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Gladstone Ports Corporation

Port of Gladstone Western Basin Strategic Dredging and Disposal Project

Initial Advice Statement

March 2009



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1. Introduction

1.1 Context

The Department of Infrastructure and Planning (DIP) is undertaking “*The Gladstone Port Western Basin Master Plan*” to develop an understanding of the long-term impacts the liquefied natural gas (LNG) sector will have on the Western Basin¹ of the Port of Gladstone, and to direct at a high-level the government’s decisions on the nature of future development in the Western Basin.

The Master Plan will investigate possible and proposed LNG plant locations and associated infrastructure corridors, including the road/bridge access to Curtis Island. The issue of common-user channel and swing-bay dredging, and the timing/need for the outer channel and or inner harbour duplication channel dredging.

In line with the dredging work, the Master Plan will investigate possible areas for the deposition of dredge spoil and the possible reclamation of other areas within the Western Basin. Should they be necessary, environmental offsets will also be considered to compensate for the loss of environmental values associated with any dredging or reclamation works.

The Master Plan will also consider the future land use for areas surrounding the Western Basin and provide guidance on the nature and suitability of various industrial uses and port activities.

The Gladstone Port Western Basin Master Plan will be prepared under Section 10 of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The plan will be prepared in such a way that would complement the Strategic Assessment Provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

A high level agreement to implement and enforce the Master Plan is proposed in the form of a Memorandum of Understanding (MOU) between the Coordinator General, Gladstone Ports Corporation, Environmental Protection Agency and the Department of Transport. The MOU will provide for the enforcement of the Master Plan so that development of the Western Basin can be planned in an orderly way.

1.2 Scope of Initial Advice Statement

In parallel with the preparation of the Gladstone Port Western Basin Master Plan, it is proposed to commence an Environmental Impact Statement (EIS) process under the SDPWO Act for the dredging and disposal in the Western Basin of the port. This Initial Advice Statement (IAS) is for the Port of Gladstone Western Basin Strategic Dredging and Disposal Project and has been prepared by Gladstone Ports Corporation Ltd (GPC) for the purposes of identifying environmental, cultural and social issues and regulatory approvals associated with these works. This IAS is intended to scope the potential impacts that will be investigated in detail prior to the proponent applying for appropriate approvals. An EIS and Environmental Management Plan (EMP) will be prepared as part of the approvals process. Terms of

¹ The Western Basin is defined as all land parcels and marine environments extending from Friend and Laird Points, south to Auckland Point and incorporating Fisherman’s Landing, the western-side of Curtis Island from Laird Point to Boatshed Point and all port infrastructure and channels contained therein.



Reference (ToR) for the EIS will be developed based on this report, the requirements of relevant government agencies and submissions from stakeholders and the community.

1.3 Proponent

GPC is the proponent for the Port of Gladstone Western Basin Strategic Dredging and Disposal Project (the Project). GPC is the responsible party for obtaining all relevant approvals to facilitate the development of the Project.

GPC has an Environment Management System that is externally certified as being compliant with the international standard AS/NZS ISO 14001: 2004 and includes an Environment Policy which covers all of its activities. A copy is provided in Appendix A.

1.4 Location

The Port of Gladstone (the Port) is a shallow, semi-enclosed estuarine system located on the Central Queensland coast approximately 525 kilometres (km) north of Brisbane and 100 km south of Rockhampton (Figure 1).

1.5 Current Port Facilities

The Port of Gladstone is Queensland's largest multi-commodity port and the world's fifth largest coal export terminal. Handling close to 1,400 vessels annually, it is one of the busiest ports in Australia and plays a vital role in the local, state and national economies. Its facilities cater for the import of raw materials and the export of finished product associated with major industries in the Gladstone region. The Port has expanded rapidly over the last 30 years in response to major mining (predominantly coal) and major industrial projects of state significance. The GPC 50 Year Strategic Plan forecasts an ultimate port shipping capacity of over 300 million tonnes per annum (GPC 2008a).

The Port of Gladstone consists of six major port facilities; Boyne Smelter Wharf, South Trees Wharf, Barney Point Terminal, Auckland Point Terminal (Port Central), RG Tanna Coal Terminal and Fisherman's Landing (Figure 2 and Figure 3).

The current Fisherman's Landing port facility includes a multi-user Bulk Liquids Wharf, Cement Australia's cement and clinker wharf and Rio Tinto Alcan Yarwun Refinery wharf. Orica Australia's bulk liquid ammonia tank is on this site and plans have been developed for caustic storage facilities for Rio Tinto Alcan Yarwun Refinery to be located at the facility.

Coal from numerous Central Queensland coal mines is exported from RG Tanna Coal Terminal and Barney Point Terminal. South Trees Wharf provides for bauxite and caustic import and alumina export for Queensland Alumina Limited (QAL) and Boyne Smelter Wharf provides for aluminium export for Boyne Smelter. Port Central (Auckland Point Wharves) provides for the export of bulk cargo such as magnetite, calcite, petroleum products, grain and containers (GPC 2008b).



Figure 1 Location of the Port of Gladstone



Figure 2 Port of Gladstone Facilities



1.6 Project Scope

The Port of Gladstone Western Basin Strategic Dredging and Disposal Project seeks to accommodate the long term dredging and dredged material disposal that is required to provide safe and efficient access to the existing and proposed Port facilities in the harbour over the foreseeable future.

Two areas of development are required for the long-term strategic development of the Port:

- » The Western Basin dredging and reclamation works are required for access to proposed wharf facilities located in the Western Basin area of the port and for the disposal of dredged material; and
- » The outer harbour works are associated with the duplication of channels to account for increased traffic through the port and will be investigated at a later stage.

The development of the Western Basin will incorporate dredging associated with the deepening and widening of existing channels and swing basins, and the creation of new channels, swing basins and berth pockets. Figure 3 and Table 1 provide a potential development scenario for the proposed Western Basin dredging and reclamation areas. The footprint of the dredging works will be refined during the EIS process. Material dredged during the Western Basin development is proposed to be placed into reclamation areas to create a land reserve to be used to service the new port facilities. The proposed Western Basin reclamation is 10 km north of Gladstone City immediately adjacent to the existing Fisherman's Landing reclamation and proposed 153 ha Fisherman's Landing reclamation (Figure 3). The final footprint of the Western Basin reclamation is currently undergoing an options assessment process.

There are currently a number of proponents undertaking investigations into sites within the Western Basin. Investigations are being undertaken to determine the nature of the material to be dredged and the navigation and berthing requirements of the likely proponents. These investigations will allow both the method of dredging and the final dimensions and footprints of the channels, swing basins and berth pockets to be determined. Subject to geotechnical investigations and dredging methodology reviews, it is possible that blasting may be required where hard material is located. It is also possible that the coarse nature of some of the material and the distance to the proposed reclamation may require double handling of the material.

The dredging of the Western Basin will occur in stages and the rate of development will be controlled by the demands of industry locating in the Gladstone region and requiring access to port facilities. It is recognised that not all of the current proponents investigating sites in the Western Basin may proceed. Therefore, flexibility in the final dimensions and exact footprint of the areas to be dredged is required. The Environmental Impact Assessment will address stages of development and the overall footprint of development. Operational works approvals will be sought for each project stage as they are required.



Figure 3 Location of Proposed Western Basin Dredging Stages 1 – 4 and Western Basin Reclamation



Table 1 Stages of Port of Gladstone Western Basin Strategic Dredging and Disposal Project

