

Initial Advice Statement

Balacava Island Coal Export Terminal Project



October 2009



Xstrata Coal Queensland Pty Ltd
Balaclava Island Coal Export Terminal
Initial Advice Statement

October 2009



Contents

Executive Summary	i
1. Introduction	1
2. Proponent	2
3. Project Need and Justification	4
4. Project Description & Project Alternatives	6
4.1 Location	6
4.2 Project Scope	6
4.3 Identification of Preferred Project Concept	8
4.4 Identification of Preferred Rail, Stockyard and Conveyor Alignment	8
4.5 Project Timing	11
5. Existing Environment	12
5.1 Introduction	12
5.2 Physical Environment	12
5.3 Biological Environment	17
5.4 Socio-Economic Environment	21
6. Potential Impacts and Management Requirements	29
6.1 Introduction	29
6.2 Physical Environment	29
6.3 Biological Environment	32
6.4 Socio-Economic Assessment	33
7. Conclusions	35



Table Index

Table 4-1	Indicative Timing for Approvals	11
Table 5-1	Census Data for Raglan, Port Curtis and Coowonga Collection Districts	23
Table 5-2	Housing Data for Raglan, Port Curtis and Coowonga Collection Districts	24
Table 5-3	Import and Export Statistics for Port Alma, 2005 - 2008	26
Table 5-4	Sites of Non-Indigenous Heritage in the Study Area	27

Figure Index

Figure 4-1	Location of Balaclava Island	7
Figure 4-2	Potential Concept Options	9
Figure 4-3	Preferred Concept Option	10
Figure 5-1	Fitzroy River Catchment	14
Figure 5-2	Wetlands Systems	16
Figure 5-3	Conservation Estate	18
Figure 5-4	Regional Ecosystems	20
Figure 5-5	Affected Properties	22
Figure 5-6	Census Collection Districts Surrounding Balaclava Island	25
Figure 5-7	Heritage Sites	28

Appendices

- A Legislation
- B Identification of Preferred Route Option
- C Flood Data
- D Tide Data
- E Climate Data
- F Desktop Database Searches
- G Endangered, Vulnerable and Rare Species List



Executive Summary

This Initial Advice Statement (IAS) has been prepared by Xstrata Coal Queensland (XCQ) to identify potential environmental, social and cultural issues, as well as planning impacts and statutory approvals relating to the development of the proposed Balaclava Island Coal Export Terminal (BICET) (the Project). The IAS is intended to identify and broadly characterise the potential impacts that will be investigated prior to the Project being granted statutory approval.

The proposed new coal export terminal will be located at Balaclava Island (approximately 5km from Port Alma), and on nearby land on the mainland adjacent to Balaclava Island, approximately 40 km north of Gladstone. It will be designed to enable up to 35 million tonnes per annum (Mtpa) of coal to be exported to global markets from Queensland's Bowen and Surat Basins via the use of vessels of up to 110,000 tonnes capacity.

Congestion at Queensland's coal terminals has been a persistent issue for Queensland's coal exports. Even taking into account the current and proposed expansion plans of existing coal terminals and the development of the proposed Wiggins Island Coal Terminal, the projected future demand estimates for Queensland coal exports would not be fully met by these developments within their expected completion timeframes. Consequently development of the Project could alleviate congestion at existing coal terminals located at Gladstone, Dalrymple Bay and Abbot Point through provision of additional export capacity and by potentially allowing more of the larger vessels to access these terminals while smaller vessels, to service XCQ's customers, are directed to BICET.

Balaclava Island is owned by Gladstone Ports Corporation (GPC) and has been designated Strategic Port Land. GPC has given XCQ rights to build, own and operate the Project and to undertake a feasibility study and environmental assessment for the Project as part of GPC's strategic plan for the Port Alma area to become a significant new port precinct. The stockpile area, railway line and part of the conveyor route are to be located on privately owned land. XCQ is currently in discussion with the private landowners regarding land access and future tenure rights and this process will continue throughout the Project's study and development phase. Development of the Project could potentially provide a catalyst for future development of other export activities at Port Alma and on Balaclava Island.

