Gold Coast Marine Development Project

Initial Advice Statement

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1 INTRODUCTION AND PROJECT OVERVIEW

1.1 Background and Scope of Initial Advice Statement

The Queensland Government recently announced the Gold Coast Marine Development Project, which is part of an integrated vision for the development of the Gold Coast Spit. The project vision has, among other elements; a Cruise Ship Terminal, a Marina Precinct suitable for super yachts and other marine craft and improved amenities in public areas of The Spit.

The proposal advances the Queensland Government's Cruise Shipping Plan, which identified that additional infrastructure was required in a number of locations including the Gold Coast, to support the growth of cruise shipping in Queensland waters.

Expressions of Interest will be sought from developers to implement the project through a partnership approach between the Queensland Government and the private sector. The cruise terminal and marina proposals contained in the plan will be the subject of a comprehensive Environmental Impact Statement (EIS) process, providing for community views to be considered and environmental and social impacts to be effectively assessed.

Gazettal of these components of the plan by the Coordinator-General as a 'significant project' under the *State Development and Public Works Organisation Act 1971* (*SDPWO Act*) will be sought. Accordingly, this Initial Advice Statement (IAS) had been prepared to provide a description of the proposed project and enable scoping of the potential impacts that will be investigated as part of the preparation of the EIS. The information in this IAS, combined with the requirements of advisory agencies and submissions received from other stakeholders and the community, will enable the subsequent preparation of Terms of Reference (TOR) for the EIS.

1.2 Site Location and Description

The project is located on and adjacent to the Gold Coast Spit, the Gold Coast Seaway and the Southport Broadwater at the northern end of the Gold Coast in southeast Queensland. The Spit is typically about 500m wide and separates the Broadwater from the ocean. The Broadwater at Southport is connected to an extensive waterway system including the Nerang River and associated canals to the south and a complex system of channels and rivers to the north including the Coomera River. These northern waterways connect up with southern Moreton Bay.

At the northern end of The Spit, there is an entrance channel known as the Gold Coast Seaway which provides tidal connection and access between the ocean, the Broadwater and the connected waterways. South Stradbroke Island is to the north of the Gold Coast Seaway.

Prior to 1982, the entrance had a well documented history of instability with a general northwards migration (leading to formation of The Spit) and continually changing shallow channels making navigation hazardous. Also associated with this migratory nature of the natural entrance were the progressive erosion of South Stradbroke Island and the ongoing formation of extensive inner bar formations which choked navigation channels in the Broadwater.

Entrance training and relocation works were undertaken to overcome these problems and provide a permanent safe navigable entrance channel with a depth of about 5.5m below Lowest Astronomical Tide (LAT). The works were completed in 1986 with the new entrance being named the Gold Coast Seaway. The project involved construction of breakwaters 320m apart associated with the new entrance, excavation of the channel between these breakwaters, filling of the original entrance, construction of a sand bypassing system to suppress bar formation across the new entrance, and dredging of channels to link the new entrance with existing navigation channels within the Broadwater.

An island, Wave Break Island, was created in the process using sand spoil from channel dredging. As the name suggests, the purpose of this island is to absorb the energy of ocean waves entering the Broadwater via the Seaway. A narrow internal spit was also formed with sand spoil along the eastern side of the southern approach channel in the Broadwater. The remaining waterway between this narrow spit and the main Spit has become known as the Marine Stadium area.

The eastern side of the main Spit has remained essentially undeveloped apart from the Sheraton Mirage development at the southern end and some car parking and minor facilities associated with the sand bypassing system at the northern end. Sea World and various other commercial and marina facilities have been developed along the Broadwater (western) foreshore of The Spit.

1.3 The Proponent

The Government intends to establish the Gold Coast Marine Development Project Board to be the proponent for the project. The Board will be established under the *SDPWO Act* with the final make up of the Board yet to be confirmed by Governor in Council.

The waterway areas and associated infrastructure of the Gold Coast Seaway and the Southport Broadwater are presently under the management and control of Queensland Transport (QT) and Maritime Safety Queensland (MSQ) which is a government agency attached to Queensland Transport. The site and water areas are not within designated port limits or strategic port land at present, therefore to support the development of the project, it is envisaged that a port will be declared on the Gold Coast. Following the creation of the port, application will be made to the Minister for Transport and Main Roads to designate the land for the project (cruise terminal and marina precinct) as Strategic Port Land including the preparation of a land use plan by the relevant Port Authority. This will be carried out in accordance with the Provisions of the *Transport Infrastructure Act 1994*.

Ultimately the overall project for The Spit will be implemented through a partnership approach between the Queensland Government and a preferred developer from the private sector.

1.4 Project and Vision Components

The State Government's total vision for The Spit represents a balance between public open space and recreational and tourism facilities (see Figure 1-1 for the overall project vision). The project in terms of this IAS and subsequent EIS will deal specifically with the Cruise Ship Terminal and Marina Precinct components of the overall project. These parts of the overall vision include:

- Providing a new dimension to Gold Coast tourism through the provision of infrastructure to cater for cruise ships, superyachts and other marine craft. A Cruise Ship Terminal will be built at the

end of The Spit on the north western corner of Doug Jennings Park. The terminal facility will occupy an area of approximately 1 ha (less than 10% of the park area) and will be designed and constructed in such a way as to have minimal impact on the park and any other public space;

- Providing much needed facilities for recreational and commercial boat users through the construction of a marina facility for superyachts, recreational and commercial vessels. The marina precinct will potentially be located either within the northern part of the Marine Stadium or adjacent to Sea World and will include marina support buildings and limited commercial activities; and
- Maintaining open space and enhancing the public recreational experience of the Spit. This will include a preservation and enhancement program for Doug Jennings Park and the western arm of the Marine Stadium as well as the provision of recreational facilities to make them more enjoyable for the community.

Further details and descriptions of these components and the associated infrastructure are outlined in Section 2 below with discussion of legislative, environmental and socio-economic factors in subsequent sections. The vision for the broader project also includes the following components (which are not part of this IAS or subsequent EIS):

- Preserving and enhancing the natural experience of the Federation Walk and Nature Reserve areas east of Seaworld Drive for residents and tourists. The Friends of Federation Walk will be consulted as part of this component;
- Recognising and respecting the traditional indigenous culture of the Gold Coast by providing an opportunity to deliver an Aboriginal cultural experience to tourists and residents as part of the Gold Coast's overall tourist attractions. Aboriginal people who originally come from the Gold Coast have long held a desire to portray their culture and explain their history to visitors and residents of the Coast; and
- Allowing for the development of a parcel of land on the western foreshore of The Spit south of Sea World. As part of the project vision, it is envisaged that a parcel of land will be made available in this area for the construction of new commercial and tourism developments in keeping with existing development themes and planning regulations for the area.

The components dealing with preservation, maintenance and enhancement of Federation Walk will proceed independently while the other commercial and tourism components will be considered separately through State and Local Government approval processes. These will not be part of this IAS or subsequent EIS.

1.5 Rationale for the Project

The project reflects the Government's commitment to expanding Queensland's cruise shipping industry and its implementation of the Queensland Cruise Shipping Plan. It is envisaged that the Cruise Ship Terminal and Marina Precinct will bring a new and exciting dimension to the Gold Coast tourism industry. Cruise shipping is a high-growth, high-yield tourism industry, which is worth at least $200M each year in Australia and which, with good infrastructure and facilities, could create up to $80M in tourism revenues each year for Queensland.

The cruise industry is supportive of a cruise terminal on the Gold Coast as it will cater for the larger cruise ships, and is close to two international airports and a variety of high quality shopping precincts and tourist attractions. Having two dedicated cruise terminals in South East Queensland (Gold Coast and Hamilton in Brisbane) will also allow cruise operators to design more varied itineraries and have more flexibility in their operations.

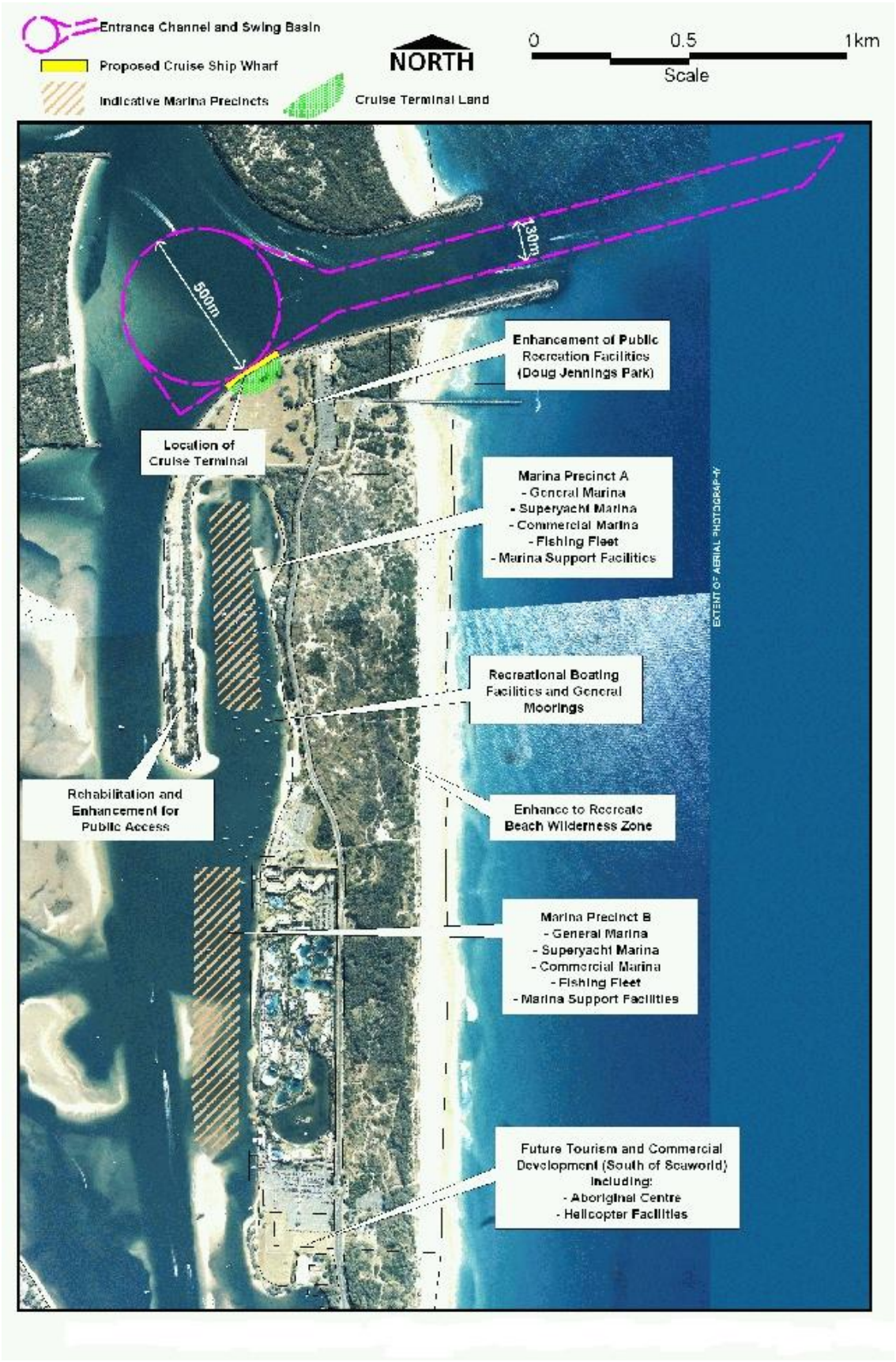
It is estimated that more than 100 jobs will be created during the construction of the cruise terminal. An operational cruise terminal, marina, and commercial development will generate hundreds of additional long term jobs.