Project Element and Stage	Location	Description	Volume/Capacity	Trigger	Timing
DREDGING					
Wiggins Island Coal Terminal (WICT) Not included in Strategic Project	Western Basin	<p>The Gladstone Ports Corporation (then Central Queensland Ports Authority) undertook an EIS process for the development of six berths at Wiggins Island to cater for coal exports (four berths) and nickel imports (two berths). Under this process the swing basin for the facility was to be dredged to RL -11.7m LWD* and the departure channel dredged to RL -16.0m LWD. A total of 6.3 million cubic metres of material will be dredged and disposed to land reclamation sites adjacent to the Coal Terminal and Gladstone Pacific Nickel sites.</p> <p>This development was declared a controlled action under the EPBC Act and a Significant Project under the Queensland <i>State Development and Public Works Organisation Act 1971</i>.</p> <p>Commonwealth and State approvals for dredging and onshore disposal were received in February 2008.</p>	6.3 million m ³	Commitment by various coal companies to contracts	Late 2009
1A North China Bay LNG Precinct	Western Basin	<p>The DIP has identified the development of an LNG precinct on the western side of Curtis Island for the development of up to four LNG plants of four train configuration. Each plant is anticipated to have an annual throughput of 12 – 15 Mtpa.</p> <p>Two LNG proponents have identified Curtis Island as their preferred site for the development of LNG plants for the processing and export of coal seam gas. These proponents are Santos and the BG Group.</p> <p>LNG Carriers under consideration have dimensions of up to draft 12.5m, length 300m, and beam 50m. The LNG industry is seeking to have capability of handling the vessels during the full tidal range such that there is no constraint on either arrival or departure. It is anticipated that channel depths of 13.0 m and swing basins of 13.5 m depth will be required.</p> <p>The initial development allows for one berth for each proponent.</p> <p>The dredging components of the Santos and BG Group projects have been referred under the EPBC Act and are the subject of an environmental assessment currently being prepared.</p>	16.0 million m ³	Commitment by LNG proponents	2011
1B Fisherman's Landing LNG	Western Basin	<p>One smaller LNG proponent is investigating the development of an LNG plant at the existing Fisherman's Landing Facility. LNG Ltd is proposing an annual throughput of three million tonnes.</p> <p>Exports will be undertaken through Fisherman's Landing No.5 Berth. The Targinie Channel requires widening and deepening and the swing basin extended beyond the existing approved channel configuration to cater for the larger LNG carriers. The proponent is investigating the options for utilising smaller LNG carriers in the early stages of development.</p> <p>The dredging component of this project has not been separately referred by the proponent under the EPBC Act.</p>	6.1 million m ³	Commitment by LNG proponent	2011
2 Laird Point LNG	Western Basin	<p>Other LNG proponents are investigating the potential to develop a 14 Mtpa LNG facility within the Gladstone State Development Area (GSDA) Curtis Island Industry Precinct. With both Santos and BG Group having sites allocated around North China Bay, the most likely option for these proponents is to develop at a site adjacent to Laird Point.</p> <p>The marine facility requires the extension of the Targinie Channel with a width of 200 m and depth of 13.0 m.</p> <p>In the event that this development precedes the expansion of the Fisherman's Landing facilities, it will be necessary to undertake the dredging of the existing Targinie Channel as part of this stage.</p>	4.5 million m ³	Commitment by LNG proponent	2011
3 Fisherman's Landing Development	Western Basin	<p>The existing reclamation at Fisherman's Landing allows the development of five berths. Four of these berths are already constructed or are currently under construction. The fifth berth is limited in size due to its location between Berth 2 and Berth 4 (Rio Tinto and Cement Australia).</p> <p>The 153 ha reclamation currently being investigated (see Onshore Disposal description in this table) is capable of supporting a further six berths. Large scale industrial facilities, similar to Rio Tinto Alcan Yarwun and Gladstone Pacific Nickel, would typically require two berths for their ultimate development.</p> <p>The facilities at Fisherman's Landing are those most likely to support development in the GSDA. An area in excess of 28,000 ha has been declared for long-term industrial development on the mainland.</p> <p>It is therefore planned to construct a line of berths between Fisherman's Landing through to Friend Point to offset the loss associated with the Friend and Laird Point development.</p>	5.5 million m ³	Further industrial development in the GSDA requiring import and export wharves and potentially stockpile and storage areas.	Unknown



Project Element and Stage	Location	Description	Volume/Capacity	Trigger	Timing
4 Hamilton Point	Western Basin	<p>Natural deep water occurs adjacent to Hamilton Point. This area is capable of being developed for Cape sized vessels. Further, it presents the one remaining area in the port for land-backed wharves to be developed.</p> <p>With respect to trade opportunities these wharf facilities present an ideal opportunity to service break bulk and containerised trades. The steel industry could also benefit from this development as the importation of iron ore and other bulk products can be accommodated in Cape sized vessels. Exports of blooms, billets, ingots and coils are best accommodated with the land backing allowing for ready transfer of product from shore side to ship. For the container industry, the ready access from vessel to yard is important with full land backing being critical.</p> <p>A total of five berths can be developed at this site with minimal dredging.</p> <p>Also included in Stage 4 are the second berths for each of the LNG proponents in North China Bay.</p>	3.9 million m ³	<p>Bulk / break bulk and container industries requiring land backed wharves.</p> <p>The berth pockets and swing basin area would be constructed progressively as proponents required them.</p>	Unknown
TOTAL WESTERN BASIN			36 million m³		
DISPOSAL					
Onshore – Fisherman's Landing	Relocation of material from Western Basin	<p>Current Proposed 153 ha Reclamation</p> <p>The EIS process has commenced for the reclamation of 153 ha of land to the north of the existing reclamation at Fisherman's Landing (Figure 3). The reclamation was a non-controlled action under the EPBC Act and a Significant Project under the Queensland <i>State Development and Public Works Organisation Act 1971</i>.</p> <p>The reclamation is required to provide for the disposal of dredged material and to support the deepening of the Targinie Channel and the development of additional berths to service future industry. The original proposal allowed for an additional six berths to be developed in the long term.</p> <p>The EIS process addresses the 153 ha reclamation approval only and does not cover additional berth development beyond that previously approved (five berths) for the existing reclamation.</p>	10 million m ³	<p>Dredging in the inner harbour.</p> <p>There are no current disposal sites available with the overall capacity to accept material from all of the Western Basin dredging areas should all of the developments proceed.</p>	2011
Onshore – Western Basin Reclamation	Relocation of material from Western Basin	<p>Western Basin Reclamation</p> <p>A total dredged volume of 36.5 million m³ is required to allow for the total development of all the dredging stages in the Western Basin.</p> <p>Subject to the timeframe over which this dredging is undertaken, allowance in the storage capacity is also required for the initial bulking of the material during the dredging operation and adequate retention time to allow for water quality to be controlled.</p> <p>Initial disposal sites had been investigated at Hamilton/Boatshed Point and Laird Point on Curtis Island (Figure 3). These two sites could accommodate up to 20 million m³ of dredged material when the retaining walls were developed to a height of 15 m.</p> <p>To accommodate the ultimate dredging concept for the Western Basin, the combined reclamation areas on Curtis Island and the proposed 153 ha Fisherman's Landing reclamation would need to be supplemented by further reclamation; likely on the intertidal areas adjacent to Friend Point.</p> <p>With additional LNG proponents enquiring of sites for development on Curtis Island, there is a desire to avoid the placement of dredged material onshore that may prevent potential sites from being utilised by the LNG industry. The Laird Point site is under investigation by an LNG proponent and other proponents are investigating options around the development of the Boatshed Point area.</p> <p>Given these constraints, the option for a single Western Basin reclamation is under consideration. This reclamation would be an expansion of the 153 ha reclamation that is currently undergoing an EIS under the SDPWO Act. It is intended that the EIS and approvals for the 153 ha reclamation will continue as a separate project. Design options for the Western Basin Reclamation are being considered with the aim of reducing potential impacts on adjacent mangrove and saltpan areas, particularly towards The Narrows.</p> <p>The nominal reclamation area as shown in Figure 3 has the capability of storing in excess of 60 million m³ (to allow for bulking and decant of capital material and future maintenance dredging material) and is suitable for the overall development of the Western Basin, thereby avoiding the need to consider reclamation at sites on Curtis Island or Kangaroo Island/Friend Point.</p>	<p>60 million m³</p> <p>This volume includes the proposed 153 ha Fisherman's Landing reclamation</p>	<p>Dredging in the inner harbour.</p> <p>There are no current disposal sites available with the overall capacity to accept material from all of the Western Basin dredging areas should all of the developments proceed.</p>	2011

* LWD = Low Water Datum



1.7 Project Timing

Table 1 identifies the likely timing for the various stages of the Port of Gladstone Western Basin Strategic Dredging and Disposal Project. Timing for the latter stages are as yet unknown as they are dependent on the approval of projects or requests from new industries for access to berths for import and export of materials.

1.8 Project Need

The Commonwealth and Queensland governments have identified Gladstone as a port with the potential to service future large scale export-oriented, resource processing and value-adding industries. The close proximity of Gladstone's international port facilities is an essential component of the economic viability of the Gladstone State Development Area (GSDA). The GSDA is an approximately 28,000 ha declared land bank managed and promoted by the Gladstone Economic and Industry Development Board (GEIDB), a statutory authority under the auspice of the Department of Infrastructure and Planning (DIP) (Figure 1). A Materials Transport Corridor links the GSDA to the Port of Gladstone facilities.

The GSDA aims to attract industries by offering internationally competitive operating costs and has the capacity to accommodate significant future industrial growth. GPC are responsible for the provision of and maintenance of declared depths of shipping channels, swing basins and berth pockets in the Port of Gladstone. The Port of Gladstone Western Basin Strategic Dredging and Disposal Project encompasses all the dredging and disposal of dredged material that is currently envisaged in the GPC 50 Year Strategic Plan for the Western Basin (GPC 2008a). The proposed dredging is required to deepen and widen existing channels and swing basins, and to create new channels, swing basins and berth pockets.