Within the broadly identified zone for the terminal, the project team used a Multi Criteria Analysis (MCA) framework to identify the preferred project concept, using a number of environmental, social and engineering criteria. The preferred project concept for the proposed coal terminal consists of:

- The development of a new shiploading facility on Balaclava Island;
- Construction of a rail spur from the existing North Coast railway line near Raglan to coal stockpiles located on higher ground on an existing cattle station; and
- Use of overland conveyors to transport coal from the stockpiles to the shiploader.

Balaclava Island is located within the Fitzroy River Delta, which is listed on the national Directory of Important Wetlands. Balaclava Island is listed on the Register of National Estate and consists of mud flats and salt pans with fringing mangroves. Preliminary site investigations on Balaclava Island have indicated that geotechnical conditions will support development of the Project.

Development of the Project will require capital and maintenance dredging within the Great Barrier Reef Coast Marine Park. A Sediment Analysis Programme (SAP) has been developed and is currently being



assessed by the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) This sampling will be used to determine the characteristics of the dredged material and the most suitable disposal and re-use options.

Selection of the Investigation Corridor has attempted to minimise disturbance to threatened ecological communities and flora and fauna species. Some clearing of Not of Concern (NOC) and Of Concern (OC) Regional Ecosystems (REs) will be required, consisting of mangrove forest on marine clay plains (NOC RE 11.1.4), *Eucalyptus crebra* woodland on metamorphosed sediments (NOC RE 11.11.15), *Eucalyptus populnea* woodland on alluvial plains (OC RE 11.3.2) and *Eucalyptus tereticornis* tall woodland on alluvial plains (OC RE 11.3.4). The area of clearing required will be confirmed on completion of the field studies to be completed as part of the environmental impact assessment process.

Published data and anecdotal reports from local stakeholders indicated the potential presence of a critically endangered bird in the Investigation Corridor (as identified in Figure 4.3). Initial site investigations for the Yellow Chat have indicated that there is no suitable habitat for this bird within the Investigation Corridor.

The location of the stockpile area and rail spur will affect two private properties, both of which are existing cattle stations. Initial discussions with the affected landowners have commenced and will continue throughout the Project.

A search of the Aboriginal and Torres Strait Islander Cultural Heritage Database and the Queensland Heritage Register was undertaken for the Investigation Corridor. The proposed Investigation Corridor does not impact on any known Indigenous or non-Indigenous heritage sites.

Preliminary investigations have not revealed any environmental constraints that would suggest the project is fatally flawed. Further field investigations will be undertaken during preparation of the Environmental Impact Statement (EIS) to confirm this. It is expected that the project will have flow-on benefits for the local, regional and state economies.

The preparation of this IAS is the first step in the process of environmental impact assessment and enables the Coordinator-General (CG) to determine whether the project meets the criteria for declaration as a "Significant Project" under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). These criteria include meeting the requirements of Section 27 of the SDPWOA:

- ▶ **Complex approval requirements, including local, state and federal Government involvement.** The Project will require a number of local, state and federal approvals (as listed in Appendix A).
- ▶ **A high level of investment in the state.** The Project cost is currently estimated at approximately \$1 billion, which represents a significant investment in the State and will facilitate or support further downstream investments generating economic benefits to the State (Section 6.4).
- ▶ **Potential effects on infrastructure and/or the environment.** The Project has the potential to impact on existing rail and power infrastructure (Section 4). Options for water supply and hence existing or future infrastructure impacts are still being assessed. In addition, the project could result in a number of environmental impacts (Section 6).
- ▶ **Provision of substantial employment opportunities.** Development of the Project will lead to the creation of up to 100 full time jobs, with approximately 800 additional jobs during the construction phase. In addition, there are likely to be indirect employment opportunities created in the local area (Section 6.4).



- ▶ **Strategic significance to a locality, region or the state.** Development of the Project would enable up to an additional 35 Mtpa of coal to be exported to global markets from Queensland's Bowen and Surat Basins. It may also alleviate pressure on existing coal terminals located at Gladstone, Dalrymple Bay and Abbot Point (Section 3).

The IAS provides:

- ▶ A brief description of the Project and proposed works;
- ▶ The need and justification for the Project; and
- ▶ Background information and a broad indication of the potential environmental, social, planning and cultural impacts associated with the construction and operation of the Project that will be further investigated during the preparation of the EIS.



1. Introduction

This Initial Advice Statement (IAS) has been prepared by GHD Pty Ltd. (GHD) for Xstrata Coal Queensland (XCQ) to identify potential environmental, social and cultural issues, as well as regulatory approvals relating to the development of the proposed Balaclava Island Coal Export Terminal (BICET), hereafter referred to as the Project.