The project will enhance the overall tourist appeal of The Spit and Broadwater. A Gold Coast Cruise Ship terminal will provide an important opportunity to showcase the Gold Coast as an international tourist destination. It will ensure the region is more accessible and attractive to residents, tourists and international cruise ship passengers. This will ultimately mean the Gold Coast will continue to develop and grow through tourism.

The superyacht industry in general as well as visitation to Australia also continues to grow. There are presently limited facilities to cater for superyachts on the Gold Coast which constrain the number and length of visits by such vessels. Providing a capacity to attract more superyachts to the region will help further develop the burgeoning Gold Coast marine industry and add to the well established tourist industry.

The master plan for the marina precinct will include provision of much needed new facilities for general recreational vessels as well as the fishing fleet and other commercial users to ensure their long term viability on the Gold Coast. The proposed dredging of the Seaway should also result in improved navigability of the entrance which is sometimes constrained for certain vessels and under certain adverse conditions at present.

Figure 1-1 Gold Coast Marine Development Project Vision



2 PROJECT DESCRIPTION

This IAS deals specifically with the Cruise Ship Terminal and Marina Precinct components of the Government's overall vision for The Spit and Southport Broadwater. These components and associated infrastructure are described below.

2.1 Cruise Ship Terminal Component

In providing a balance between open space and commercial/tourism facilities, the Cruise Ship Terminal is to be the minimum size necessary to provide adequate service to the industry and the region. The project has been assessed under the Queensland Government's Value for Money Framework, which includes an analysis of the costs, risks, technical and environmental challenges of the project and explores the various delivery options available to implement the project. As a result of this assessment, it has been determined that the scope of the Cruise Ship Terminal component will be as follows:

- Provision of a single dedicated cruise vessel wharf and berth. The results of a cruise ship simulation study showed that the best location for a wharf was at the north-western end of The Spit within the Gold Coast Seaway as shown in **Figure 1-1**. It was considered that this would be the best and safest location for berthing and departure of vessels due its location adjacent to the swing basin.

  The wharf is to be accessible to cruise ships up to 300m in length, on a regular basis with minimal possibility of interruption from weather conditions. It is also to be accessible to similar sized naval vessels on an *ad hoc* basis.

- Capital dredging of an access channel, swing basin and berth pocket which are suitable to accommodate the above vessels with a minimum under keel clearance of 2m. The outer channel and inner channel within the Seaway are proposed to be dredged to a depth of 12m below Lowest Astronomical Tide (-12m LAT) with the swing basin and berth area to –10m LAT. The access channel has a proposed width of 130m while the swing basin will have a diameter of 500m (see **Figure 1-1**).

  The quantity of capital dredging material is to be confirmed and will be dependent on any over-dredging strategies adopted. However, it is anticipated to be of the order of 2,000,000 m^3. It is also anticipated that it will be undertaken using a trailer suction hopper dredge.

- Provision of an ongoing maintenance plan to ensure that adequate navigable depth of water is available for the designated cruise ships and naval vessels at essentially all times. There are a number of options which can be considered for such maintenance and these will be assessed in detail as part of the EIS. They may include combinations of regular maintenance dredging, extension of the southern training wall and extension/modification of the existing sand bypassing system.

  The sedimentation processes and the likely quantity/form of channel maintenance will be assessed as part of the EIS. However, it is anticipated that in the order of 350,000 m^3 per year will need to be dredged/bypassed in addition to the quantities pumped by the existing sand bypassing system. The potential for rapid infill during storm events is also a key consideration.

- Appropriate disposal of the capital and maintenance dredged material. The method and site for disposal of the dredged material will be assessed as part of the EIS with recommendations based on appropriate scientific and technical studies. The material is likely to be predominantly clean sand which is part of the active beach system. Therefore disposal options are likely to include retaining it within this system and potential use for beneficial beach nourishment purposes.
- Provision of a functional ocean terminal building which, as a minimum, will include:
    - ticketing and baggage handling facilities;
    - space for AQIS and Customs and Immigration;
    - adequate space for meet, greet and farewell activities;
    - adequate power and data outlets, toilet facilities and drinking fountains; and
    - adequate telecommunications facilities.

  The cruise terminal will be designed and constructed in such a way as to have minimal impact on Doug Jennings Park and any other public space. The terminal facility will occupy an area of approximately 1 hectare of Doug Jennings Park which is less than 10% of the park area. It is proposed that the terminal building will be no higher than 3 storeys which is the present maximum building height in the existing developed areas of the Spit at and south of Sea World.
- Provision of the following minimum parking arrangements in close proximity to the terminal, and made available to patrons of the terminal when required:
    - Parking for 30 coaches in the area, that can be called up as required;
    - Tour/Shuttle buses: 12 spaces;
    - Visitors cars: 200 spaces;
    - VIP/Hire vehicles: 20 spaces;
    - Taxis: 50 spaces.
- Provision of adequate infrastructure and facilities for:
    - Drinking water - a pipeline capable of delivering adequate supplies of drinking water to cruise and naval vessels;
    - Wastewater management – sewage and grey water are to be disposed of in an environmentally approved manner using “best practice” standards; and
    - Refuelling of cruise and military vessels. Again, “best practice” standards are to apply with respect to the provision of measures to prevent and manage potential fuel spills.
- Provision and service of a security system adequate to provide ongoing comprehensive protection.

  The facility will take into consideration the separation and security issues for cruise ships / cruise passengers / other interested parties and the general public in accordance with the ISPS code and the Maritime Transport Security Legislation and US and Australian defence force protection requirements.
- Relocation and/or reconfiguration as necessary of existing facilities including the sand bypassing pipeline under the Seaway and the sewage effluent outfall in the Seaway.

The final design and cost estimates for the Cruise Terminal components will be dependent on the outcomes of the EIS and the private developer tendering processes with respect to the individual requirements.

2.2 Marina Precinct / Superyacht Component

The Marina Precinct will be located either within the Marine Stadium or offshore from Sea World (refer **Figure 1-1**). The final location, size and configuration will be determined as part of the EIS process and in consultation with prospective developers, again with a view to maintaining a balance between public open space and commercial/tourism facilities.

The scope of the marina/superyacht component is as follows:

- Provision in the precinct for the mooring of up to:
    - 350 general recreational vessel berths (lengths up to 24m);
    - 30 superyacht berths (length of 24m or greater);
    - 35 commercial marine berths (charter/fishing vessels);
    - an appropriate number of buoy moorings.

- Capital dredging as needed to cater for the above range of vessels. As a guideline, this is likely to involve dredging to:
    - - 4.5m LAT for superyacht and commercial facilities;
    - - 3.0m LAT for general marina facilities.

  The quantity of capital dredging material is to be confirmed and will be dependent on the site and configuration. The majority of the Marine Stadium area was dredged to –3.0m LAT in 1998 while a deep hole and an intertidal shoal remain off Sea World. The main south navigation channel to/from the Seaway is presently dredged to –4.5m LAT which is sufficient to provide access to the marina.

- Provision of an ongoing maintenance plan to ensure that adequate navigable depth of water is available for the designated vessels. The likely nature and quantity of siltation material and subsequent maintenance dredging requirements will be dependent on the site and configuration of the marina. These will be assessed as part of the EIS, however, it is likely that maintenance dredging quantities and frequency will be low.

- Appropriate disposal of the capital and maintenance dredged material. The method and site for disposal of the dredged material will be assessed as part of the EIS with recommendations based on appropriate scientific and technical studies. The capital dredging material is likely to be predominantly clean sand with minimal silt content as was the case for the recent Marine Stadium dredging. This material was used for beach nourishment purposes and such options would be considered again.

  There is the potential for some of the maintenance dredging material to be fine silts depending on the location and configuration of the marina. While quantities of such material are not likely to be large, options for its disposal will be considered.

- Provision of adequate support facilities in the marina precinct such as:

  - A chandlery;
  - Retail facilities to support the marina;
  - A fish market;
  - Marina management facilities;
  - Adequate power and data outlets;
  - Shower/ toilet/ washing facilities;
  - Adequate telecommunications facilities;
  - Limited commercial office accommodation for tourism operators, boat brokers etc as required to support the marina.
- Provision of adequate infrastructure and facilities for:
  - Drinking water supply to vessels;
  - Wastewater management – sewage and grey water are to be disposed of in an environmentally approved manner using "best practice" standards; and
  - Refuelling – again, "best practice" standards are to apply with respect to the provision of refuelling facilities with measures to prevent and manage potential fuel spills.
- Provision of adequate security measures to protect and monitor the operations of the precinct. A clear physical delineation between the marina/superyacht precinct and public land is proposed.

The Marina Precinct will not include general boat maintenance facilities or accommodation components. The final location, design and cost estimates for the marina will be dependent on the outcomes of the EIS and the private developer tendering processes with respect to the individual requirements.

In addition the recreational boating facilities may be upgraded by the provision of pontoons adjacent to the boat ramps and sewage pump out facilities.

2.3 Associated Infrastructure Works

The capacity of existing infrastructure on The Spit and the expected increases in demand associated with the project will be established in the EIS as well as options for implementing necessary upgrades. The Cruise Ship Terminal and Marina Precinct are to be serviced by infrastructure that is capable of:

- providing adequate power, that is, 415 volt, 50 Amp, 3 phase power supply;
- providing adequate drinking water as outlined above;
- providing adequate telecommunication facilities;
- disposing of sewage and grey water in an environmentally approved manner as outlined above; and
- providing refuelling facilities that are managed in an environmentally approved manner as outlined above.

The Cruise Ship Terminal and Marina/Superyacht Precinct are also to be serviced by an adequate transport system, which will cater for public, private, emergency and service vehicles. The Gold Coast City Council and Main Roads have been considering options for alleviation of existing traffic congestion on The Spit which is serviced by a single road, Seaworld Drive. This road is presently two-lane each way south of Sea World and one-lane each way north of Sea World. A study on the projected traffic generated by the project will be required to determine any significant impacts on traffic movements in this area and options to address them.

2.4 Shipping Movements

When the cruise terminal opens, it is anticipated that there will be approximately 20 cruise ships per year visiting the Gold Coast.