In July 2008, the GSDA was extended to include a large area on the southern end of Curtis Island. The expanded area consists of three areas:

- » The Curtis Island Industry Precinct, which provides for the establishment of liquefied natural gas facilities on the west coast of southern Curtis Island;
- » The Restricted Development Precinct has been applied to the area of Kangaroo Island and is intended to provide for the establishment of essential transportation infrastructure within the GSDA; and
- » The Environmental Management Precinct has been applied to the area east of the range on southern Curtis Island to recognise, protect and maintain areas of high ecological significance (DIP 2008).

In the Curtis Island Industry Precinct, there are currently a number of LNG proponents investigating sites. GPC are also looking to develop up to five berths at Hamilton Point for a range of future imports and exports. DIP is currently consulting with a working group to investigate and provide common user infrastructure to Curtis Island, including a road bridge from Friend Point to Laird Point at the southern end of The Narrows. Dredging and dredged material disposal are required to service the potential LNG and GPC developments on Curtis Island.

The proposed Western Basin reclamation will provide both a dredged material disposal location and will also provide land adjacent to the wharves necessary for efficient loading and unloading of vessels and temporary storage of cargoes and products prior to transport to the GSDA or loading onto ships for export. The proximity of the Materials Transportation Corridor linking the Fisherman's Landing facility to



the GSDA and the rail link from Cement Australia to the main North Coast Rail line makes the current Fisherman's Landing and proposed Western Basin development ideal for the transfer of product between the Port and the GSDA and the hinterland of Central Queensland.

Wharf 1 to Wharf 5, adjacent to the existing Fisherman's Landing facility, are either in use or committed to proposed industries within the GSDA (Figure 3). The proposed development and subsequent adjacent wharves are required to meet the import/export and storage needs for the variety of industries likely to establish in the GSDA in the long term. The proposed Western Basin reclamation will be designed to provide the best solution to achieve the efficiencies of handling required by industries located within the GSDA.

1.9 Project Benefits

The Port of Gladstone Western Basin Strategic Dredging and Disposal Project would be staged as indicated in Table 1. Based on the likely need to expedite the works, GPC proposes to engage a contractor to undertake the expanded bund construction for the Western Basin reclamation. Direct employment is estimated to be 55 person-years for the bund construction. Dredging would be staged over a number of years based on the triggers outlined in Table 1. A total of 90 person-years is estimated for this phase of the work and it would be performed by contractors.

The proposed Port of Gladstone Dredging and Disposal Project will serve to enhance and expand the existing port infrastructure to service planned and as yet unknown industries within Gladstone and the GSDA.

The direct permanent employment resulting from the dredging and Western Basin reclamation will relate to the nature of the product to be handled through the newly created port facilities and as such is not yet quantifiable. Indirect employment will result from the creation of industrial developments remote to the port. These developments would not be viable without ready access to port infrastructure for import or export of product. As such the local, state and national economies will ultimately benefit from the Western Basin Strategic Dredging and Disposal Project.

As previously discussed, the close proximity of Gladstone's international port facilities is an essential component of the economic viability of the GSDA. The provision of dredged channels, swing basins and berths as identified in the Western Basin Strategic Dredging and Disposal Project will provide access to the port facilities, which is a key component of the import and export chain and assists in encouraging industries to develop within the Gladstone region.

1.10 Legislation, Approvals and Other Requirements

1.10.1 Overview

GPC is required to give due consideration to the likely environmental impacts of the Project under various Commonwealth, State and local legislation, guidelines and policies. This section identifies legislation and provides a description of other documents and guidelines relevant to environmental management of the Project. It is not intended that this section provides a legal review of the proponent's obligations but is simply to highlight key environmental legislation relevant to this proposal.



1.10.2 Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act, 1999

In accordance with the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act), an approval from the Commonwealth Minister for the Environment, must be sought prior to undertaking an action, which has, would have, or is likely to have, a significant impact (defined in the Act) on a matter of National Environmental Significance (NES). An action includes a project, development, or undertaking an activity or series of activities. The project will occur within the Great Barrier Reef World Heritage Area (GBRWHA). The GBRWHA is defined as a matter of NES under the EPBC Act. It is considered that the Western Basin Strategic Dredging and Disposal Project may potentially impact on the GBRWHA and on other matters of NES. Therefore, the Port of Gladstone Western Basin Strategic Dredging and Disposal Project will be referred to the Department of the Environment, Water, Heritage and the Arts (DEWHA) for a formal decision under the EPBC Act. If the DEWHA determines that the Project is likely to have a significant impact on a matter of NES, then the Project will be determined to be a “controlled action” requiring assessment and approval at the Commonwealth level.

The referral will address relevant Matters of NES that may be impacted, which include:

- » Sections 12 and 15A (World Heritage properties);
- » Sections 15B and 15C (National Heritage);
- » Sections 18 and 18A (Listed threatened species and communities); and
- » Sections 20 and 20A (Listed migratory species).

GPC will apply the Queensland Department of Infrastructure and Planning to have a significant project under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). If DEWHA determines that the Project is likely to have a significant impact on a matter of NES, then the Project (or an element of the Project) will be determined to be a “controlled action” requiring a form of environmental assessment (including an EIS) and approval at the Commonwealth level. GPC would seek to prepare the EIS in accordance with the Queensland Bilateral Agreement, which gives accreditation under the EPBC Act to the EIS process under the SDPWO Act. This process removes duplication with the EPBC Act, and streamlines approval processes under the *Integrated Planning Act 1997*.

Environment Protection (Sea Dumping) Act 1981

The *Environment Protection (Sea Dumping) Act 1981* (Sea Dumping Act) regulates the deliberate loading and dumping of wastes and other matter at sea (including relocation of dredged material). It applies to all vessels, aircraft or platforms in Australian waters and to all Australian vessels or aircraft in any part of the sea. The Sea Dumping Act applies in respect of all Australian waters (other than waters within the limits of a State or the Northern Territory inland waters), from the low water mark out to the limits of the Exclusive Economic Zone.

The National Ocean Disposal Guidelines for Dredged Material (NODGDM, EA 2000) establishes a procedure to determine if material is suitable for unconfined disposal at sea. Land based disposal in the Western Basin reclamation has been nominated as the disposal option for the dredged material. If this is the case, it is not anticipated that a Sea Dumping Permit will be required.



Great Barrier Reef Marine Park Act 1975

The *Great Barrier Reef Marine Park Act 1975* (GBRMP Act) establishes a framework for the establishment, control, management and development of the Great Barrier Reef Marine Park (GBRMP). The Act is administered by the Great Barrier Reef Marine Park Authority (GBRMPA).

Section 117 of the *Great Barrier Reef Marine Park Regulations 1983* states that the GBRMPA must assess any project that has the potential to impact on the Marine Park. This only applies to projects that occur wholly or partly within the Marine Park boundary; therefore a Marine Parks Permit will not be required for the Western Basin Strategic Dredging and Disposal Project.

1.10.3 State Legislation

State Development and Public Works Organisation Act 1971

GPC has previously advised DIP of their intention to seek significant project status for this project (Appendix B). A request for significant project declaration for the project in accordance with Section (26)(1)a of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) was submitted with this IAS. The SDPWO Act empowers the Coordinator General to facilitate and coordinate a project with "significant project status". For a significant project the Coordinator General is responsible for administering the EIS process including an evaluation of the EIS and the preparation of a report. The Coordinator General is empowered to make certain recommendations and, in addition, is empowered to state conditions that must be imposed under certain approval processes. Once the Coordinator General has completed the EIS process under the SDPWO Act, then the various material Project approvals may be granted in accordance with the relevant legislation.

Environmental Protection Act 1994 (Qld)

Sections 36 and 37 of the *Environmental Protection Act 1994* (EP Act) note that all persons have a duty of care to the environment. Therefore, it is not permissible to cause environmental harm (as defined in the Act) whilst undertaking any activity unless all reasonable and practical means are taken to minimise that harm.

The EP Act outlines the scope and content for preparing environmental protection policies to protect Queensland's environment. These policies may be made about the environment or anything that affects or may affect the environment. It should also be noted that all subordinate legislation to the Act, such as the Environmental Protection Policies, binds all persons. Compliance with all policies will be required.

Environmentally relevant activities (ERAs) defined within the Act require licensing. Dredging is a designated Environmentally Relevant Activity (ERA) under the *Environment Protection Regulation 2008*.

Aboriginal Cultural Heritage Act 2003 (Qld)

The *Aboriginal Cultural Heritage Act 2003* establishes a 'cultural heritage duty of care', which requires that a person who carries out an activity must take all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage.