This IAS has been prepared to:

- ▶ Enable the Coordinator-General to determine whether the project meets the criteria for declaration as a “Significant Project” under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). Under Section 27 of the SDPWO Act, in considering whether a project should be declared a “Significant Project”, the Coordinator-General must have regard to one or more of the following:
 - Detailed information about the project given by the proponent in an IAS (this report);
 - Relevant planning schemes or policy frameworks, including those of a relevant local government or of the State or the Commonwealth (refer to Appendix A);
 - The project’s potential effect on relevant infrastructure. The project has the potential to impact on the existing North Coast rail line and power infrastructure and the existing facilities at Port Alma (Section 4.2)
 - The employment opportunities that will be provided by the project (Section 6.4);
 - The potential environmental effects of the project. The Project has the potential to impact on a number of environmental aspects (Sections 5 and 6);
 - The complexity of local, State and Commonwealth requirements for the project;
 - The level of investment necessary for the proponent to carry out the project (Section 2); and
 - The strategic significance of the project to the locality, region or the State (Section 4).

- ▶ Provide sufficient detail to enable regulatory agencies and other stakeholders to have effective input in establishing Terms of Reference (ToR) for an Environmental Impact Statement (EIS) for the Project.



2. Proponent

The proponent for this project is Xstrata Coal Queensland Pty Ltd (XCQ). XCQ, with its principal office in Brisbane, is a wholly owned subsidiary of Xstrata Plc.

Xstrata Plc is a major global diversified mining group, listed on the London and Swiss Stock Exchanges and is included in the FTSE top 15. The Xstrata group is headquartered in Zug, Switzerland and has approximately 43,000 employees worldwide, including contractors. Xstrata plc obtains approximately 25% of its revenue from Australia and has invested more than \$8.5 billion in Australia since 2002 in its coal, copper and zinc operations in Queensland, New South Wales and the Northern Territory.

Xstrata Plc has been recognised by the Dow Jones Sustainability Index (DJSI) as the Global Super Sector Leader for Basic Resources in its World and STOXX Indexes for 2008/2009. This is the second consecutive year that Xstrata Plc has been named as the resources sector leader and third year that Xstrata Plc has been included in the DJSI of sustainability leaders. Xstrata Plc has also been rated as the sector leader in the 2007 Australian Corporate Responsibility Index.

Xstrata Coal, the coal commodity business unit of Xstrata Plc, is the world's largest exporter of thermal coal and the fifth largest producer of hard coking coal. With its headquarters in Sydney, Australia, Xstrata Coal has interests in more than 30 operating coal mines throughout Australia, South Africa and the Americas.

XCQ, one of the business units of Xstrata Coal, manages several existing operations including the Oaky Creek Mine east of Tieri (underground operations), the Newlands Mine at Glenden (underground and open-cut operations), the Collinsville Mine near Collinsville (open-cut operations) and the Rolleston Coal Mine near Rolleston (open-cut operations). In 2008, the total managed production in Queensland was 26 million tonnes (Mt) of coal (of which 9.8 Mt was coking and 16.2 Mt was thermal). XCQ, via Abbot Point Bulkcoal Pty (APBC), also operates the Abbot Point Coal Terminal (north of Bowen) and holds directorships for the Dalrymple Bay Coal Terminal (DBCT) and Wiggins Island Coal Export Terminal Pty Ltd (WICET).

XCQ is also one of the participants (together with ICRA Wandoan Pty Ltd and Sumisho Coal Australia Pty Ltd) in the Wandoan Joint Venture which is the proponent of the proposed Wandoan Coal Project (WCP) which was declared a "significant project" in December 2007 by the Co-ordinator General. The WCP is a joint venture by XCQ, ICRA (Wandoan) Pty Ltd and Sumisho Coal Australia Pty Ltd to develop a new coal mine approximately 5 kilometres west of the township of Wandoan. The WCP would comprise open cut coal operations which would initially produce approximately 22 million tonnes per annum of thermal coal product for export. The EIS for the WCP has been on public display and the Supplementary EIS is being finalised.