For safety reasons as well as security, it is anticipated that public access to the Seaway will only be restricted when cruise ships are entering and departing the terminal. Marine safety issues will be determined by the relevant Harbour Master following the declaration of port limits. During the period ships are berthed, an exclusion zone in the water of up to 100 metres may also apply. Otherwise, access to the Seaway will be readily available. Cruise ships arrive at times and dates that are predetermined months in advance. Precise times and dates for cruise ship visits will be published in time for Seaway users to plan their activities (for example, in the Gold Coast Bulletin and websites).

2.5 Employment

It is estimated that more than 100 jobs will be created during the construction of the cruise terminal. An operational cruise terminal, marina, and commercial development will generate hundreds of additional long term jobs. There will also be indirect flow on effects for employment in the vast number of supporting commercial and tourism businesses.

3 RELEVANT REGULATION, APPROVALS AND PLANNING SCHEMES

3.1 General Considerations

It is expected that the EIS for the cruise ship terminal and marina precinct components of the project will proceed under the requirements of the *State Development and Public Works Organisation Act 1971*. This requires the proposed project to be designated by the Coordinator-General as a 'significant project' and provides for public and government comment on both the draft Terms of Reference for the EIS and the draft EIS.

Key pieces of legislation that are expected to apply to the project, and will need to be considered throughout the EIS process are:

1. *Environment Protection (Sea Dumping) Act 1981 (Cth).*
2. *Environment Protection and Biodiversity Conservation Act 1999 (Cth).*
3. *Integrated Planning Act 1997 (Qld).*
4. *Environmental Protection Act 1994 (Qld).*
5. *Coastal Protection and Management Act 1995 (Qld).*
6. *Fisheries Act 1994 (Qld).*
7. *Transport Infrastructure Act 1994 (Qld).*
8. *Marine Parks Act 2004 (Qld).*
9. *Aboriginal Cultural Heritage Act 2003 (Qld).*

State policies are also expected to apply to the proposed development. Key considerations in regard to the above legislation and policies are outlined below.

At a local level, the Gold Coast Planning Scheme currently applies to the proposed project area. As the project proceeds, it is envisaged that a port will be declared on the Gold Coast and a process for declaring the area for the cruise terminal and marina as Strategic Port Land will be undertaken including the preparation of a land use plan in accordance with the *Transport Infrastructure Act 1994*. On completion of the land use plan, the Gold Coast Planning Scheme will no longer apply and an existing port authority will become the assessment manager for these parts of the development. Details of the current local planning scheme are outlined below for completeness

3.2 Commonwealth Regulations

3.2.1 Sea Dumping Act

Dredging and disposal of dredge material will be required for the capital deepening of the Seaway, swing basin and marina basin as well as for maintenance of those areas. Options for disposal of the dredge material (predominantly clean sands) will be assessed as part of the EIS and are likely to include the nearshore active beach system which is within State waters, subject to gaining the

requisite approvals. It is possible, although unlikely, that consideration could be given to a deep water, off-shore site located in Commonwealth waters.

The *Environment Protection (Sea Dumping) Act 1981* (*Sea Dumping Act*) requires a permit to lawfully carry out disposal of dredge spoil (including loading for the purposes of dumping dredge spoil) in Commonwealth waters. The *Sea Dumping Act* applies within the coastal waters of an Australian State unless that State has enacted suitable legislation, giving effect to the purpose of the Commonwealth *Sea Dumping Act*. Queensland does not have such legislation[1] and thus the Commonwealth legislation applies.

The Department of the Environment and Heritage (DEH) is the determining authority that administers the *Sea Dumping Act* and issues permits for all sea dumping activities. Australia's *National Ocean Disposal Guidelines for Dredged Material* (NODGDM) outline the application and assessment procedures associated with permits to dispose of material at sea under the *Sea Dumping Act.* The Minister may apply conditions to a permit on approval.

An application for a Sea Dumping Permit for disposal of capital and maintenance dredged material would need to be lodged with the DEH and, under Section 161 of the *EPBC Act*, referred to the Minister for Environment and Heritage. The referred actions under the *Sea Dumping Act* would then need to be assessed under the accredited EIS assessment process. In this regard, a Sampling and Analysis Plan (SAP) would need to be developed in accordance with the NODGDM in the initial phase of investigations. This SAP would outline the requirements for site investigation, sediment sampling methodology, testwork and reporting parameters. As the project will require capital dredging and long-term maintenance dredging, a long-term dredge spoil management strategy may be required. This will involve examination of the current environment, the proponent's ability to meet responsibilities under the *Act*, the establishment of a TACC (Technical Advisory and Consultative Committee),[2] and the development and implementation of a Long Term Dredge Spoil Management Plan (for the dredging and disposal of spoil).

3.2.2 Environment Protection and Biodiversity Conservation Act

In the situation where the project will have, or is likely to have, an impact on a matter of National Environmental Significance (NES) then the activity must be referred under the *Environment Protection and Biodiversity Conservation Act* (*EPBC Act*), and a decision made as to whether the activity is a 'controlled action'. The *EPBC Act* identifies seven matters of national environmental significance (NES). Those matters of NES that ***may*** apply to this project include listed threatened and migratory species, Ramsar sites[3] and Commonwealth waters. The works for construction of the berth and possible extension of the southern seawall, dredging of the Seaway and swing basin, disposal of dredge spoil, and the dredging and construction for the marina have the potential to trigger the *EPBC Act*.

It should be noted that the project has been referred to DEH under the provisions of the *EPBC Act*. Where the action is determined to be a 'controlled action', DEH will decide on an environmental

[1] The *Queensland Marine (Sea Dumping) Act 1985* has not been proclaimed.
[2] The role of the TACC is to help protect the environment and integrate environmental issues with the activities of operation, ongoing planning and maintenance.
[3] The southern boundary of the Moreton Bay Ramsar site is in close proximity to the proposed dredging works for the Seaway and turning basin.

assessment approach. As an EIS is required under Queensland procedures (see below), it is expected that State and Commonwealth bilateral arrangements for the assessment process will apply, and the Coordinator-General will be the lead agency.

3.3 Queensland State Regulations

3.3.1 State Development and Public Works Organisation Act

It is expected that the EIS for the cruise ship terminal and marina precinct components of the project will proceed under the requirements of the *State Development and Public Works Organisation Act 1971* (*SDPWO Act*). This requires the proposed project to be declared by the Coordinator-General as a 'significant project' and provides for public and government comment on both the draft Terms of Reference for the EIS and the draft EIS.

3.3.2 Integrated Planning Act and Associated Legislation

IPA outlines the assessment and approval process (Integrated Development Assessment System (IDAS)) that is used for licences and permits required by Queensland regulation.

A development permit under *IPA* will be required for issues that may include, but not be limited to:

- Environmentally Relevant Activity (ERA) (as defined under the *Environmental Protection Act 1994* (e.g. dredging).
- Operational work in a tidal area (including tidal work for a marina with more than 6 vessel berths) or in a coastal management district as defined by the *Coastal Protection and Management Act 1995* including disposing of dredge material in tidal water.
- Operational work requiring the removal, destruction or damage to a marine plant (e.g. seagrass in Marine Stadium) pursuant to the *Fisheries Act 1994.*
- If acid sulfate soils are present, State Planning Policy (SPP 2/02) – *Planning and Managing Development Involving Acid Sulfate Soils* will apply.

It is envisaged that a port will be declared on the Gold Coast and application made to designate the land for the cruise terminal and marina precinct as Strategic Port Land in accordance with the provisions of the *Transport Infrastructure Act 1994* as outlined below. After the port authority is established for the area, and the land is declared as Strategic Port Land, that authority will become the assessment manager for IDAS applications made pursuant to *IPA.* It should be noted that the area of land made available for commercial development south of Sea World will not be included in the Strategic Port Land designation.

3.3.3 Transport Infrastructure Act 1994

Currently the area of the proposed development is governed by the Gold Coast City Council under the Gold Coast Planning Scheme. However, as part of the project, the site would become part of a designated Port under the *Transport Infrastructure Act 1994* with the port authority becoming the assessment manager. This would involve the development of a land use plan for Strategic Port Land. Although Strategic Port Land is not subject to local planning schemes (i.e. the provisions of the Gold Coast Planning Scheme), the subsequent development of the port land use plan must take into

account the Gold Coast City Council's views and the results of a public consultation process to amend the land use plan. Any apparent conflicts with the existing Local Area Plans would need to be resolved separate to the EIS process.

3.3.4 Marine Park Act 2004

The southern boundary of the Moreton Bay Marine Park runs directly east, from the south-eastern tip of South Stradbroke Island. The landward area of the Marine Park is Habitat zone. Habitat zones are designed to provide for reasonable use and enjoyment of the Marine Park, while maintaining productivity of the natural communities by excluding activities such as shipping operations and mining (EPA website). The eastern area of the Marine Park is General Use zone.

The proposed alignment of the channel for capital dredging extends into the Habitat and General Use zones in the Moreton Bay Marine Park. Activities within the Park are regulated under the *Marine Parks (Moreton Bay) Zoning Plan 1997* and require approval under the *Marine Parks Act 2004*, issued by the QPWS (EPA). Approval will also be required where spoil disposal activities occur to the north of the northern training wall within the bounds of the Marine Park.

3.3.5 Other Legislation and Policies

Further Queensland regulatory mechanisms which may need to be considered include:

- *Nature Conservation Act 1992* and *Regulations*.
- *Native Title (Queensland) Act 1993*.
- A*boriginal Cultural Heritage Act 2003* (*ACHA*). This states that a notified Cultural Heritage Management Plan (CHMP) is required if an EIS is undertaken. The *ACHA* also provides information on the nature and content of a CHMP, which is a document registered by the Minister for Natural Resources and Mines.
- *Land Act 1994.*
- *Vegetation Management Act 1999*.
- For the clearing of vegetation on State or freehold land, the *State Policy for Vegetation Management on Freehold Land* and the *Broadscale Tree Clearing Policy for State Lands* would apply.
- State and Regional Coastal Management Plans – the Queensland State Coastal Management Plan and South-east Queensland Regional Coastal Management Plan include policies that may need to be considered (e.g. coastal use and development, and water quality). In particular, the Regional Plan highlights the following significant issues requiring consideration:
    - Significant coastal wetlands (Broadwater);
    - Significant coastal dunes (foredunes of The Spit);
    - Shorebird habitat (The Spit and Broadwater); and
    - Areas of special interest for whales and dolphins (Broadwater).

  The State and Regional Coastal Plans have the effect of a State Planning Policy.

- Other State Planning Policies and Guidelines, especially those that take into account the vulnerability of The Spit to freak combinations of meteorological conditions (Gold Coast Planning Scheme), for example the *SPP1/03 Mitigating the adverse impacts of Flood, Bushfire and Landslide*.