The Act establishes a framework for the conduct of assessment of cultural heritage impact and processes to be undertaken in preparing Cultural Heritage Management Plans. The Act states that where an EIS is required under a legislative framework then a Cultural Heritage Management Plan must be prepared to manage all aspects of cultural heritage for the construction and operation of the project.



Coastal Protection and Management Act 1995 (Qld)

The *Coastal Protection and Management Act 1995* (CP&M Act), as amended from 20 October 2003, repeals the *Harbours Act 1955*, the *Canals Act 1958* and the *Beach Protection Act 1968*. Provisions from these repealed Acts have been integrated into the CP&M Act and other Government statutes. The CP&M Act includes provisions to continue permissions and approvals given under the older coastal legislation. An assessment under the CP&M Act will be triggered in relation to assessable development within tidal waters both for dredging and reclamation.

The *State Coastal Management Plan - Queensland's Coastal Policy* and *Curtis Coast Regional Coastal Management Plan* guides decision-making on coastal areas and the proposed development will need to be reviewed against the policy requirements for coastal development.

Marine Parks Act 2004

In 1982, the Marine Parks Act was passed. Parliament replaced the *Marine Parks Act 1982* in 2004. The new *Marine Parks Act 2004* commenced on 31 August 2006 along with the new *Marine Parks Regulation 2006* and *Marine Parks (Declaration) Regulation 2006*. The *Marine Parks Act 2004* provides for the management and control of Marine Parks and a Marine Parks Permit may be required if the dredging and reclamation are deemed to impact on the Great Barrier Reef Coast Marine Park. The Queensland Parks and Wildlife Service (QPWS) in the Environmental Protection Agency (EPA) administer the Act.

Integrated Planning Act 1997 (Qld)

The *Integrated Planning Act 1997* (IP Act) establishes the Integrated Development Assessment System (IDAS) which integrates a range of development approvals including the *Coastal Management and Protection Act 1995* and *Fisheries Act 1994*.

This legislation has three specific roles that directly affect land use planning and regulation relevant to the project:

- » Firstly, the IPA establishes the means for plan making in Queensland, an activity usually undertaken by Local Government;
- » Secondly, the IPA defines 'development' and establishes the process for making, assessing and deciding development applications (the Integrated Development Assessment System or 'IDAS'); and
- » Thirdly, provides an 'umbrella' through IDAS that requires development to be assessed (where relevant) against other legislation through referral to agencies responsible for that jurisdiction.

Dredging by a port authority is not a designated Environmentally Relevant Activity (ERA) under the *Environment Protection Regulation 2008*. Therefore, GPC is not required to seek a specific permit in relation to an ERA, under the IP Act. Approval for tidal works, operational works and removal of marine plants under IP Act will be required.

Fisheries Act 1994 (Qld)

The *Fisheries Act 1994* provides a framework for the management and regulation of activities in relation to fisheries, coastal areas important as fish habitats and marine plants.

An IPA application for tidal works will trigger a referral to Department of Primary Industries and Fisheries (DPI&F) under the *Fisheries Act 1994* for a concurrence response from DPI&F in relation assessable to development described above. As a concurrence agency, the DPI&F maintain an interest in the proposed works in relation to:



- » Any temporary or permanent disturbance to protected marine plants and tidal fish habitats;
- » Any temporary or permanent waterway barrier works (e.g. barriers to the movement of fish between fish habitats);
- » Achieving offsets for any disturbances to fish habitats or tidal land; and
- » Ensuring the adoption of best practice construction and environmental management techniques to minimise impacts to fish habitats.



2. Existing Environment and Potential Impacts

2.1 Introduction

The potential environmental impacts associated with the Port of Gladstone Western Basin Strategic Dredging and Disposal Project are those that may result from the conduct of dredging and onshore disposal of dredged material.

The following provides an overview of the existing environmental values and an initial assessment of potential impacts are based on information drawn from previous studies undertaken within the Project area and surrounds. Investigations may be staged to allow timeframes for early stages of dredging and disposal for the Western Basin to be met, with approvals conditional on further investigations.

2.2 General

The Port Curtis Integrated Monitoring Program (PCIMP) prepared an Ecosystem Health Report Card in 2007. The Report Card provided an overall grade for various zones within Port Curtis, based on a variety of indicators such as sediment quality and water quality. This report card indicated that the Fisherman's Landing area had a slightly lower grade than most other zones in the harbour, being given a B+ under the grading system defined by PCIMP (Storey *et al.* 2007). It was concluded that this slightly lower result was mainly attributable to conditions in Boat Creek, which does not receive licensed discharges. There are two licensed discharges at the Fisherman's Landing wharves; Rio Tinto Alcan Yarwun and a trade waste discharge (Storey *et al.* 2007).

2.3 Climate

Gladstone is located in Central Queensland and experiences a sub-tropical, coastal climate. Figure 4 shows rainfall and temperature statistics from the Radar Hill weather station which has records from 1957 (WeatherZone 2008). The mean annual minimum temperature is 18.5 °C and mean annual maximum is 27.7 °C. Gladstone experiences a wet season in the summer months, with the highest rainfall received from December to February. Average annual rainfall is 876.8 mm. The prevailing wind direction is from the east and southeast, with a mean wind speed of 20.7 km/hr at 3pm (WeatherZone 2008).

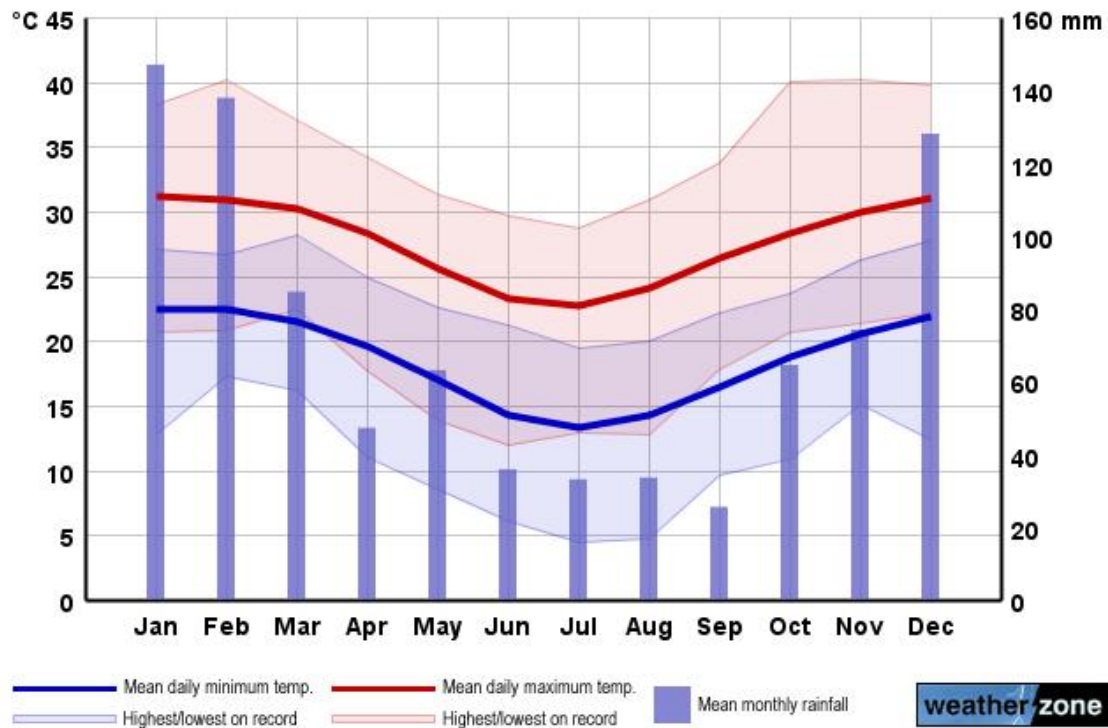


Figure 4 Climate statistics for the Radar Hill Weather Station from 1957 – 2008 (WeatherZone 2008)

2.4 Land and Infrastructure

2.4.1 Land Ownership

The proposed Western Basin reclamation area is currently unallocated State Land. The dredged channels are unallocated State Land.

2.4.2 Port Infrastructure

This section summarises the current port infrastructure in terms of channels, berths and wharves. These are also shown in Figure 2.

