, Greater Sand Plover and Red-Necked Stint.

The presence of a breeding population of Little Tern on the Ross River mouth sand bar is considered noteworthy. However, the sandbar is a mobile feature and changes shape regularly with seasonal and flood influences.

Habitat loss and alteration is probably the greatest contributing factor to the decline of shorebird populations in the past century. Recreational activities and uncontrolled dogs can also disrupt the normal foraging and resting activities of shorebirds at stop-over sites. Observations by Buosi and Adkins (2005) noted that numerous small disturbances were more damaging than fewer larger disturbance events.

Potential impacts that may result from the Project include:

- » Loss of habitat – mangroves, grassland/saltpan and intertidal mud flats, these habitats will be quantified and assessed during the EIS; and
- » Displacement – The sandbar and tidal habitat is considered to be a valuable roosting site, as is the adjacent egret roosting site, these habitats maybe altered. However it should be noted that the sandbar is a temporary habitat subject to seasonal and flood influences.

TPA has commissioned a threatened and migratory bird species survey; the results are anticipated in time for the EIS. The EIS will review in detail the potential impacts from the Marine Precinct and mitigate and provide offsets for these where appropriate. For example, it is expected that sand will accrete over time on the eastern side of the proposed breakwater. This may provide alternative habitat for roosting migratory birds. This potential will be investigated during the EIS phase.

#### Migratory Reptiles (not including marine turtles)

Estuarine crocodiles (*Crocodylus porosus*) are known to inhabit this region and occasionally visit Cleveland Bay. Their presence within the vicinity has been recorded once by the Queensland EPA. There are no known nesting sites at the mouth of the Ross River and they are likely to continue to migrate throughout the estuarine environment despite the Project development. They are unlikely to be negatively impacted by the Project.

#### Migratory Marine Mammals

##### Dugong

Australia supports the global stronghold for the dugong (Marsh and Lawler, 2000); this provides a significant obligation to manage their conservation appropriately. Dugong feed almost exclusively on seagrass species *Halophila ovalis*, *Halophila spinulosa* and *Halodule uninervis* (Lanyon and Marsh, 1995, Sheppard et al. 2006). Dugong feeding trails have been observed within Cleveland Bay and they are known to migrate along the Queensland coast up to hundreds of kilometres between feeding sites. The largest aggregation of dugongs in the Bay has been observed around Cape Cleveland where extensive seagrass beds are known to occur (I. Lawler, pers. comm.). Dugongs are at risk from many threatening activities and impacts such as seagrass die-back from flooding or sedimentation, habitat removal, boat-strike (Groom 2004, Hodgson and Marsh 2007) and gill-netting (Marsh et al. 2002). Data is available on dugongs for this region with regular aerial survey monitoring being undertaken by James Cook University (Marsh and Lawler, 2001). As a coastal species, dugongs are often in conflict with anthropogenic impacts. Dugongs and some turtles are known as sympatric herbivores and share the same resource partition (seagrass and invertebrates) and as such they are vulnerable to the same potential impacts. These include direct impact from vessel strike from increased boating traffic. Indirect impacts may potentially include:

- » Habitat removal (seagrass extraction);
- » Sedimentation of habitat from dredging leading to die-back of seagrass and reefal habitat;
- » Noise pollution;
- » Reduced water quality impacting on the health of dugongs; and
- » Increased vessel traffic may increase disturbance of foraging species.

As noted above the most significant foraging area for the dugong in Cleveland Bay is off Cape Cleveland. The nearest seagrass beds have been identified approximately four kilometres upstream of the Project area. The potential for impact on dugong and their habitat, and any mitigation measures, will be investigated further during the EIS program.

## Dolphins and other cetaceans

The Australian snubfin dolphin is a recently described species that inhabits the waters of Cleveland Bay and the coastal waters of Queensland. It is a species of conservation priority because of its perceived rarity. It is thought to be the only species of dolphin endemic to Australia and is listed as rare under the *Nature Conservation Act 1992*. This species is believed to be found all year round throughout Cleveland Bay and has been known to frequent the waters around the Port. The Indo-Pacific humpback dolphin is also known to inhabit the waters of Cleveland Bay year round and has a similar distribution and is vulnerable to the same type of threats as the Australian snubfin dolphin (Parra *et al.* 2004). The Indo-Pacific humpback dolphin has important feeding and nursing areas in Cleveland Bay, in particular the mouth of the Ross River and associated channels (pers. comm. Parra, 2008). Potential impacts to these species from the Project include noise pollution, disturbance of feeding habitat, habitat degradation and vessel strike. Other cetacean species that were identified as potentially existing in the Project area included whale and dolphin species that are more likely to inhabit deeper coastal waters. It is highly unlikely that they will be impacted by the Project. All potential impacts and mitigation measures will require further investigation in the EIS process.

### 5.1 (f) Likely impact on the environment in part of the Commonwealth marine area

The Project site is not within a Commonwealth marine area.