3.4 Current Local Regulations

3.4.1 Gold Coast Planning Scheme

It is envisaged that the sites released to the marina development and the cruise ship terminal will be declared as Strategic Port Land and therefore the Gold Coast Planning Scheme will no longer apply to those areas. However, under S286(1)(c) of the *Transport Infrastructure Act 1994*, the views of the Local Government Authority must be taken into consideration in the approval process for an amendment to the port land use plan. Details of the current local planning scheme are outlined below for completeness and consideration in this regard. Other parts of the redevelopment (such as the excess of Crown Land south of Sea World) will remain subject to the Gold Coast City Council Planning Scheme.

Local Area Plans (LAPs) exist for the proposed project area. *The Spit (Gold Coast Harbour)* LAP (Part 6, Div 2, Chapter 26) covers most of the project area, with the *South Stradbroke Island* LAP (Part 6, Div 2, Chapter 22) to the north covering the areas where dredging of the seaway and disposal of spoil are proposed.

Both LAPs focus on the need to ensure for the protection and enhancement of the environment, natural beauty and significance of The Spit and Seaway areas (and Broadwater) including the foreshores and marine environment. The LAPs highlight the need to conserve and maintain open spaces for environmental, ecological and visual significance. The Spit LAP also requires management of recreational usage of park reserves, and the ecologically sustainable promotion of the economic viability and operational functions of the marine-oriented land uses to ensure long-term sustainability, and the conservation of the marine environment.

Precincts that may potentially be impacted are Phillip Park and Environs (Precinct 1, The Spit), The Seaway Park (Precinct 2, The Spit), Sea World (Precinct 5, The Spit) and the Seaway (Precinct 1, South Stradbroke Island):

- Phillip Park and Environs: The area is to be preserved and enhanced as public open space in view of its environmental significance. The maximum building height in this area is one storey.
- The Seaway Park - Similarly to Phillip Park and Environs, the area is to be preserved and enhanced as public open space in view of its environmental significance. Additionally, adequate measures should be taken to cater for the increasing demand for informal recreational usage. The maximum building height for this precinct is also one storey.
- Sea World: This may be impacted due to access for, or development of, the proposed marina (Option 2). No development within this precinct may impact on the visual significance of the area. The maximum building height in this precinct is 3 storeys.
- Seaway: The intent for this precinct is to protect the natural systems and to manage the erosion activity, at the interface of South Stradbroke Island and the Seaway. The long-term stability of the Seaway must be maintained.

Other aspects of the Planning Scheme will also need to be considered including Overlays and Planning Strategy maps. For example, relevant overlays may include:

- Natural Hazard (Flood) Management Areas - some areas to the east of Marine Stadium and on the western side of Sea World are classed as Designated Flood Affected Areas;
- Conservation Strategy Plan - identifies the proposed area of the terminal and option 1 for the marina as within "large habitat systems". Also the area is defined as having "existing 1994 remnant vegetation (and other natural systems) within the city".
- Public Open Space Management - the northern area of the Spit is designated Recreation Park.
- Scenic Tourist Route – the Spit and Broadwater are identified as scenic tourist route areas.

Relevant Planning Strategies may include the Tourism Strategy and Conservation Strategy. It should be noted that other local and regional plans and strategies may also apply to the proposed development.

4 COASTAL AND HYDRAULIC PROCESS FACTORS

4.1 General Characteristics and History

The project is located within the Gold Coast Seaway and the Southport Broadwater as described in Section 1.2 and is subject to the prevailing coastal and hydraulic processes of the region. The Seaway is the entrance channel connecting the ocean with the Southport Broadwater and other internal waterways. This entrance channel cuts through a long, sandy, high wave energy coastline which is subject to substantial longshore transport of sediment. As well as providing tidal and navigation connection to the ocean, the entrance conveys flood discharges to the ocean for the catchments of a number of river systems which flow into the Broadwater.

Prior to 1982, the entrance had a well documented history of instability with a general northwards migration under the dominant northward longshore transport of sand. Continually changing shallow channels made navigation hazardous. Also associated with this migratory nature of the natural entrance was the progressive erosion of South Stradbroke Island and the ongoing formation of extensive inner bar formations which choked navigation channels in the Broadwater.

Entrance training and relocation works were undertaken to overcome these problems and provide a permanent safe navigable entrance channel with a depth of about 5.5m below Lowest Astronomical Tide (LAT). The works were completed in 1986 with the new entrance being named the Gold Coast Seaway. The project involved construction of breakwaters 320m apart associated with the new entrance, excavation of the channel between these breakwaters, filling of the original entrance, construction of a sand bypassing system to suppress bar formation across the new entrance, and dredging of channels to link the new entrance with existing navigation channels within the Broadwater. An island, Wave Break Island, was created in the process using sand spoil from channel dredging. As the name suggests, the purpose of this island is to absorb the energy of ocean waves entering the Broadway via the Seaway.

The sand bypassing system is a trestle mounted jet pump based operation which collects and pumps sand from the southern side of the entrance to the northern side. The intent of the system is to artificially transfer the net northerly longshore transport of sand from one side of the entrance to the other thereby preventing the build up of sand to the south of the training walls and erosion to the north as well as minimising the inflow of sand and shoaling of the entrance channel/bar.

Since completion of the works, considerable scour of the bed has occurred within the entrance channel adjacent to the southern breakwater and the tip of the northern breakwater where depths in excess of 18m below LAT presently exist. The ebb tide delta seaward of the training walls has also continued to grow with sand scoured from within the Seaway channel between the walls and leakage of longshore sand transport through/beyond the sand bypassing system. While the general depth across this delta is typically greater than 5.5m below LAT, a narrow bar shallower than 4.0m below LAT is present from time to time but is generally not continuous across the entrance.

Deposition within the Broadwater channels has also required maintenance dredging from time to time, particularly in the southern approach channel seaward of Wave Break Island near the

confluence with the northern approach channel. The main south navigation channel in the Broadwater is generally maintained at a depth greater than 4.5m below LAT.

4.2 Wind and Wave Climate

The outer entrance channel is exposed to winds and waves with unlimited fetches from essentially all onshore directions although south southeast to southerly sector waves are influenced by Pt Danger some 25km to the south. Waves at the site include both short period locally generated sea and longer period swell. Southeast to southerly winds and waves are dominant and are particularly strong, while afternoon north easterly winds and waves of lesser strength and height are common during summer months. The region also experiences extreme cyclonic wind and wave conditions occasionally during summer through to early autumn.

Recorded wave data nearby indicates that an offshore significant wave height (Hsig) of 1m is exceeded about 50% of time while a significant wave height of 2m is exceeded about 5% of time. During extreme events, offshore significant wave heights in excess of 6m can occur.

The Gold Coast Seaway training walls and entrance channels are aligned slightly north of east with the southern wall being 200m longer. This limits the penetration of waves into the entrance channel from the dominant southeast direction. However, some wave penetration does occur, particularly of longer period waves. In addition to the direct influences of winds and wave motion on ship movements, they are dominant factors for the prevailing longshore sediment transport processes. Waves approaching the shore and breaking at an angle generate a longshore current which transports the sand. Such wave-induced effects may cause substantial cross-currents at the entrance under certain conditions.

The wind and wave conditions along the channel and at the proposed berth will be further investigated as part of the EIS for consideration with respect to the prevailing processes and implications for navigation/mooring.

4.3 Capital Dredging

The navigation requirements in terms of the channel and basin depths and widths are described in Sections 2.1 and 2.2 for the Cruise Terminal and Marina Precincts respectively. Capital dredging of the entrance channel across the ebb tide delta and through the Seaway itself will be required. As discussed above, the depths across the ebb tide delta vary but are typically greater than 5.5m below LAT apart from a narrow, shallower bar.

Dredging a channel to -12.0m LAT would extend some 800m to 900m seaward of end of the existing southern training wall to reach the -12.0m LAT contour. Within the Seaway channel between the breakwaters, the existing channel has depths in excess of the design navigation depth of 12m below LAT in places. However, a 130m wide channel along the centre line would require additional dredging primarily on the northern side of the channel. Dredging the swing basin to –10.0m LAT would involve substantial dredging of the shoal which has formed seaward of Wavebreak Island where existing depths are less than 1m below LAT in places.

The capital dredging quantity for the entrance channel and swing basin necessary for the Cruise Ship Terminal is to be confirmed but is likely to be of the order of 2,000,000 m^3. This dredging and

maintenance of the existing south navigation channel in the Broadwater will be sufficient to provide navigable access for all craft to the potential Marina Precinct sites. Further capital dredging of the marina basin is likely to be required to provide sufficient depth for superyachts depending on the site and configuration adopted. This will be assessed through the EIS process.

4.4 Tidal Hydraulics

Tidal hydraulic processes are important with respect to understanding the existing flow and current regime and how that may influence navigation and berthing within the Broadwater. Dredging associated with the project also has the potential to alter the existing tidal hydraulic regime. An understanding of such potential impacts is important with respect to other potential follow on impacts.

Prior to construction of the Gold Coast Seaway and the associated navigation channels, the tidal regime of the Broadwater was controlled primarily by the shallow mobile bar and extensive shoals inside the entrance. The bar and estuary shoals attenuated the ocean tidal range by approximately 60%. The tidal range also varied considerably due to both natural changes in the bar and shoals as well as canal estate development along the Nerang River which increased the tidal prism.

Following construction of the Gold Coast Seaway, tide levels in the Broadwater/Nerang River were monitored by the Department of Harbour and Marine. The report documenting the findings of this monitoring (Harbours and Marine 1988) concludes that:

> "Construction of the Gold Coast Seaway, with the associated navigation channels in The Broadwater, has created more efficient channels and altered the water flows throughout the estuary. The mean range has increased; the height of the Mean High Water Line has risen; the Mean Low Water Line has fallen.
>
> The predicted change has occurred. It has continued after the completion of the dredging while the estuary adjusted to the flow through the Seaway.
>
> The fall in the height of the low tide levels observed early in this study ceased during the period September 1986 to April 1988. At the water level stations near the Seaway these levels are approximately at the height experienced in the open sea. Accordingly little further change is expected."

Ongoing scour of the Seaway entrance channel and some further dredging within the Broadwater has led to some minor additional changes to the tidal hydraulic characteristics of the Broadwater and connected waterways. These processes have been investigated as part of various studies in the region incorporating data collection and numerical modelling which show the dominance of tidal flow to/from the north of the Seaway and the high velocities through the various channels.

Peak tidal velocities in the Seaway entrance channel exceed 1.2m/s under mean spring tide conditions. Higher velocities occur during large spring tide conditions while lower velocities occur during neap tides and around the turn of each tide (ie around high tide and low tide). Pure tidal velocities decrease seaward of the training walls. However, wind and wave induced effects can modify the currents in this area and potentially cause cross current conditions.

Differential current speeds and directions occur across the swing basin area as the flow divides and changes direction into the two approach channels either side of the entrance. Low velocities occur immediately in front of Wavebreak Island. Potential velocities at the berth will be governed by its exact location and configuration which will be investigated as part of the EIS. However, mean spring tide velocities at the berth are likely to be at least 0.6 to 0.8m/s.