The Western Basin of the Port of Gladstone covers the area from the west of the RG Tanna Coal Terminal through to the commencement of The Narrows and Great Barrier Reef Coast Marine Park (State). Existing development in the Western Basin includes the Auckland and Clinton channels, servicing the RG Tanna Coal Terminal, and Targinie Channel, servicing development at Fisherman's Landing. Auckland and Clinton channels are 180 m wide, are dredged to RL -16.0 low water datum (LWD) and are capable of handling Cape Sized bulk carriers used in the coal trade (vessel displacement up to 220,000 t). Targinie Channel is 120 m wide, is dredged to RL -10.6 m low water datum and is capable of handling Panamax vessels (up to 80,000 t). The Clinton Bypass Channel is 160 m wide, dredged to RL -10.6 m LWD and has been developed to allow light draft vessels to bypass the operations at RG Tanna Coal Terminal and is used in conjunction with Targinie Channel. Approval exists for Targinie Channel to be widened to 180 m (currently 120 m) and deepened to RL -14.0 m LWD.



Existing development in the Outer Harbour includes the Gatcombe and Golding Channels and their respective Bypass Channels and the Boyne and Wild Cattle Cuttings. All outer harbour channels and bypass channels are 183 m wide, with the exception of the Gatcombe Bypass Channel which is 175 m wide. The Gatcombe and Golding Channels and Boyne and Wild Cattle Cuttings are dredged to RL -16.3 m LWD, the Golding Bypass is maintained at RL -7.3 m LWD and the Gatcombe Bypass is maintained at RL -12.5 m LWD.

The proposed Port of Gladstone Dredging and Disposal Project will serve to enhance and expand the existing port infrastructure to service planned and as yet unknown industries within Gladstone and the GSDA.

2.4.3 Supporting Infrastructure

The dredging and disposal at the Western Basin reclamation should not directly affect any of the existing or planned infrastructure adjacent to the Port, such as road, rail and air transport, water supply, electricity, sewerage and telecommunications. Shipping will increase as a result of the provision of dredged channels and berths, however, individual proponents will be required to address the impacts of increased shipping in the port.

The proposed source of material for the bund walls is a quarry that will be developed by GPC in the GSDA. As the site for the quarry has previously been utilised as a quarry by a former owner, a Material Change of Use and Environmentally Relevant Activity application will be prepared and lodged with the Department of Infrastructure and Planning (DIP), EPA and any other relevant agencies. This will be a separate process from either the Fisherman's Landing 153 ha reclamation or the Western Basin Strategic Dredging and Disposal Project EIS. It is proposed to use conventional road transport to transport the materials from the GPC quarry for the construction of the bund wall and the capping of the site. Materials for the reclamation will be placed as a consequence of dredging of the Western Basin in stages (Stage 1A, 1B, 2, 3 and 4).

With development of industry on the reclaimed land in the Western Basin, there will be increased demand for transport, water supply, electricity and telecommunications infrastructure subject to the industry's needs. The transfer of product between the port site and the industrial lands at Aldoga, the port will be by road, conveyor, pipeline or rail. Anticipated development at the Western Basin reclamation may result in low level development with stockpiles, silos and other associated infrastructure.

Each industry (import, export or processing) that establishes adjacent to the Port will be required to address the impacts of their development on infrastructure such as water supply (raw and potable), sewerage, electricity and telecommunications. These industries will also be responsible for gaining approvals for the logistics and infrastructure associated with establishing at the port and transferring materials to and from the port.

2.5 Geology, Groundwater and Surface Water

2.5.1 Geology

The Project is entirely located below the high water mark, with the exception of the landward edge of the proposed Western Basin reclamation. According to the 1:100,000 Geological Series – Gladstone Sheet 1950, the geology underlying the reclamation is described as Quaternary Holocene deposits (Qhm) –



Mangrove swamps, mudflats and saltpans. Immediately landward of the reclamation area the geology is described as Quaternary age alluvium (Qha) – Gravel, sand, silt, clay and alluvium.

2.5.2 Groundwater

The Department of Natural Resources and Water groundwater bore database reported seven groundwater bores within 1 km of the Gladstone LNG, Fisherman's Landing Project site, which is located on the existing Fisherman's Landing reclamation (Worley Parsons 2008). The DNRW information indicated that there are at least two water bearing aquifers within the region (clay and schist) (Worley Parsons 2008). Two of the seven bores are used for water supply and the remaining bores have been abandoned. Drilling on the Gladstone LNG Project, Fisherman's Landing site identified a perched groundwater table within the dredged sediments. This is likely to be hydraulically connected to Port Curtis, but not to the mainland aquifers (Worley Parsons 2008).

The groundwater in areas adjacent to the Fisherman's Landing embayment is likely to be tidally influenced, both in quality and depth fluctuations.

2.5.3 Surface Water

From south to north, the Boyne River, South Trees Inlet, Auckland Creek, Calliope River, Boat Creek and Graham Creek are the main waterways entering Port Curtis (Figure 2). The shallow Fisherman's Landing embayment is located between Boat Creek on the mainland and Graham Creek on Curtis Island, with The Narrows commencing at the northern end of the embayment. There are no defined waterways entering the Fisherman's Landing embayment, however, a couple of small drainage lines enter the centre and northern ends of the bay. The catchments for these drainage lines are quite small. However, the northern end of the bay is connected to the substantial tidal flats at Friend Point and Kangaroo Island on high spring tides (Figure 5).

2.5.4 Potential Impacts

The creation of a large reclamation immediately adjacent to or attached to the coastline may have an impact on the depth and flows of groundwater in adjacent areas and also the surface water drainage paths. In turn, this may impact on the fringing mangrove and saltpan communities adjacent to the bund and may also impact on the adjacent terrestrial vegetation through changes to groundwater depths, fluctuations and quality.

Sheet 3: Intertidal Wetlands of Port Curtis

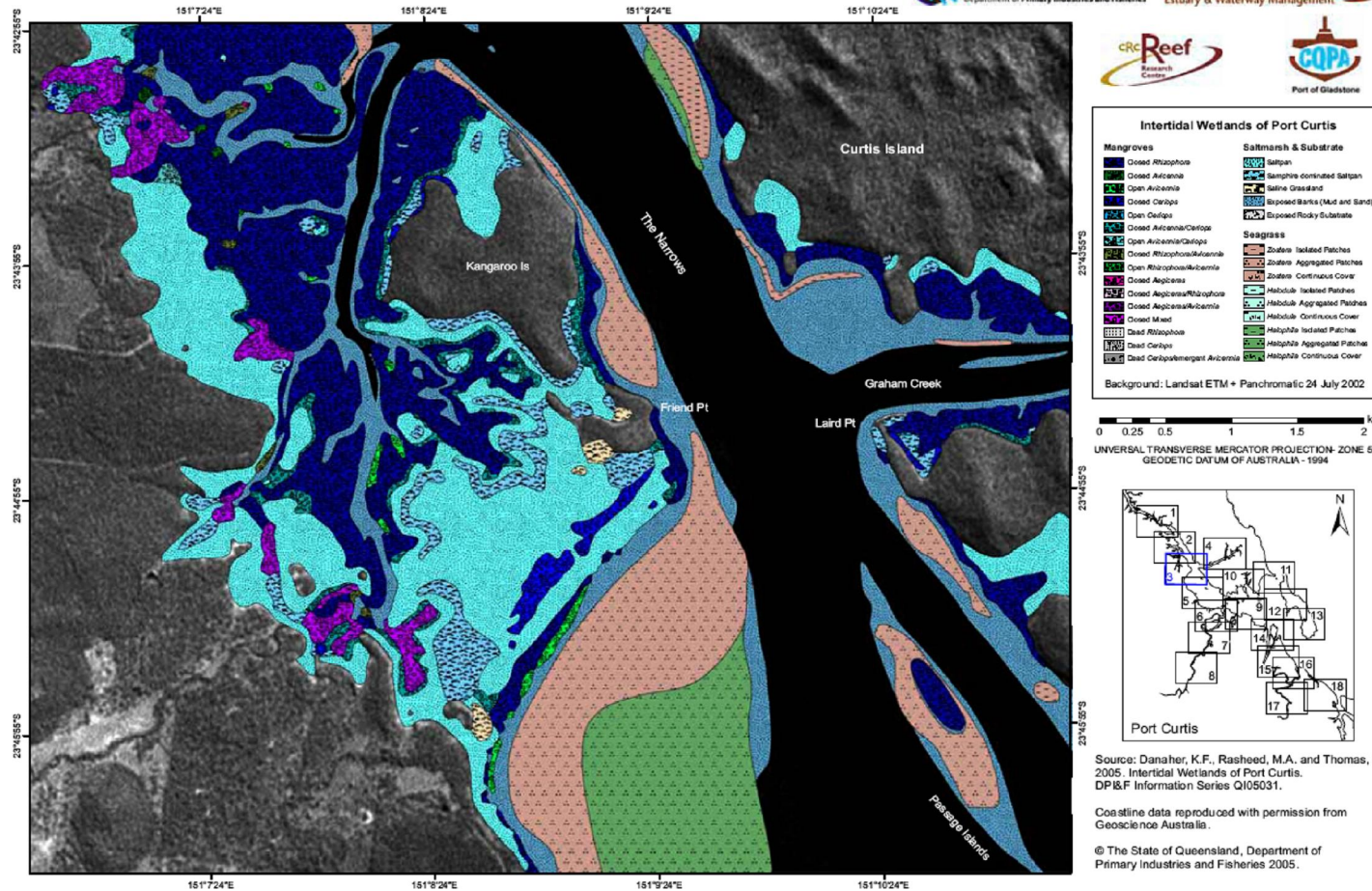


Figure 5 Intertidal Wetlands of Port Curtis, Sheet 3, Fisherman’s Landing. Source: Danaher *et al.* 2005.