### 5.2 Likely impacts for nuclear actions, actions affecting Commonwealth land or actions taken by the Commonwealth

The action is not considered to be a nuclear action and does not involve any nuclear activity.

## 6 Measures to avoid or reduce impacts

- » Mandatory use of turtle exclusion devices (TEDs) on all dredging equipment;
- » Fauna spotters during dredging to avoid species along the dredge path; and
- » Turning off dredge suction whilst removing it from the seabed.
- » Appropriate management of dredge tailwaters to ensure no contaminated water is purged into the Bay; and
- » Appropriate management of sedimentation from dredging, especially in important and sensitive habitat areas.

Potential Acid Sulfate Soils will be managed in accordance with the State Planning Policy and the Queensland Acid Sulfate Soil Technical Manual – Soil Management Guidelines.

### Environmental Offset Opportunities

During the EIS phase TPA will investigate a series of offset opportunities in the local area where appropriate, having regard to existing approved land uses.

### Environmental Management Plan (EMP)

The Marine Precinct will require a site-specific EMP that will aim to:

- » Facilitate the development and operation of the Marine Precinct in accordance with applicable environmental laws, policies and procedures;
- » Integrate environmental considerations into the development and operation of TPA planning;

- » Provide a framework for continually improving environmental performance and strive for best practice; and
- » Provide a platform for integration with TPA Environmental Management System.

The EMP will be accommodated by all users of the Marine Precinct.

## 7 Conclusion on the likelihood of significant impacts

**NOTE: Under the EPBC Act, you must identify in the referral whether or not you believe significant impacts on the matters protected under the Act are likely. If you identify that significant impacts are likely, you must identify the relevant protected matters in section 7.2.**

Do you THINK your proposed action is likely to have significant impacts?

- |                                     |                           |
|-------------------------------------|---------------------------|
| <input type="checkbox"/>            | No, complete section 7.1  |
| <input checked="" type="checkbox"/> | Yes, complete Section 7.2 |

### 7.1 Proposed action is NOT LIKELY to have significant impacts

Key reasons

Not applicable

### 7.2 Proposed action is LIKELY to have significant impacts

Matters likely to be impacted

- |                                     |  |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | sections 12 and 15A (World Heritage)   |
| <input type="checkbox"/>            | sections 15B and 15C (National Heritage places)  |
| <input type="checkbox"/>            | sections 16 and 17B (Wetlands of international importance)                                   |
| <input checked="" type="checkbox"/> | sections 18 and 18A (Listed threatened species and communities)                              |
| <input checked="" type="checkbox"/> | sections 20 and 20A (Listed migratory species)   |
| <input type="checkbox"/>            | sections 21 and 22A (Protection of the environment from nuclear actions)                     |
| <input type="checkbox"/>            | sections 23 and 24A (Marine environment)   |
| <input type="checkbox"/>            | sections 26 and 27A (Protection of the environment from actions involving Commonwealth land) |
| <input type="checkbox"/>            | section 28 (Protection of the environment from Commonwealth actions)                         |

Key reasons

The proposed action may potentially impact on the World Heritage values of this area, as it is likely certain habitats that are important to threatened and migratory species will be modified. These impacts may potentially include:

- » Increased noise pollution through construction and operation activities and the increase in large and small vessel traffic during operation (of particular importance to cetaceans, dugongs and turtles);
- » Increased potential for boat strikes (of particular importance to cetaceans, dugongs and turtles);
- » Elevated nutrient contents, endangering seagrasses and corals through increased growth of macrophytic algae, and through an increase in contaminants in the water and sediments; and
- » Adverse affects on water quality in the World Heritage Area from elevated nutrients, turbidity and contaminants during operation of the Marine Precinct.

### 8 Assessment approach under the EPBC Act

NOTE: If a decision is made that a proposal needs approval under the Act, the Minister will also decide the assessment approach needed to satisfy the objectives of the Act. While the information you have provided in this referral will be taken into account in making this decision, the final decision rests with the Minister.

#### Level of assessment

X	Bilateral Agreement applies
	Accredited assessment
	Assessment on referral information
	Preliminary information
	Public Environment Report
	Environmental Impact Statement
	Commission of Inquiry
	No comment/Not sure

#### Key reasons

9 Environmental history of the responsible party

NOTE: The EPBC Act Regulations provide for the environmental history of the party proposing to take the action to be taken into account when deciding the assessment approach for actions that need approval under the Act.

		Yes	No
9.1	Does the party taking the action have a satisfactory record of responsible environmental management. <ul style="list-style-type: none"> <li>If Yes, provide details</li> </ul>		
9.2	Is the party taking the action 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? <ul style="list-style-type: none"> <li>If Yes, provide details</li> </ul>		
9.3	For an action for which a person has applied for a permit under the EPBC Act, is the person making the application 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? <ul style="list-style-type: none"> <li>If Yes, provide details</li> </ul>		
9.4	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? <ul style="list-style-type: none"> <li>If Yes, provide details of environmental policy and planning framework</li> </ul>		

## 10 Information sources and attachments

### 10.1 References

Buosi, P. and Adkins, A. (Natural Resource Assessments) 2005. *Townsville Port Access Project: Migratory Bird Impact Assessment*. Technical Report for Qld Rail.