There is little attenuation of tidal levels through the existing Seaway and to the south. However, the mean spring tidal range to the north is reduced slightly from 1.3m in the ocean to about 1.1m near Sovereign Islands. Previous numerical modelling investigations have indicated that further deepening of the entrance channel will have negligible impact on tide levels (less than 1cm) as the levels through the Seaway and immediately to the south are similar to those in the ocean. Similarly, there will be negligible change to tidal flows and velocities. This will be investigated further as part of the EIS.

The potential sites of the Marina Precinct are both in areas of relatively low tidal velocities and dredging/marina construction is not anticipated to cause any substantial changes to tidal hydraulics. Again this will be investigated further as part of the EIS.

4.5 Flood Hydraulics

The Broadwater and Gold Coast Seaway provide the conveyance channels for flood discharge from the Nerang, Coomera and Pimpama Rivers as well as other connected creeks and waterways. These systems have extensive floodplains which have been largely developed. Consequently, any works which have an adverse impact on flooding may result in damage.

Adverse impacts to flooding can generally occur as a result of:

- Increases in rainfall run-off;
- Loss of floodplain storage volume;
- Restriction of downstream discharge channels; and/or
- Increased conveyance of upstream discharge channels.

The proposed Cruise Ship Terminal and Marina Precinct will have essentially no effects on the overall rainfall run-off or floodplain storage characteristics of the system. They will involve some dredging of the Gold Coast Seaway and channels within the Broadwater. Such dredging alone would be expected to increase the hydraulic efficiency of the channels thereby potentially reducing upstream flood levels associated with substantial rainfall run-off. Some restriction of the discharge channel eg. a wharf structure and/or the presence of a ship would be required to have an adverse upstream impact.

The proposed Cruise Ship Terminal has berth facilities within the main channel. If the wharf structure is piled, it may cause a minor local increase in resistance to flow. However, this is likely to be more than compensated for by the dredging of the adjacent channel and swing basin (ie a decrease in resistance to flow).

If a ship is moored at the berth during a flood, there may be some further localised restriction in addition to that caused by the wharf piles. However, there would be substantial warning of an

impending major flood and it is anticipated that protocols would be that the ship not come into port or be required to leave prior to such an event.

As discussed in Section 4.6 below, one option to reduce sedimentation of the entrance channel could be to extend the training walls. Any such extension would be accompanied by dredging of the channel. Furthermore, it could be expected that the channel between the extended walls would scour to provide a similar conveyance capacity to the existing channel.

While extension of the training walls would conceptually provide a longer channel and added resistance with the potential for increased flood levels, this would be offset somewhat by the dredged/scoured channel. A detailed hydraulic assessment would be required to confirm the net effect. Furthermore, it is considered unlikely that there would be a need to extend the northern Breakwater as discussed in Section 4.6 below.

Marina facilities constructed in the Marine Stadium would seem unlikely to have any impact on flooding as there is no through flow in this area. If the marina is constructed adjacent to Sea World, increased resistance would result from the structures and vessels but would again be offset somewhat by dredging. The net effect and the potential for high flood velocities through the marina basin will be investigated as part of the EIS.

As well as the potential impacts on flooding from upstream discharge, consideration needs to be given to the potential impacts on storm tide penetration in from the ocean and the dynamic interaction with floodwater discharge. A hydraulically more efficient entrance channel may allow additional storm tide penetration into the Broadwater. This is likely to only effect the downstream Broadwater region where peak levels are dominated by the ocean storm tide level rather than freshwater discharge which typically occurs at a later time. Peak levels in the Broadwater region are unlikely to exceed about 2.2m AHD with minimal inundation of surrounding land. As such, a small increase in storm tide penetration is unlikely to have any significant adverse flooding impacts. The benefits of a more hydraulically efficient entrance in reducing flooding from upstream discharge are likely to outweigh any small adverse impacts of increased storm tide penetration.

The above flooding considerations have been based on a general understanding of the hydraulic processes and the results of limited hydraulic modelling previously undertaken. Further detailed modelling will be required as part of the EIS to investigate the potential implications of the specific proposal.

4.6 Sedimentation and Maintenance Dredging

4.6.1 Seaway Entrance Channel

A key consideration for the project is the need to dredge and maintain a navigable channel across the entrance bar and through the Seaway. The Cruise Ship industry is likely to require a guaranteed navigable channel depth for access to the terminal. The entrance is located in a high wave energy environment where there is substantial coastal sediment transport and potential for sedimentation of the dredged channel. Key considerations include:

- The rate of sedimentation and its influence on being able to guarantee sufficient navigable depth at all times;

- The total quantity of sedimentation and associated cost to maintain the channel; and
- Practical methods to minimise and/or manage the sedimentation to guarantee navigable access at all times.

The coastal zone at Gold Coast Seaway is characterised by substantial transport of sediment along the shore. This long-shore transport of sand is generated by waves approaching the shore at angle. Transport occurs both towards the north and south depending on the prevailing wave directions. Due to the dominant winds and waves being from the southeast, there is a net long-shore transport of sand to the north which has been previously assessed at being approximately 500,000 cubic metres per year. The gross transport (in both directions) is typically around 900,000 cubic metres per year.

As part of the concept of the Gold Coast Seaway, a sand bypassing system was designed and installed. The aim of this system is to intercept and artificially transfer the net long-shore transport of sand from the southern side of the entrance to the northern side and thereby suppress formation of a shallow entrance bar seaward of the trained entrance.

The sand bypassing system is managed by Queensland Transport and has been operating since 1986. As discussed in Section 4.1, the system has been successful in maintaining a general depth across the ebb tide delta of greater than 5.5m below LAT. However, the delta has continued to grow seaward and a shallower bar is often present across part of the delta. Previous studies determined that this growth was rapid initially but was estimated to be continuing (over the whole delta) at about 200,000 cubic metres per year.

The previous coastal process assessments indicate that there is substantial sediment transport onto and across the ebb tide delta seaward of the Seaway. These processes, together with the tidal flows into/out of the Seaway, maintain a general depth across the delta in excess of 5.5m with the development of shallower, narrow bar across some parts.

The excavation of a channel to –12.0m LAT will cut across essentially the entire sand transport zone. The channel will effectively intercept and trap the majority of any sand transported to it from both upcoast and downcoast directions (ie. the gross transport across the delta).

An initial estimate of the rate of this sedimentation is about 250,000 m^3/yr. However, importantly more than 20% (50,000 m^3) of this may be deposited in a short period (e.g. one week) during a major storm event which could be expected to occur every 1 to 2 years on average. During an extreme event such as a cyclone, in excess of 100,000 m^3 may be deposited over the duration of the storm.

It could be expected that the majority of the initial deposition in the channel will occur over a relatively narrow zone of about 150m where the majority of the long-shore transport occurs. The sediment will then be redistributed along the channel by the prevailing tidal currents over a distance of about 800m. It would not be expected that this redistribution would be uniform but may result in the majority affecting the channel depth over a limited distance seaward of the end of the southern breakwater.

An initial estimate of the greatest siltation depth is in excess of 4m per year, or in excess of 1.2m during an individual major storm. While the average siltation depth will be less, the navigation will always be constrained by the shallowest section of the channel.

Therefore to maintain a navigable entrance channel to the required depth will necessitate additional works and/or management strategies which will be investigated as part of the EIS. Options may include:

- Initial over-dredging together with regular maintenance dredging;
- Extension of the sand bypassing system; or
- Extension of both the breakwaters and the sand bypassing system.

Preliminary considerations of key issues associated with such options are outlined below and will be subject to further detailed investigations.

(a) Maintenance Dredging

Relying on dredging alone (in conjunction with the existing sand bypassing system) would necessitate dredging to accommodate the sedimentation and maintain the required navigable depth. Investigations will be required to quantify, design and optimise such a dredging strategy. The frequency of maintenance dredging would be dependent on the over-dredging design. This could include a wider deep zone on the side(s) of the channel in the main transport region to trap the sand prior to it reaching the channel. Nevertheless, the total quantity of maintenance dredging (approximately 250,000 cubic metres per year) would still be required.

The EIS would examine the options for dredging strategies and the appropriate balance between scope of capital dredging and frequency of maintenance dredging. The dredging strategy will also need to take into account periodic rapid storm infill.

(b) Extension of Sand Bypassing System

Extension of the existing fixed trestle sand bypassing system to cover the majority of the long-shore transport zone would be considered. However, the design of such a system alone is such that it would not be capable of intercepting all of the sediment transport. Considerable leakage through the system would occur, particularly during major storm events. Furthermore, sedimentation of the dredged channel will initially be related to the local sediment transport processes immediately adjacent to the channel and will not be influenced substantially by the sand bypassing system. As such, additional mobile maintenance dredging incorporating over-dredging similar to the dredging only scenario above would still be required initially.

If the extended sand bypassing system were able to collect and pump additional sand, ultimately this could lead to a diminishment of the ebb tide delta with deeper water adjacent to the channel and less inflow of sediment to the channel. However, it is considered that for a fixed trestle sand bypassing system without a downdrift wall to trap the leakage, this would be a gradual process with a limited capability to substantially reduce the quantity of additional dredging required.

It is therefore considered that extending the sand bypassing system alone (without extending the southern training wall) is not a viable option. It would necessitate similar mobile dredging to the dredging only scenario initially, with the additional cost and limited benefit of the extended bypassing system. While the requirement for additional dredging may reduce in time, there would still be a risk of not maintaining the necessary navigation depth.

(c) Extension of Breakwaters with Sand Bypassing System

Extension of the existing breakwaters in conjunction with extension of the sand bypassing system should be considered as part of the EIS to reduce the direct inflow of sediment and manage the leakage through the sand bypassing system. In principle, the southern breakwater would trap the initial leakage with subsequent recirculation occurring for the bypassing system to pick up the sand.

To avoid substantial build up against the southern training wall, it is considered that additional sand (approximately 150,000 m^3/yr), which is transported past the existing sand bypassing system, would have to be pumped through the extended system. Such a system would still potentially alter the alignment of the offshore bar and continue to allow some minor leakage to the entrance channel, necessitating but significantly reducing additional mobile maintenance dredging. Again, detailed investigation would be required for design and optimisation of such a scheme.

It is considered that extension of the southern training wall by 300m to 400m would provide substantial benefit by extending across the primary long-shore transport zone. Any further extension would be into deeper water with a substantial increase in cost and limited additional benefit. (Note that extension of the southern training wall by about 700m would be required to reach the -12.0m LAT contour). It is considered that extension of the northern training wall would provide limited benefit and is unlikely to be necessary.

A more detailed analysis of these options will be undertaken during the EIS to develop a sustainable and efficient long term dredging strategy.

4.6.2 Broadwater Basins and Channels

As well as the main entrance channel, the dredged swing basin, berth pocket and marina basin within the Broadwater may potentially be subject to ongoing sedimentation from:

- Local redistribution of sand sized particles transported by the prevailing currents; and
- Settling of fine sediments carried down in suspension from the upper catchment.