2.6 Visual Amenity

Dredging and disposal of dredged material can generate turbid plumes that are visible to shipping traffic and to the general public from air, land and water. The construction of the Western Basin reclamation as an extension to the current Fisherman's Landing reclamation will substantially alter the visual character of the immediate Fisherman's Landing embayment, but will be consistent with the visual character of the Port as a whole, which contains a number of reclaimed areas. A visual impact assessment will be undertaken as part of the EIS and mitigation measures identified.

2.7 Noise and Air Quality

There are minimal noise and air quality impacts associated with dredging and onshore disposal of dredged material. Some transient noise impacts may be experienced by marine fauna during individual dredging campaigns, however this is not expected to be significant. The placement of rock during construction and the final surface of the Western Basin reclamation may generate some dust. Mitigation measures for managing this, such as watering roads and stabilising the finished surface, will be identified during the EIS phase. A greenhouse gas inventory will be prepared for the dredging and construction of the reclamation and the potential for reducing impacts will be explored.

2.8 Water Quality

Water quality within Port Curtis is influenced by several anthropogenic activities, including grazing, agriculture, industry and urban-based activities. Previous water quality investigations undertaken within Port Curtis indicate that the bay is subject to high levels of turbidity, nutrients and bacterial levels (Connell Hatch 2006). High turbidity events are considered to be a natural process within Port Curtis resulting from freshwater inflows during rainfall and wave and tidal current induced resuspension. In addition, the resuspension of sediments during dredging can result in an increase in bioavailable metals concentrations in the water column (Anderson *et al.* 2007).

The potential impacts of dredging and dredged material disposal are the generation and migration of turbid plumes and the associated sedimentation and light reduction at sensitive habitats such as seagrasses and other intertidal communities. The EIS will summarise the water quality data available in Port Curtis, including data collected during ambient conditions and during recent capital dredging projects at Fisherman's Landing and RG Tanna Coal Terminal.

The closest GBRMP boundary to the dredging and reclamation is at the North Entrance to Port Curtis, which is approximately nine kilometres from the southern end of the Stage 1A dredging. It is not anticipated that the plumes generated from dredging and reclamation activities will have a significant impact on the GBRMP given the distance from the dredging to the GBRMP. The potential for migration of turbid plumes over other sensitive habitats, including the GBR Coast Marine Park Habitat Protection Zone at the Narrows, and the impacts of onshore dredged material disposal will be investigated in detail in the EIS through hydrodynamic and water quality modelling. Where required, management and mitigation measures will be proposed to reduce impacts to acceptable levels. The design of the Western Basin reclamation will take into account the need to manage the water quality in the decant waters and management of the quality and quantity of stormwater runoff from the final surface of the reclamation will also be addressed.



2.9 Sediment Quality

Past GPC capital dredging sediment studies have indicated that sediments are generally uncontaminated and suitable for onshore disposal to reclamation areas at RG Tanna Coal Terminal and Fisherman's Landing and have also met the Interim Sediment Quality Guidelines – low screening levels in the National Ocean Disposal Guidelines for Dredged Material (NODGDM, Environment Australia 2002) (GPC 2008c).

Detailed sediment monitoring programs for maintenance dredging have been carried out on channel sediments in 1992, 1996, 2000 (by WBM Oceanics Australia) and 2006 by GHD (GPC 2008c). Approximately 25 – 30 grab samples were collected during each study allowing broad comparisons of results over time. Approximately 10 – 15 grabs were regularly spaced along the outer channel and 10 – 15 grabs regularly spaced along the inner channel closest to port, industrial and urban developments (GPC 2008c).

The 1992, 1996 and 2000 sediment studies indicated that sediments were generally uncontaminated and suitable for sea disposal. In 2006, the 95% Upper Confidence Limit (UCL) for arsenic, TBT and PAHs slightly exceeded NODGDM screening levels, however evidence was provided which indicated that the risk of dredging and disposal of this material was low (GPC 2008c).

Any sediments to be dredged as part of the Western Basin Strategic Dredging and Disposal Project would be analysed and compared to either Environmental and Health Investigation Levels in the Draft Guidelines for the Assessment and Management of Contaminated Lands 1998 and the Interim Sediment Quality Guidelines in the NODGDM (Environment Australia 2002).

2.10 Coastal Environment

The Port of Gladstone is located in the sheltered waters of Port Curtis, which are created by the presence of Facing and Curtis Islands. The tidal range in Port Curtis is large (around 4 m for a large spring tide) (Connell Hatch 2006). The large mangrove communities fringing Port Curtis provide a storage buffer for waters at high tide. The extensive shallow tidal flats and large tidal range result in the harbour experiencing significant tidal velocities, particularly through the main shipping channels (Connell Hatch 2006). This leads to a generally well mixed water body.

Sediment transport in coastal environments is driven by the prevailing combination of wind, waves and tides. Deepening and widening of the dredged channels throughout the length of the Port may increase the velocity of tidal currents and alter sedimentation and scour patterns throughout the Port. Construction of a large reclamation in the Fisherman's Landing area may also reduce the area available for tidal waters to dissipate, leading to changes in water levels, particularly high and low water springs. In particular, this may impact on the distribution of habitats in the Narrows, which is within the GBRWHA (but outside the GBRMP) and is also within the GBR Coast Marine Park.

BMT WBM have established a hydrodynamic and water quality model of the Port of Gladstone. This model was utilised for the assessment of impacts on the recently approved Wiggins Island Coal Terminal Project. The model will be further calibrated and refined as required and utilised to determine the potential impacts on tidal currents (direction and velocity), water levels and sedimentation and scour patterns of the proposed dredging and reclamation. In particular, the impact of reclaiming a large proportion of the Fisherman's Landing embayment on water levels at high and low tide and the hydrology of the intertidal communities at Friend Point and Kangaroo Island will be explored. Modelling of water



quality plumes generated during dredging and discharge of decant waters from Western Basin reclamation will be undertaken to determine impacts on potentially sensitive habitats.

2.11 Marine Flora and Fauna

Port Curtis supports a diverse range of marine flora and fauna communities and has been well studied over the past decade. Three studies in particular have characterised the marine communities in Port Curtis, these being:

- » Danaher K.F., Rasheed M.A. and Thomas R. (2005). The Intertidal Wetlands of Port Curtis. Information Series QI05031. Department of Primary Industries and Fisheries, Queensland;
- » Rasheed M.A., Thomas R., Roelofs A.J., Neil K.M. and Kerville S.P. (2003). Port Curtis and Rodds Bay Seagrass and Benthic Macro-Invertebrate Community Baseline Survey, November/December 2002. DPI Information Series QI03058. Department of Primary Industries and Fisheries, Cairns;
- » Alquezar, R. and Small, K. (2006). Port Curtis Macrobenthic Monitoring Programme (final report). Centre for Environmental Management, Central Queensland University, Gladstone; and
- » Rasheed M.A., McKenna S.A., Taylor H.A. and Sankey T.L. (2008). Long Term Seagrass Monitoring in Port Curtis and Rodds Bay, Gladstone – October 2007. DPI&F Publication PR07 – 3271. Department of Primary Industries and Fisheries, Cairns.

The 2008 Rasheed *et al.* report summarises annual seagrass monitoring since 2002.

2.11.1 Seagrass

Port Curtis supports extensive areas of coastal and deepwater seagrass and represents the only substantial area of seagrass that has been mapped between Shoalwater Bay 170 km to the north and Hervey Bay 170 km to the south (Rasheed *et al.* 2003, Danaher *et al.* 2005).

The 2002 baseline monitoring program mapped the intertidal, subtidal and deepwater seagrass beds within the Port Limits and the Rodds Bay Dugong Protection Area. Figure 6 shows the extent of seagrass that was mapped in this survey. A total of 7,246 ha of seagrass was identified on the intertidal banks of the Port, with an additional 6,332 ha of deepwater seagrass identified (Rasheed *et al.* 2003). The extensive seagrass beds within the Port include species that are preferred as food by dugongs and turtles, as well as meadows that are known to be important breeding grounds for juvenile tiger prawns (Rasheed *et al.* 2003).