Murtha, G. 1975. Soils and land use on the northern section of the Townsville coastal plain, north Queensland. CSIRO. Melbourne.

Environment Australia. 2003. *Recovery plan for marine turtles in Australia*. Environment Australia, Canberra. (Public access)

Groom, RA., Lawler, IR., and Marsh, H. 2004. *The risk to dugongs of vessel strike in the Southern Bay Islands area of Moreton Bay*. School of Tropical Environment Studies and Geography, James Cook University. Unpublished Report to the EPA.

Hodgson, AJ., and Marsh, H. 2007. Response of dugongs to boat traffic: The risk of disturbance and displacement. *Journal of Experimental Marine Biology and Ecology* 340: 50-61. (Public access)

Lanyon, JM. and Marsh, H. 1995. Temporal changes of some tropical intertidal seagrasses in North Queensland. *Aquatic Botany* 49: 217 -237. (Public access)

Lee Long, WJ., Mellors, JE. and Coles, RG. 1993. Seagrasses between Cape York and Hervey Bay, Queensland, Australia. *Australian Journal of Marine and Freshwater Research*. 44(1): 19-31. (Public Access)

Lee Long, WJ., McKenzie, LJ. and Coles, RG. 1996. Seagrass communities in the Shoalwater Bay region, Queensland – Spring (September) 1995 and Autumn (April) 1996. Queensland Department of Primary Industries Information Series QI96042 (QDPI, Brisbane) 36pp. (Public Access)

Marsh, H. and Lawler, IR. 2000. *Dugong distribution and abundance in the northern Great Barrier Reef Marine Park - November 2000*. Report for the Great Barrier Reef Marine Park Authority. Townsville. (Public access)

Marsh, H. and Lawler, IR. 2001. *Dugong distribution and abundance in the southern Great Barrier Reef Marine Park and Hervey Bay: Results of an aerial survey in October – December 1999*. Report for the Great Barrier Reef Marine Park Authority. Townsville. (Public access)

Marsh, H., Pentose, H., Eros, C. and Hugues, J. 2002. *Dugong status report and action plans for countries and territories*. UNEP, Nairobi. (Public access)

Parra, GJ, Corkeron, PJ., and Marsh, H. 2004. Population sizes, site fidelity and residence patterns of Australian snubfin and Indo-Pacific humpback dolphins. *Journal of Animal Ecology*. 75:862 – 874. (Public access)

Sheppard, JK., Lawler, IR., and Marsh, H. 2007. Seagrass as pasture for seacows: Landscape-level dugong habitat evaluation. *Estuarine, Coastal and Shelf Science* 71, Issues 1-2, 117-132. (Public access)

[www.environment.gov.au](http://www.environment.gov.au) (Public access)

[www.epa.qld.gov.au](http://www.epa.qld.gov.au) (Public access)

[www.msq.qld.gov.au](http://www.msq.qld.gov.au) (Public access)

### 10.2 Reliability of information

Where possible peer reviewed journals were accessed for ecological information. The most relevant and recent data sources have been used.

### 10.3 Attachments

You must attach	figures, maps or aerial photographs showing the project locality (section 2)	X
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 4)	X
If relevant, attach	copies of any state or local government approvals and consent conditions (section 3.4)	
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 3.5)	
	copies of any flora and fauna investigations and surveys (section 4)	
	technical reports relevant to the assessment of impacts on protected matters and that support the arguments and conclusions in the referral (section 4 and 5)	X
	report(s) on any public consultations undertaken, including with Indigenous Stakeholders (section 4)	

## 11 Signatures and declarations

**NOTE: Providing false or misleading information is an offence punishable on conviction by imprisonment and fine (Section 489, EPBC Act).**

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Project title

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- 11.1 Party who prepared the referral      I declare that the information contained in this form is, to my knowledge, true and not misleading. I request that the person named in 11.3 below (if any) be designated as the proponent for the action.

Signature

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Date

---

Full name

---

- 11.2 Party who is responsible for action      I declare that the information contained in this form is, to my knowledge, true and not misleading.

Signature

---

Date

---

Full name

---

- 11.3 Proponent (complete only if different from 11.2)      I, being the person nominated in Section 1.3 of this referral form as the nominated proponent (or agent acting on behalf of), agree to be designated as the proponent for the action described above if it is decided that the action requires approval under Part 9 of the EPBC Act.

Signature

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Date

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Full Name

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If the referring party is a small business (fewer than 20 employees), estimate the time, in hours and minutes, to complete this form (include your time reading the instructions, working on the questions and obtaining the information and time spent by all employees in collecting and providing this information).

Hours	Minutes