The balance and extent of such sedimentation will be dependent on the location. The sand sized sediments will typically be mobilised when currents exceed about 0.3m/s. Where the current speeds decrease, the sediment transport capacity also decreases resulting in sedimentation. This typically occurs where flows spread out or channels divide and velocities decrease. A change in channel depth as a result of dredging can also reduce the velocities and cause sedimentation.

Existing areas of such depositions occur:

- Immediately seaward of Wave Break Island where the flood tide current splits to the north and south;
- To the north of Wave Break Island where the flood tide flow disperses over a wider zone; and
- To the south of Wave Break Island where the flood tide flow splits between the main south channel and the channel towards the west.

The finer sediments would tend to deposit in areas of very low velocities. Existing areas of this nature are in the Marine Stadium. However, recent dredging from this area indicated limited silt content with the material being used for beach nourishment purposes.

Detailed investigations will be undertaken to determine the likely nature and quantity of additional sedimentation within the Broadwater as well as maintenance dredging requirements.

4.7 Dredge Material Disposal

The nature of the sediments for capital dredging as well as options for disposal will be dependent on the location. It could be anticipated that the majority will be sand originally from the beach system. However, some stiff indurated sands may be encountered at depth. Some lenses of fine sediments may also be encountered in areas out of the main flow such as in the vicinity of the Marine Stadium. Maintenance dredge material from the entrance and swing basin will be essentially all sand from the active beach system while some finer silts may be encountered as part of maintenance of the marina basin.

The EIS will consider options for disposal of the dredged material in an environmentally sound manner. This will include consideration of potential implications for coastal processes, water quality and marine ecology as well as potential impacts for surfboard riders and beach users. The sand sized particles have originated from the beach system and any capital or maintenance dredging of such material would be suited for beach nourishment purposes (provided the silt content is limited). Sand from the Broadwater has been used for such purposes in the past. There is unlikely to be any limit to the quantity of sand which can be returned to the beach system or used for beneficial beach nourishment purposes. Options could include direct nourishment of upper beach areas or placement of the sand in the nearshore zone to the north or south of the entrance. Options for disposal of the sand outside the active beach system (eg deep water offshore or elsewhere on land) will need to consider the longer term implications for coastal processes including the nearshore profiles and alignments of the Seaway delta and adjacent shorelines.

The finer silt sized sediments would not be suitable for beach nourishment. Disposal of such material elsewhere in the marine environment would generate turbid plumes and other potential environmental impacts that would require investigation. The fine, saline nature of the sediments are such the beneficial land disposal is also likely to be limited.

Further investigation of the potential quantities and the need/options for disposal of fine sediments will be investigated as part of the EIS.

4.8 Water Quality Considerations

In regard to potential water quality impacts, provided the marina facilities are designed and operated to ‘best practice’ standards, it is unlikely that there will be any discernible, long term physicochemical water quality impacts (e.g. depleted dissolved oxygen levels, increased nutrient/pathogen/algal carbon levels). ‘Best practice’ refers to actions such as the provision of sewage pump out facilities, enforcement of appropriate waste management protocols from vessels, provision of refuelling safeguards and management practices, etc. The key reason for this assertion relates to the expected significant rates of water exchange and tidal flushing of the marina basin and the expected low rates

of pollutant and contaminant input. Furthermore, the proposed marina facilities do not include provision for boat maintenance facilities.

However, there could be the potential for both short-term water quality and more chronic or sublethal ecological impacts, essentially related to the aggregation of a large number of vessels within a confined area and the associated dredging and marine structures that are required to moor and service these vessels. There may be some level of 'effective' discharge, albeit small, of various pollutants (e.g. heavy metals, oils and greases and antifouling materials) from moored and motoring vessels that will accumulate in the sediments beneath the operation, noting that this accumulation may be disturbed by the dredging works proposed and the flow retardation effects of the various piles and marine structures that will be required. These accumulated pollutants could cause water quality and ecological impacts via the following mechanisms:

- short-term impacts due to pore water liberation and sediment remobilisation at times of maintenance dredging; and
- potential long-term, effects due to the possible flux of 'exotic' contaminants from sediments below the marina.

The spatial extent of the impacts of these processes is likely to be relatively localised, essentially within the marina basin itself and for some small distance (anticipated to be < 100 metres) around the marina. It should be noted, however, that these effects would be additive to any other impacts which will be occurring within the Broadwater from other catchment and waterway based sources (e.g. stormwater runoff, discharges from nearby boat maintenance operations, distributed sources of pollutant inputs from the large number of other vessels within the Broadwater, Nerang and Coomera River systems). This matter will require quantification at the EIS stage via appropriate monitoring and assessment activities, with subsequent definition of relevant management actions.

Potential impacts on water quality resulting from dredging and spoil disposal activities include:

- Mobilisation of seabed sediments into the water column resulting in increased turbidity levels; and
- Mobilisation and release of contaminants from sediments into the water column, if any are present.

Given that the sediments will be predominantly clean sand, it is not anticipated that dredging operations will generate any substantial water quality impacts. Investigations into the quantity of fine sediments and the quality of the sediment to be dredged have yet to be undertaken. This will be carried out as part of the EIS to ensure compliance with approval processes together with an assessment of the impact on water quality.

5 ECOLOGICAL FACTORS

The areas in which the project is proposed have been artificially created through the construction of the training walls for the Nerang River entrance, and the establishment of the Gold Coast Seaway in the mid 1980s. However, while these areas are highly modified environments, the current Gold Coast Planning Scheme highlights the environmental significance that this area retains.

5.1 Conservation Zones

Moreton Bay Marine Park

The Moreton Bay Marine Park extends to the southern boundary of South Stradbroke Island. The proposed dredging alignment in the Seaway, and dredge spoil disposal activities are likely to occur in, or within close proximity to the boundary of the Marine Park on the seaward side of the Island. Activities within the Park are regulated under the *Marine Parks (Moreton Bay) Zoning Plan 1997* and require approval under the *Marine Parks Act 2004.*

Moreton Bay Ramsar Site

The northern part of the Broadwater has been included in the 1993 designation of Moreton Bay as a wetland of international importance under the RAMSAR Convention. RAMSAR wetlands are protected under provisions of the Commonwealth *Environmental Protection and Biodiversity Act 1999.* The proposed development will not occur within the boundary of the Ramsar site, although dredging for the swing basin and channel in the Seaway are in close proximity to the southernmost boundary of the Ramsar site. The EIS will therefore examine any impacts on RAMSAR values.

Fish Habitat Areas

Fish Habitat Areas in Queensland are declared and managed by the Department of Primary Industries under the *Fisheries Act 1994* and the *Fisheries Regulation 1995*. The Jumpinpin-Broadwater Fish Habitat Area occurs approximately 3km north of the areas directly affected by the proposed facilities. Potential impacts on this fish habitat and fish stocking will be examined as part of the EIS.

5.2 Marine Plants

Marine plants are defined as plants occurring on or adjacent to tidal lands, and includes macroalgae, seagrass, mangroves, saltmarsh, and *Melaleuca* and *Allocasuarina* adjacent to tidal lands. All marine plants are protected under the *Fisheries Act 1994* and require a permit for removal, destruction or disturbance.

WBM Oceanics Australia (2001; 2003) has assessed the marine plant communities in the area of the proposed development. Mangrove and saltmarshes are largely absent from the area, reflecting unsuitable habitat conditions for these assemblages, and possibly minor historical clearing. *Melaleuca* and *Allocasuarina* assemblages do occur on the Gold Coast spit, but are located entirely on terrestrial lands that are not seasonally inundated and are therefore not classed as marine plants.

Three species of seagrass were recorded within the southern Broadwater by WBM Oceanics Australia (2003): Zostera capricorni, Halophila ovalis and Halophila spinulosa. Seagrass occurred as small (<0.5 ha), highly fragmented and apparently ephemeral patches, which were restricted largely to the steep slopes of channels and occasionally, on protected gradually sloping sand banks (i.e. Z. capricorni). Seagrass communities were often found to have a patchy distribution, particularly on the western foreshore of the Broadwater. Sparse H. ovalis was often found beyond the Z. capricorni in deeper waters, but did not form distinct beds.

WBM (2003) recorded discrete, small (<0.1 ha) patches of *H. ovalis* and *Z. capricorni* in the northern sections of the Marine Stadium (Marina Option 1) at water depths of –0.45 to –1.71 AHD. Small (<0.1 ha) patches of *H. ovalis* and *Z. capricorni* were also recorded along the foreshore adjacent to Marina Option 2. No seagrass was recorded in other areas proposed for development (i.e. Seaway, swing basin, spoil disposal area, or berth area).

Dredging of the Seaway and swing basin will lead to the reprofiling of shallow subtidal areas in close proximity to the channel. However, such changes are anticipated to be minor. Furthermore, impacts to the tidal hydraulic regime of the Broadwater are expected to be negligible. Therefore it is unlikely that there will be any indirect seagrass loss within other areas of the Broadwater as a result of dredging activities. Quantification of such indirect changes to sandbanks and associated seagrass is difficult. Depending on the final location and configuration of the marina, there may be some direct loss of small patches of seagrass from the sites under consideration as will be determined in the EIS. A permit to destroy seagrass would be required by DPI.

5.3 Benthic Fauna

Patterns in benthic fauna community structure were investigated by WBM (2003) in June 2003 and January 2004 within three main habitats throughout the southern Broadwater (deep water, shoals and seagrass). The effect of habitat on benthic community structure appeared to vary at different spatial scales. At broad spatial scales, there was little evidence of benthic communities being consistently different between habitat types across the study area. However, when examined at finer spatial scales (within locations), benthic community structure was quite different between seagrass and unvegetated habitats. This indicates that benthic community structure varied among habitat types, although not in a consistent way across the study area. It is likely that declines in seagrass extent over the last 50 years have resulted in changes to the benthic community structure, with potential flow-on effects to ecosystem functioning in the study area.

The impacts of dredging on benthic fauna in the Broadwater will be further examined as part of the EIS.

5.4 Fish and Fisheries

The rock walls of the Southport Seaway and Wavebreak Island have species rich fish assemblages (Koutsoukos, 1999), however there is insufficient information with which to compare species richness in Southport Broadwater to similar habitats (or natural rocky habitats) elsewhere. These fish assemblages were comprised of tropical, temperate and sub-tropical species, which is a typical feature of rocky shore environments in the bioregion.

Soft sediment habitats support feeding and spawning habitats for a range of species, including species of commercial significance. Spawning aggregations of several fish species including yellowfin bream (*Acanthopagrus australis*), dusky flathead (*Platycephalus fuscus*) and sand whiting (*Sillago ciliata*) are known to occur at, or in the vicinity of surf bars (e.g. Pollock, 1984). The effect of the construction of the Southport Seaway on the spawning and subsequent recruitment of these and other species is also unknown. The shoals and channel environments within the southern Broadwater also represent important feeding areas for fish. Furthermore, these areas represent habitats utilised by invertebrate species of direct fisheries significance, including ghost-nippers (*Trypaea australiensis*), penaeid prawns and sand crabs (*Portunus pelagicus*).