Xstrata Coal Surat Basin Rail Pty Ltd, a subsidiary of XCQ, is a participant in the Surat Basin Rail Joint Venture which is undertaking feasibility studies into the construction of an approximately 210km new railway to connect the existing QR Network near Wandoan with the QR Network Moura system (SBR). The SBR would be a multi user open access railway to facilitate export of coal through the Port of Gladstone and potentially other freight. The EIS for SBR has been on public display and the Supplementary EIS is being finalised.

In Queensland, the Xstrata Community Partnership Program has committed \$7.8 million over five years to local communities.

Xstrata Coal is committed to 'the goal of sustainable development'. Xstrata Coal balances social, environmental and economic considerations in how it manages its business. Xstrata Coal believes that



operating to leading standards of health, safety and environmental management, contributing to the development of sustainable communities, and engaging with stakeholders in two-way, open dialogue, regardless of location, enhances Xstrata Coal's corporate reputation and is a source of competitive advantage.

Xstrata Coal conducts regular internal and external audits of its businesses and operations to ensure compliance with its business principles, policies and standards.

In its approach to climate change, Xstrata Coal:

- ▶ Is committed to playing its part in the international collaborative effort to implement solutions to the challenge of climate change;
- ▶ Recognises the future will be a carbon constrained world and is working with governments, researchers and industry around the world to develop a portfolio of options for reducing greenhouse gas emissions from the use of coal in power generation;
- ▶ Is a major contributor to the A\$1 billion COAL 21 Fund, through the imposition of a voluntary levy on its production. The Fund will financially support the research, development and deployment of low emission power generation technologies in Australia;
- ▶ Collaborates in research and development programs and provides both technical and financial support to dedicated Cooperative Research Centres focused on near- zero emission technologies;
- ▶ Supports additional research into CO₂ capture and storage to enable this technology to be commercialised worldwide as rapidly as possible;
- ▶ Works continually for the more efficient use of energy and reduction of greenhouse gas emissions through dedicated energy efficiency at all operations;
- ▶ Looks to collaborate with its customers, both domestic and international, in working towards the sustainable use of coal through new power generation technologies;
- ▶ Seeks to effectively reduce fugitive emissions from its operations through the capture and use of methane wherever viable from coal seams to generate electricity; and
- ▶ Contributes to the development of effective public climate change policy.

The contact details for the Project Proponent are:

Xstrata Coal Queensland Pty Ltd

G.P.O Box 2587

Brisbane QLD 4001

Telephone: 1800 145 265

Facsimile: 07 3831 3162



3. Project Need and Justification

This section describes the need for the proposed Project, the current infrastructure requirements that the proposed Project will fulfil and the expected economic and social benefits of the Project.

Demand for coal has increased significantly over the past decade. Despite concerns over global carbon emissions and the current global financial downturn this growth is expected to continue and remain strong. Coal represents a low cost stable supply of fuel relative to other alternatives and will continue to be a vital input into world economic growth.

The cumulative average growth rate for global thermal coal demand over the past 28 years was around 10%. Historical demand growth indicates the global seaborne thermal coal demand could increase by more than 60 Mt per annum (Mtpa) on an ongoing basis once the current global economic conditions recover. Australian coal exports constitute approximately one third of this market and accordingly if market share is to be maintained, the annual increase in thermal coal demand from Australia will exceed 20 Mtpa on an ongoing basis. However, issues such as port congestion could jeopardise Australia's share of this growing market as other countries such as Indonesia have substantial coal reserves and potential cost and supply chain advantages.

In its IAS for the Wiggins Island Coal Terminal (WICT) Gladstone Ports Corporation (GPC) advised that on completion of the recent expansion, the RG Tanna Coal Terminal will have reached the limit of its development capability and that capacity had been contracted fully to customers. The WICT while not yet developed has received indicative tonnage nominations from coal producers well in excess of its design capacity of 70 Mtpa. WICT could be fully contracted prior to the Project being concluded if global demand for coal resumes recent growth rates.

In expectation of current and known potential future coal export terminal capacities being insufficient to meet short to medium term growth projections for export coal, and in consideration of its prospective coal production growth expectations from its coal reserves, XCQ is undertaking a feasibility study for the development of the Project. The study, approval and development timeframes for large scale projects together with the fact that indicative nominations for capacity at WICT exceed its capacity limitations, mean it will be imperative that the Project is progressed well before WICT is fully constructed.