Thirteen of the intertidal and subtidal meadows identified in the baseline survey are monitored in October/November annually by DPI&F. The subtidal seagrass beds within Port Curtis have shown high variability between years, which has been linked with environmental factors such as tidal exposure and climatic conditions (Taylor *et al.* 2007). Appendix C illustrates the changes in area and cover of the 13 annually monitored seagrass beds in the Port of Gladstone.

The biomass of the intertidal seagrass beds at Fisherman's Landing and Wiggins Island declined significantly between the 2004 and 2005 monitoring events, but increased in 2006 and 2007. In contrast, the biomass of the subtidal meadows at Fisherman's Landing and Wiggins Island was unchanged between 2006 and 2007 and the area of the Wiggins Island subtidal meadow had reduced substantially to its smallest size since the commencement of monitoring in 2002 (Rasheed *et al.* 2008). The majority



of other seagrass meadows throughout the Port Limits and Rodds Bay recorded increases or no significant change in biomass in 2007 compared to 2006.

2.11.2 Intertidal Communities

Port Curtis contains large areas of tidal flats and supports substantial mangrove, saltmarsh, seagrass, sandbank and rocky substrate communities (Danaher *et al.* 2005). Figure 7 shows the extent of the intertidal communities as mapped in 2005 by DPI&F. These communities provide shoreline stabilisation as well as providing valuable habitat, nursery and feeding areas for many species of marine fauna.



Figure 6 Intertidal, Subtidal and Deepwater Seagrass Beds identified in DPI&F Baseline Survey 2002. Source: Rasheed *et al.* 2003.



Figure 7 Intertidal Communities of Port Curtis, 2005. Source: Danaher *et al.* 2005.



2.11.3 Benthic Communities

Port Curtis supports a healthy community of estuarine benthic fauna. A monitoring programme conducted by the Centre for Environmental Management (CEM) (Central Queensland University) from November 1995 to November 2003 monitored at five locations within Port Curtis (being Graham Creek, Fisherman's Landing, Clinton Coal Wharf, Auckland Point and Curtis Island) (Alquezar and Small, 2006). Temporal trends within this monitoring program showed that abundance, species richness and diversity were higher in November compared to April for all sites. Annual trends showed significant variation in diversity, abundance and species richness, with the lowest observations in 1999. In following years (2000 – 2001) there was a recovery of fauna to 1995 levels. The temporal changes were observed at all sites during the CEM monitoring programme and therefore indicate a large scale influence, rather than a point source impact (Alquezar and Small, 2006).

Epi-benthic fauna occur throughout the Port Curtis region in varying densities, as described by Rasheed *et al.* (2003). The highest faunal densities were located outside of Facing Island, within the East Banks Sea Disposal Ground and surrounding Seal Rocks.

The inner harbour ranged from low density regions of open substrate with scattered fauna to high density regions of rubble reefs, dominated by bivalves (scallops) with mixed reef taxa. The area directly east of Fisherman's Landing and north into The Narrows was classified as a high and medium fauna density region dominated by bivalves and consisting of rubble reefs, hard corals, ascidians and bryozoan. The communities around Fisherman's Landing were the most diverse of all the survey areas, and were considered to be associated with the high tidal currents in the channel regions of the inner port (Rasheed *et al.* 2003).

2.11.4 Marine Megafauna and Birds

Port Curtis supports a range of marine megafauna, including turtles, dugongs, dolphins, sharks, fish and reptiles as well as numerous wetland and migratory birds. The Commonwealth EPBC Protected Matters Online Search Tool revealed 26 threatened species, of which eleven were threatened marine species, as potentially occurring within the Western Basin (Appendix D). Of these, three species are turtles that are known to utilise the Port Curtis region (flatback turtle, green turtle, and loggerhead turtle). Flatback turtles are known to breed on the seaward beaches of Curtis Island and green turtles are frequently spotted in the mouth of the Calliope River and Targinie Estuary. Dugongs and turtles are frequently sighted within Port Curtis region, indicating that the seagrass communities present within the Port Limits are a valuable food source. Other threatened marine species that were identified as potentially occurring within the area were:

- » two bird species (southern giant-petrel and kermadec petrel),
- » one whale species (humpback whale),
- » two sharks (green sawfish and whale shark), and
- » three other turtles (leatherback, hawksbill and olive ridley).

In addition, there are 33 migratory species (including terrestrial and wetland species), 72 listed marine species and 11 whales and other cetaceans identified as potentially occurring or having suitable habitat in the Western Basin area by the EPBC Protected Matters Online Search Tool.



2.11.5 Potential Impacts

Dredging and disposal of dredged material results in the generation of turbid plumes, which can impact on subtidal and intertidal communities through increased sedimentation and reduction of light. While the subtidal and intertidal communities in Port Curtis are tolerant of periodic increases in turbidity associated with freshwater inflows during rainfall and wave and tidal current induced resuspension, additional turbidity and sedimentation resulting from dredging and decant activities has the capacity to present added physiological stressors.

The potential for migration of turbid plumes over sensitive habitats and the impacts of onshore dredged material disposal will be investigated in detail in the EIS. Management and mitigation measures will be proposed to reduce impacts to acceptable levels, if required. GPC actively support and sponsor the Port Curtis Integrated Monitoring Program (PCIMP) monitoring program and also fund the annual DPI&F seagrass monitoring program, which together, have developed a good baseline dataset that can be utilised in the long term assessment and monitoring of ecological health within the Port.

The potential impacts of dredging and onshore disposal of dredged material on marine megafauna such as turtles and dugong and benthic communities will also be explored and mitigation measures identified, if necessary.

The proposed reclamation will involve the removal of the majority of intertidal and subtidal seagrass meadows north of Fisherman's Landing. The EIS will discuss the local and regional significance of this loss to species such as turtles and dugong and to fisheries and will consider potential habitat offsets under relevant Queensland EPA and DPI&F policies.

2.12 Protected Areas

2.12.1 World Heritage

The Port is wholly contained within the Great Barrier Reef World Heritage Area (GBRWHA) and partly contained within the Great Barrier Reef Marine Park (GBRMP) to the east of Facing Island in the outer harbour (Figure 8). The Western Basin Strategic Dredging and Disposal Project is not located within the GBRMP. The northern boundary of the GBRMP is at the northern end of Curtis Island, encompassing Port Alma.

As the world's most extensive coral reef ecosystem, the Great Barrier Reef is unique and was declared a World Heritage Area in 1981. Internationally recognised for its outstanding universal value, it remains one of only a small number of World Heritage properties worldwide that have been adopted for all four natural criteria:

- » Exceptional natural beauty and aesthetic importance.
- » Significant geomorphic or physiographic features.
- » Significant ecological and biological processes.
- » Significant natural habitats for biological diversity.

The biodiversity and interconnectedness between species and habitats makes the GBRWHA one of the richest and most complex natural ecosystems on earth, with coral reef, mangrove and seagrass habitats contributing to its biological diversity and natural values.



GBRMP zones in the vicinity of the Port Limits include:

- » Habitat Protection Zones at:
 - Seal Rocks,
 - the eastern side of Facing Island, and
 - Rodds Bay.
- » Green Zones on:
 - the eastern side of Curtis Island, and
 - the northern side of Rodds Bay Peninsular.
- » A Yellow Zone on the northern side of Rodds Bay Peninsular (Figure 8).

2.12.2 Other Protected Areas

Other protected areas within the Port of Gladstone Limits include (Figure 9):

- » Rodds Bay Dugong Protection Area (DPA), which is a Zone B Dugong Protection Area. The boundaries of the Rodds Bay DPA run from the southwestern tip of Facing Island to Rodds Peninsular, across the northern entrance channel of the Port from South End to the northern tip of Facing Island and across the bottom of The Narrows from Friend Point to Laird Point, just south of Graham Creek (GBRMPA 2008);
- » The Port Curtis Wetland (QLD019) is listed on the Directory of Important Wetlands. The site includes all tidal areas in the vicinity of Gladstone, from a line between Laird Point and Friend Point (southern end of The Narrows), to a line between Gatcombe Head and Canoe Point, including the seaward side of Facing Island and Sable Chief Rocks, and southern Curtis Island west of a line between North Point and Connor Bluff (DEWHA 2008);
- » The Great Barrier Reef Coast Marine Park has similar boundaries as the Great Barrier Reef Marine Park and also has a boundary at the southern end of The Narrows, between Friend and Laird Points (Qld EPA 2008). There is a Habitat Protection Zone under the GBR Coast Marine Park in the Narrows; and
- » Colosseum Inlet and Rodds Bay Fish Habitat areas are present to the south of Port Curtis.