The Southport Broadwater supports both commercial and recreational fisheries for a variety of finfish species. Quantifying the commercial catch for the Southport Broadwater is confounded by the spatial resolution of the reporting requirements for commercial catch and effort data in Queensland. On the basis of discussions with the Queensland Seafood Industry Association (QSIA), WBM (2002) found that the Southport Broadwater region supports mesh net fisheries for a variety of species including: garfish (principally *Hemirhamphus regularis ardelio*), sand whiting (*S. ciliata*), sea mullet (*Mugil cephalus*), yellowfin bream (*A. australis*) and dusky flathead *(P. fuscus*). The QSIA considered the species composition of catches in the Southport Broadwater to be more or less similar to those from similar net fisheries elsewhere in Moreton Bay. The commercial fishery in the region is subject to a range of both time and areas closures under the *Fisheries Regulations 1995*.

While also not quantified, based on similar studies adjacent to population centres and tourist destinations, the magnitude of the recreational catch in the Southport Broadwater is likely to be large and could exceed the commercial catch for several species (e.g. West and Gordon 1994). No estimates of recreational fishing effort in the Southport Broadwater are available, however the participation rate in recreational fishing in the Gold Coast region is high. Of households in the Gold Coast region, 45,000 (29%) participate in recreational fishing (Roy Morgan Research, 1999). Many of these participants are likely to fish in the Southport Broadwater. Unlike commercial fisheries, recreational fisheries are open access and effort is considered to be increasing in such fisheries (reviewed in McPhee *et al.*, 2001).

The EIS will examine the impact of the proposed development on fish stocks and their access by recreational and commercial fishing. It will explore options to:

- Ensure dredging is conducted so as to minimise the risk of interrupting life cycle processes (e.g. migrations, spawning, etc.);
- Facilitate access by the public to fishing in this area and the Broadwater more generally; and
- Maintaining healthy fish stocks in the Broadwater.

Rocky shore, surf bar and estuarine soft-sediment habitats would be affected by dredging and berth construction works. Dredging operations (eg. timing of dredging) could be modified to reduce the risk of interrupting important life-cycle attributes (e.g. migrations, spawning periods) of commercially important species. Potential impacts to fish and fisheries will be further investigated in the EIS.

5.5 Shorebirds and Seabirds

Whilst numerous migratory and resident shorebirds[4] have been recorded in the Southport Broadwater, it is an area in which shorebird habitat use has been not been comprehensively surveyed over time. Generally, the high level of recreational activity, both on water and its terrestrial margins, and the low diversity of habitat types of this area, does not support high value feeding or roosting habitat for shorebirds.

Generally, the northern part of the Broadwater[5] provides both larger areas and higher quality feeding and roost habitat, though still affected by high levels of water-based recreational activity. The northern part of the Broadwater has been included in the 1993 designation of Moreton Bay as a wetland of international importance under the RAMSAR *Convention.* Most migratory shorebirds in the Broadwater area have been listed as significant either by:

- International Bilateral Conservation Agreements (i.e. CAMBA &/or JAMBA)[6]; and/or
- State legislation, i.e. *Queensland Nature Conservation Act 1994* (NC Act); and/or
- Commonwealth legislation, i.e. *Environment Protection and Biodiversity Act 1999* (EPBC Act).

Of the seabirds[7] known from the general area, several species of conservation significance may potentially use habitats of the Broadwater and coastal inshore habitats on a regular and seasonal basis. These include the *endangered* Australian sub-species of the Little Tern *Sterna albifrons*, which is known to have traditional roost sites on South Stradbroke Island. The following provides a summary of values of each site as habitat for shorebirds and seabirds (WBM Oceanics Australia 2003).

- Berth area. The rock revetment wall dominates this site. This structure supports potential habitat values for a small number of species as high tide roost sites for smaller-sized migratory waders (e.g. Grey-tailed Tattler *Heteroscelus brevipes*) and perching/sunning sites for some waterbirds. Adjacent open waters may be used as feeding habitat by gulls and terns, including the Little Tern. The rock wall is well used by recreational fisherman. This daily disturbance activity means that it is unlikely that birds would use this area on a regular basis, particularly adjacent to car parking areas. This site is not considered to provide any significant habitat values for shorebirds or seabirds.
- Marina Option 1. The Marine Stadium is a relatively quiet backwater with flat sandy beaches (approximately 6-8m tidal range) and surrounded by a relatively narrow band of coastal sheoak (to 8m in height). There are numerous regular boat anchorages in this area. Numerous footprints and dog tracks indicate that the beaches are well used. This area is potentially suitable for several shorebird species that use sandy beaches as feeding habitat (e.g. Lesser Sand Plover

[4] The terms *shorebirds* and *waders* are generic terms used in this study to describe both resident and migratory species from the following families: Scolopacidae (snipes, sandpipers, godwits, curlews and their allies); Burhinidae (stone-curlews); Haematopodidae (oystercatchers); Recurvirostridae (stilts and avocet); Charadriidae (plovers, dotterels and lapwings); and Glareolidae (pratincoles).

[5] i.e. north of Wave Break Island to about Rat Island, including habitats associated with South Stradbroke Island and Browns Island.

[6] CAMBA (*Agreement between the Government of Australia and the Government of China for the protection of migratory birds in danger of extinction and their environment 1986*) and JAMBA (*Agreement between the Government of Australia and the Government of Japan for the protection of migratory birds in danger of extinction and their environment 1974*);

[7] The seabird grouping generally includes species of the families Procellariiformes, Sulidae, Fregatidae and Laridae.

Charadrius mongolus). It is expected that regular human activity in this area may limit the values of this area to shorebirds. The habitats of this site do not support value to seabirds.

- Marina (Option 2): The area adjacent to the proposed marina (Option 2) comprises a narrow sandy beach (up to 3m wide) in parts, or no beach. South of Sea World there is a narrow beach with a single line of coastal she-oak trees that separates the beach from a large car park. This area does not provide suitable habitat for shorebirds. The adjacent open waters may be used as feeding habitat by a variety gulls and terns, including the Little Tern. The dredging required for the marina is likely to remove part or all of the intertidal sand banks within the site (subject to design). The banks are used by a variety of shorebirds mainly as feeding habitat, though under suitable combinations of tide height and bank morphology it may be used by a small number of birds as a high tide roost site. These banks are of local significance within the southern part of the Broadwater.

The dredger would generate noise that is likely to disturb birds and other fauna. All areas utilised by wading birds are currently subject to major noise (boats, jet skis) and physical (pedestrians, boats) disturbance. Given current high levels of disturbance, it is unlikely that further noise disturbance by the dredger will result in major impacts to wader bird utilisation of the study area. Potential impacts to shorebirds and seabirds will be further investigated in the EIS together with measures that could be integrated into the overall project to enhance the habitat values of the area for birdlife.

5.6 Other Marine Fauna

The Draft South East Queensland Regional Coastal Management Plan identifies the Broadwater as an area of special interest for whales and dolphins. Humpback whales (*Megaptera novaeanglia*) migrate along the coast between June and November, and enter nearshore areas adjacent to, and rarely within, the Broadwater. Two species of dolphin occur in the region: the Indo-Pacific humpback dolphin (*Sousa chinensis*), which occurs in turbid, sheltered waters (Hale *et al.* 1998), and the common bottlenose dolphin (*Tursiops truncatus*), which is generally found in more oceanic waters such as the eastern areas of Moreton Bay (e.g. Corkeron *et al.*, 1987; Lanyon and Morrice, 1997). All cetaceans are protected under the *EPBC Act* (Commonwealth). Species protected under the *Nature Conservation (Wildlife) Regulation 1994* (Qld) include the Humpback whale and the Indo-Pacific humpback dolphin.

Several species of marine turtles including the Green Turtle (*Chelonia mydas*) and the Loggerhead Turtle (*Caretta caretta*) utilise Moreton Bay as feeding areas. These two species are listed under the *Nature Conservation (Wildlife) Regulation 1994*. It is likely that both species would occur in the study area, although there is no empirical data to determine patterns in distribution and abundance.

The highest population densities of Dugong (*Dugong dugon*) in the Moreton Bay region occur in the Moreton and Amity Banks region. The scarcity of seagrass in the southern Broadwater limits the value of the southern Broadwater area as a dugong habitat. Dugong is protected under the *Nature Conservation (Wildlife) Regulation 1994.*

Impacts on these species will be the subject of further examination in the EIS.

5.7 Terrestrial Flora and Fauna

Extensive development has resulted in the removal of most terrestrial vegetation along the south western foreshore of the Spit. Vegetation communities on the wider Spit area are comprised mostly of coastal she-oak, coast banksia (*B. integrifolia*), cottonwood (*Hibiscus tiliaceus*), coastal ti-tree (*L. laevigatum*) and coast wattle. These species occur over a ground layer of both native and introduced grass, herb and vine species. Coastal she oak (*C. equisetifolia*) are not long-lived, and many individuals in this area appear to be dying. Also non-native species such as *Lantana camara* are present. Coastal vines are becoming more dominant. The coastal dune vegetation of the wider Spit area is classed as a Major (vegetation) Remnant (PLI, 1998), and has conservation value at the local level. However, this vegetation type is of no current conservation concern at the regional level (Sattler and Williams, 1999).

The proposed cruise terminal facility is located on a reserve for marine and port purposes with limited tree cover. Depending on the final site and size of the marina facilities, there will be some limited loss of native vegetation cover.

Habitat on The Spit is of low value to ground-dwelling fauna. Due to the absence of appropriate habitat/natural vegetation in adjacent areas, there are limited opportunities for ground-dwelling fauna colonisation from surrounding areas. Further investigation of the potential impacts to terrestrial flora and fauna will be undertaken as part of the EIS.

6 OTHER OPERATIONAL AND SOCIO-ECONOMIC FACTORS

6.1 Noise

Commercial and recreational users of the waterways in the project area represent the main existing threats to the noise amenity (PLI 1998). With the increase in the development of noise sensitive receptors in the land/water interface, there is to be expected an increase in conflicts due to elevated noise emissions. Of particular concern is noise created by personal watercraft ("jet skis"), and to a lesser extent helicopter operations (WBM Oceanics Australia 2003). Dredging operations in the study area also represent a potential source of noise pollution (WBM Oceanics Australia 2003). There is currently a lack of empirical information on the existing noise amenity of the study area, and potential noise impacts from various waterborne activities.

Given current high levels of human disturbance, it is unlikely that further noise disturbance generated by dredging or other works will result in major impacts to fauna utilisation of the study area. No residential development occurs directly adjacent to the proposed works areas, although businesses in the vicinity of Sea World represent potential sensitive noise receptors. The noise impacts generated by the proposal will be the subject of detailed study in the EIS.

6.2 Waste Management

Cruise Ships comply with the *International Convention for the Prevention of Pollution from Ships* (MARPOL) which set the requirements for the storing, treating and removal of pollution from ships. These standards will be strictly enforced. Modern cruise ships have state-of-the-art waste treatment facilities on board and recycle much of their waste. "Best practice" standards are to apply with respect to disposal of waste. As such, there should be no impact of waste disposal activities on the Broadwater or the Spit resulting from cruise ships. Again this issue will be the subject of detailed study in the EIS.