There are no Ramsar listed wetlands within the Port Limits, however, Port Curtis is listed in the Directory of Important Wetlands because of the presence of notable marine flora and fauna and because it supports feeding grounds for migratory species listed under the CAMBA, JAMBA, ROKAMBA² and Convention on Migratory Species (Bonn Convention) (DEWHA 2008).

2.12.3 Potential Impacts

The Port of Gladstone, while forming part of the GBRWHA and being adjacent to or partly within other protected areas, has been an operating port since 1914. While being a major capital development, the proposed Western Basin Strategic Dredging and Disposal Project will be limited to the existing port limits and will not occur within the GBRMP. The closest GBRMP boundary to the dredging and reclamation is at the North Entrance to Port Curtis, which is approximately nine kilometres from the southern end of the

² CAMBA = China – Australia Migratory Bird Agreement; JAMBA = Japan – Australia Migratory Bird Agreement; ROKAMBA = Republic of Korea – Australia Migratory Bird Agreement.



Stage 1A dredging. The EIS will explore the significance of these protected areas to the ecology of Port Curtis and will assess any potential impacts of dredging and dredged material disposal to the values of these areas and the communities they support.

With the implementation of appropriate management measures during dredging and disposal, significant impacts on the values of the WHA are not expected. Also, it is not anticipated that the plumes generated from dredging activities will have a significant impact on the GBRMP given the distance from the dredging to the GBRMP. Turbid plumes from some of the dredging stages may migrate into the Habitat Protection Zone of the GBR Coast Marine Park that is located within the Narrows. These impacts will be further explored through hydrodynamic and water quality modelling undertaken during the EIS phase.



Figure 8 Great Barrier Reef Marine Park Boundaries in Port Curtis



Figure 9 Protected Area Boundaries in Port Curtis



2.13 Cultural Heritage

There are a number of traditional owner groups in the Port Curtis area. There is a Native Title Claim (QC01/29) over the Gladstone region, including parts of the GSDA. Port Curtis Coral Coast (PCCC) Native Title Claim Group is the Claimant. Through the EIS process, all claimants will be formally notified and invited to be part of a Cultural Heritage Management Plan process under the *Aboriginal Cultural Heritage Act 2003*. GPC has previously worked with the PCCC group to negotiate a Cultural Heritage Management Plan for the Wiggins Island Coal Terminal development.

2.14 Social and Economic Environment

The Gladstone Regional Council area encompasses the former Calliope and Miriam Vale shires and Gladstone City. The Gladstone Sub Statistical Division had a population of 42,903 in the 2006 census (Worley Parsons 2008). The GSDA to the west of Gladstone City was established in 1993 by the Department of Infrastructure and Planning as a major land bank suitable for large-scale industrial development (DIP 2008). The Commonwealth and Queensland Governments have identified Gladstone as a Port with the potential to service future large scale export-oriented, resource processing and value-adding industries. The close proximity of Gladstone's international port facilities is an essential component of the economic viability of the GSDA.

The Gladstone region contains the city of Gladstone, and a variety of coastal and hinterland townships including Boyne Island/Tannum Sands, Yarwun, Targinie, Miriam Vale and Calliope. Industries within the catchment include pastoral, agricultural and processing and manufacturing. Major processing and manufacturing industries located within the Gladstone Region are summarised in Table 2. In addition, a number of proponents are investigating options for constructing LNG plants at the Curtis Island Industry Precinct of the GSDA and the existing Fisherman's Landing reclamation, and Gladstone Pacific Nickel have undertaken feasibility and environmental studies on a site south of Hanson Road. Major imports and exports handled within the port on behalf of local industries and industries located within the Central Queensland hinterland are provided in Table 3.



Table 2 Major Industries in the Gladstone Region

Industry Name	Industry Type
BSL - Boyne Smelters Limited	Aluminium smelter
QAL - Queensland Alumina Ltd	Alumina refinery
NRG - NRG Gladstone Operating Services Pty Ltd	Coal fired power plant
Orica Australia Pty Ltd	Sodium cyanide, ammonium nitrate and chlorine plant
Rio Tinto Aluminium Yarwun	Alumina refinery
QER - Queensland Energy Resources Pty Ltd *	Oil shale miner and medium shale oil and naphtha plant
Cement Australia	Cement and clinker plant

* Ceased operations in 2003

Source: GPC (2008b)

Table 3 Major Imports and Exports of Port of Gladstone

Imports	Exports
Bauxite	Alumina
Bunker oil	Aluminium
Caustic soda	Calcite
Cement gypsum	Cement
Containers	Cement Clinker
General cargo	Coal
Liquid pitch	Containers
LP gas	Fly ash
Petroleum coke	General cargo
Petroleum products	Sorghum
	Wheat

Source: GPC (2008b)

The GSDA attracts industries by offering internationally competitive operating costs. The close proximity of Gladstone's international port facilities is an essential component of the economic viability of the GSDA. The provision of dredged channels, swing basins and berths as identified in the Western Basin Strategic Dredging and Disposal Project will provide access to port facilities, which are a key component of the import and export chain and assists in encouraging industries to develop within the Gladstone region.



Based on the likely need to expedite the works, GPC proposes to engage a contractor to undertake the expanded bund construction for the Western Basin reclamation. Direct employment is estimated to be 55 person-years for the bund construction. Dredging would be staged over a number of years based on the triggers outlined in Table 1. A total of 90 person-years is estimated for this phase of the work and would be performed by contractors.

The direct permanent employment resulting from the dredging and development of the Western Basin reclamation is related to the nature of the product to be handled and as such is not quantifiable. Indirect employment will result from the creation of industrial developments remote to the port. These developments would not be viable without ready access to port infrastructure for import or export of product. As such the local, state and national economies will ultimately benefit from the Western Basin Strategic Dredging and Disposal Project.

Recreational and commercial fishing occurs in the harbour and surrounding region.

The EIS will undertake a social impact assessment, community consultation and an economic impact assessment to quantify the positive and negative impacts of the Project and propose appropriate mitigation measures where required.

2.15 Environmental Management

GPC has an Environment Policy which covers all of its activities. GPC also has an Environment Management System that is externally certified as being compliant with the international standard AS/NZS ISO 14001: 2004. All port operations are managed through this EMS and GPC are committed to continual improvement of environmental performance.

An Environmental Management Plan (EMP) will be prepared for the project. The EMP will be prepared with the intent of ensuring that all activities associated with dredging and disposal are conducted in a manner that protects the natural and social environment and is consistent with project approvals and legislative requirements.

The overall goal of the EMP is to:

- » Provide a mechanism to minimise the potential for environmental impacts to occur during dredging and disposal of dredged material;
- » To provide Local, State and Commonwealth government (where needed) with a framework to confirm compliance with their policies and requirements;
- » To provide the community with evidence that the dredging and disposal operations are being managed in an environmentally responsible manner; and
- » To provide opportunities for continual improvement in the management of environmental, social and economic environments.



2.16 Community Consultation

GPC undertake regular consultation with the community through their Environmental Working Group, production and distribution of a newsletter *PortTalk*, which is distributed throughout the community, and through public awareness sessions conducted by the CEO at various forums.

Specific consultation programs are conducted for large capital projects and a consultation plan will be developed and implemented for the Port of Gladstone Western Basin Strategic Dredging and Disposal Project. Stakeholders will include industry, government, special interest bodies, community organisations and the general public.



3. Conclusion

The proposed Port of Gladstone Western Basin Strategic Dredging and Disposal Project will provide for the development of various industries at the Port of Gladstone and the GSDA. It is expected that any impacts of this project on the natural, social or built environment can be minimised through appropriate mitigation measures specified in an EMP for the dredging and disposal of dredged material.

Consultation with the relevant State and Commonwealth Government Agencies will be undertaken to identify the scope of the environmental assessment. Depending on the level of assessment required a ToR for the assessment will be prepared and advertised for public comment. Agency and community comments will then be incorporated into a final ToR for the assessment.



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Appendix A
GPC Environment Policy



Appendix B

Letter Advising Department of Infrastructure and Planning of Intention to Apply for Significant Project Status



Appendix C
Maps of Seagrass Extent 2002 – 2007

Rasheed *et al.* (2007)



Appendix D
EPBC Act Protected Matters Report



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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	J Lee	B Skarratt	<i>pp J Rapley</i>	J Rapley	<i>J Rapley</i>	2/3/09
1	J Lee	J Lee	<i>J Lee</i>	J Lee	<i>J Lee</i>	11/3/09
2	J Lee	J Lee	<i>J Lee</i>	J Lee	<i>J Lee</i>	16/3/09
3	J Lee	J Lee	<i>J Lee</i>	J Lee	<i>J Lee</i>	19/3/09