The air quality of the Southport Broadwater airshed is dependant on two factors:

- The prevailing meteorological conditions; and
- The air pollutants emitted in the airshed.

There is limited existing air quality data in the region and no quantitative air quality monitoring data in the immediate study area. The potential air quality impacts and associated regulations or management strategies will be assessed as part of the EIS. This will include consideration of emissions from the vessels and increased traffic in the context of general regional population and industrial growth.

6.3 Ballast Water Management

Since 2001, the Australian Quarantine and Inspection Service (AQIS) in consultation with other government departments and the shipping industry developed and implemented new ballast water management requirements. These requirements aim to reduce the risks of introducing exotic marine pests into Australia's waters. Continued compliance of the additional vessel traffic with Australia's

mandatory ballast water management requirements should result in minimal risk of translocation of marine pest species from ballast water to the study area. This will be examined, however, in the EIS.

6.4 Navigation Considerations

The ability for cruise ships to safely navigate the entrance and berth in the Gold Coast Seaway are critical for the project's viability. To fully understand this, the State Government commissioned a simulation study of cruise ships entering and leaving a Gold Coast cruise terminal. Star Cruises at their facility in Port Klang, Malaysia undertook the study.

The aim of the study was to determine:

- the safe operational limits for selected cruise vessels arriving and departing the terminal facility;
- the safe operational limits for selected cruise vessels navigating the access channel including the seaway;
- the optimum berth location from a navigational perspective; and
- the minimum physical characteristics of the access channel and swing basin required to accommodate different classes of vessels.

The results of the simulations indicated that modern day cruise vessels up to 300m in length have high levels of manoeuvrability. It is anticipated that such vessels will be able to safely access the terminal in nearly all weather conditions that the Seaway normally experiences. Vessels with a lesser standard of equipment may be restricted in entry and departure without the use of tug assistance in some weather conditions.

The specified channel and swing basin dimensions as well as the location of the berth were determined as part of the study. It is not anticipated that weather conditions will be a significant factor in the operation of the cruise ship terminal. Further simulations of different tide, wind and wave conditions are likely to be undertaken to confirm this.

6.5 Land Tenure and Use

The Cruise Terminal will be located within the existing Doug Jennings Park (Lot 528 on WD 6624). This land is presently a Reserve for Port and Harbour Purposes under the trusteeship of the Department of Transport and is primarily used for recreational activities. The location for the marina precinct and land based facilities is yet to be determined.

6.6 Cultural Heritage

The *Aboriginal Cultural Heritage Act 2003* (*ACHA*) states that a notified Cultural Heritage Management Plan (CHMP) is required if an EIS is undertaken. The *ACHA* also provides information on the nature and content of a CHMP, which is a document registered by the Minister for Natural Resources and Mines.

6.7 Social Considerations

As outlined previously, the Government's vision for the overall Gold Coast Marine Development Project is to provide a balance between public open space and recreational and tourism facilities. The social implications of the project will be assessed through the EIS process and will include substantial public consultation. Some initial considerations are outlined below with respect to various aspects in this regard.

Doug Jennings Park (including the Western Arm of Marine Stadium)

The cruise terminal will involve a minor reduction in the size of Doug Jennings Park, approximately one hectare of the 12 hectare reserve. As part of the overall project vision, the public amenities of Doug Jennings Park and other areas on the Spit will be upgraded to make them more enjoyable places for the community. This upgrade would see the introduction of public facilities including toilets, drinking water, barbeques, shelters, play equipment and tables for Doug Jennings Park and the western arm of the Marine Stadium. This will result in an upgraded public open space of approximately 20 hectares.

Marina Precinct

The Gold Coast Marine Development Project includes 2 options for the location of a new marina:

- Option 1: The Marine Stadium
- Option 2: West of Sea World

The Marine Stadium is a popular casual anchorage area at present with the waterway and foreshores being utilised for various recreational purposes as well as power boat racing and triathlon events. While the size and concept design of a marina at this site are still to be finalised, it would involve a reduction in the area of waterway and foreshores available for recreational activities. A marina development would also include general marina berths providing boat users with access to such facilities which are presently limited in the vicinity. Furthermore an area for recreational boating and general moorings would be retained.

The waterway and foreshore adjacent to Sea World are presently utilised less than the Marine Stadium for recreational boating/mooring and other activities. Accordingly, a marina at this location is likely to result in less of a disruption although the site and size of land based facilities for this option are yet to be finalised. The impacts of both options will be examined in the EIS.

Diving Industry

Currently there are about 10 locally-based diving companies as well as a number from other parts of South East Queensland that operate in and around the Seaway. The area is also popular for general recreational diving. There are concerns that dive access may be removed as a result of the operations of cruise ships, and that the quality of the dive experience will be reduced. Access to these areas should not be dramatically affected other than during periods when the cruise ships are entering and exiting the Seaway, berthing or during periods of dredging.

The impact of dredging operations on the Seaway and sea life within it will be fully examined in the EIS and are discussed further in Section 5 above. So too will the impact on the use of the area for diving purposes be examined in the EIS together with options to mitigate any impacts.

Recreational Fishing

The Seaway and other parts of the Broadwater are currently used for recreational fishing. Concerns have been expressed that access may be removed and/or the productivity of the area will be reduced. The development of the proposed marine facilities should not result in any significant reduction of access to the area, apart from the constraints (described above) on access during periods when cruise ships are berthing. The impact on marine productivity and fish life will be examined as part of the EIS and are discussed further in Section 5 above. Measures to enhance the fishing opportunities in the area will also be examined in the context of the EIS.

Dog Walkers

Natural areas of the Spit and Doug Jennings Park are used for various community pursuits including exercise routines and dog walking etc. This should not be affected to any significant degree apart from the small areas utilised for Cruise Terminal and marina facilities. The area around the cruise ships will also be subject to restricted access during periods of berthing (within 100 metre zone). The balance of the area will remain unaffected and will be enhanced as outlined above.

Surfboard Riders

Currently surfboard riders traverse the Seaway on a regular basis to surf near the northern training wall off South Stradbroke Island. The South Stradbroke Island wave is renowned both locally and internationally for its quality and consistency. The capacity to do so will only be limited (1-2 hours) during periods of arrival and departure of cruise ships. During the period they are berthed, an exclusion zone in the water of up to 100 metres will apply. This will still allow ready access to the ocean.

Concerns have also been expressed that the dredging, spoil disposal and/or training wall extension may reduce the surfing utility of the area of South Stradbroke Island. This issue will be examined in the EIS as part of the modelling of impacts of the project on coastal processes. So too will measures to enhance the safety of access to South Stradbroke Island be examined in the context of the EIS.

Security Measures

The proposed cruise terminal will comply with laws and regulations relating to maritime security. It is anticipated that a security perimeter of approximately 100 metres extending out from a ship will be required when berthed at the terminal. Public access through the Seaway, and continuing public access to the greater part of the training walls and Doug Jennings Park will continue to be available when ships are berthed at the terminal. These matters will be the subject of further examination during the EIS in consultation with relevant State and Federal authorities.

Safety Regulations

For safety reasons as well as security, it is anticipated that public access to the Seaway will be restricted when cruise ships are entering and departing the terminal. Otherwise, access to the Seaway will be readily available.

6.8 Economic Considerations

As outlined in Section 1.5, the project will build on the Queensland Cruise Shipping Plan and has the potential to provide a wide range of follow-on effects to boost the regional Gold Coast economy. The tourism industry and local businesses will benefit through direct expenditure by passengers and vessel crew. There will also be substantial revenue gained through various provisioning and support services for visiting vessels.

As part of the Preliminary Assessment, an economic evaluation was carried out. The evaluation examined the impact on the Gold Coast and the net economic benefits of a cruise terminal to the State. The estimates were based on the net present value of the project over a 20 year period at a real discount rate of 6%.

In particular, the economic evaluation determined that the economic impact of a stand alone cruise ship terminal on the Gold Coast would be approximately $92 million, most of which will be to the benefit of the Gold Coast. This represents a total direct economic benefit of $235 million less capital and operating costs of $143 million.

It should be noted that a proportion of this economic benefit would be transferred from Brisbane to the extent that the Gold Coast terminal attracts cruise ships away from the Portside Wharf facility.

It should also be noted that the wider indirect economic benefits from the terminal are difficult to model and highly speculative. Equally, it is difficult to accurately model the impact of the Gold Coast terminal on the Brisbane terminal.

The State Government is of the view that a cruise ship terminal is essential tourism infrastructure for the Gold Coast but recognises that a stand-alone terminal might have limited financial appeal to a private sector developer.

It has therefore developed the concept of the Gold Coast Marine Development project to provide developers with the opportunity to underwrite the financial performance of the terminal from the revenues generated by other elements of the project.

The Gold Coast Marine Development Project provides a vision for the Gold Coast and The Spit that includes not only a cruise ship terminal but also a marina for superyachts and other vessels, and commercial / tourism development. The economic evaluation referred to above did not include the economic benefits that would come from the provision of a marina facility for superyachts, the fishing fleet and other vessels, and the commercial/tourism development.

In terms of the marina facility, it is considered that providing additional facilities for superyacht will increase the visitation to Queensland and the Gold Coast. An initial estimate of this is for a 10%

increase in visitation and therefore economic benefit, of approximately $5 million per year. The NPV of these benefits is $57 million calculated over 20 years at a discount rate of 6%.

The benefits listed here for superyachts accrue from all aspects of superyacht visitation including regular maintenance, provisioning and refuelling. They do not include money spent by the owners or passengers of superyachts while visiting.

In addition to the calculated economic benefits listed, the provision of new facilities for the fishing fleet, other commercial users and recreational craft in the region would help to ensure their long term viability on the Gold Coast.

The commercial/tourism development will also provide significant economic benefit with the Gold Coast Marine Development Project as a whole providing significant contribution to the economies of the Gold Coast and Queensland. There will be hundreds of jobs created during the construction phase of the project and it is expected that a commercial and tourism development would create a significant number of jobs in the longer term. The additional economic activity that a commercial development would generate will also need to be taken into account.

Overall, it is expected that the Gold Coast Marine Development Project will have a significant positive economic benefit for the economies of the Gold Coast and Queensland generally.

7 CONCLUSIONS

It is proposed to prepare draft Terms of Reference (ToR) for the preparation of an Environmental Impact Statement with ToR requirements based partly on the assessment of issues and impacts presented in this IAS. These ToR plus the IAS will be presented for public and agency comment. The final ToR will then be prepared.

It is anticipated that all potential adverse impacts will then be assessed through the EIS process and measures to minimise such impacts identified for incorporation into final design of the project and implementation through an Environmental Management Plan ensuring that any development will be environmentally acceptable and sustainable. Extensive public consultation will be undertaken as part of this process.

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