This approximately \$1 billion Project would enable up to an additional 35 Mt of coal per annum to be exported to global markets from XCQ's existing mines at Rolleston and Oaky Creek in the Bowen Basin. The Project could also serve as an alternative export terminal for coal produced from the potential WCP in the Surat Basin, should XCQ's requirements be unable to be met by WICT.

Development of BICET could alleviate congestion at existing coal terminals located at Gladstone, Dalrymple Bay and Abbot Point particularly as demand for Queensland coal exports is expected to ramp up quickly once global economic conditions permit. Congestion could be alleviated through provision of additional export capacity and by potentially allowing more larger vessels to access these terminals where smaller vessels to service XCQ's customers are directed to BICET.



It is expected that the Project will generate flow on benefits for the local and State economy in the manner of:

- ▶ Generation of around an additional 100 full time equivalent positions during operations and around 800 additional jobs during construction.
- ▶ Flow on expenditure in the local and State economy arising from the increased direct and indirect employment opportunities.
- ▶ Supporting coal mining operations which generate royalties for the Queensland Government.

Balaclava Island (where the Project's conveyor and berths will be located) is owned by GPC and is designated Strategic Port Land. GPC has given XCQ rights to build, own and operate the Project and to undertake a feasibility study and environmental assessment for the Project as part of GPC's strategic plan for the Port Alma area to become a significant new port precinct. In line with public comments made by GPC, the Project could facilitate or act as a catalyst for future opportunities on Balaclava Island and/or the existing Port Alma precinct. This could occur through:

- ▶ Dredging of the channel for the Project providing an opportunity for larger vessels to access Port Alma (current restrictions on vessel sizes exist as the natural channel depth is a limiting factor);
- ▶ The Project's demonstration of the economic feasibility of developing a coal terminal on Balaclava Island, notwithstanding the challenging physical attributes of the site, which could act as an incentive for other coal terminal or other export product proponents to assess similar developments based on their own feasibility requirements;
- ▶ Sharing of certain supporting infrastructure such as access roads, power and water services;
- ▶ Economies of scale in maintenance dredging and harbour services.



4. Project Description & Project Alternatives

4.1 Location

The proposed coal terminal will be located at Balaclava Island, and on nearby land on the mainland adjacent to Balaclava Island approximately 5 km from Port Alma, and approximately 40 km north of Gladstone (Figure 4-1).

4.2 Project Scope

The Project will be designed to export up to 35 Mtpa of coal via the use of vessels of up to 110,000 tonne capacity. It is currently proposed that a railway link and overland conveyor will be used to transport coal from the existing North Coast railway line to the new coal terminal. The main components of the Project comprise the following:

- ▶ An approximately 13.5 km long rail spur off the QR Network North Coast railway line;
- ▶ A rail provisioning facility and minor maintenance facility;
- ▶ Rail receival infrastructure, including wagon dump hoppers and associated equipment;
- ▶ Coal in-loading feeders and conveyors;
- ▶ Coal stockpiles, stackers / reclaimers and conveyors;
- ▶ Out-loading conveyors and surge bins;
- ▶ Shiploaders and export berths;
- ▶ Environmental management measures including sediment traps;
- ▶ Capital and maintenance dredging;
- ▶ Electrical power, instrumentation, control, water supply, lighting and communications;
- ▶ Access road; and
- ▶ Buildings and fencing.

Accommodation facilities for the construction workforce may also be required. The need and possible location for such facilities will be investigated further.

Subject to further investigations, the development and operation of water treatment facilities treating groundwater and/or sea water may also be required.



4.3 Identification of Preferred Project Concept

The project team used a Multi Criteria Analysis (MCA) framework to identify the preferred Project concept, using a number of environmental, social and engineering criteria. This MCA framework is described in Appendix B.

The three concept options considered are presented in Figure 4.2.

The preferred project concept (Option 3) for the proposed coal terminal consists of the development of new shiploading facilities on Balaclava Island. A rail spur will be constructed from the existing North Coast railway line near Raglan to a coal stockpiles located on higher ground on an existing cattle station. An overland conveyor will be used to load the ship, transporting coal from the stockpile area to the shiploader.

The advantages of Option 3 over the other concept options considered are:

- ▶ Substantially reduced dredging and associated spoil disposal;
- ▶ Lowest impact on designated wetlands;
- ▶ Substantially minimised interaction with adjacent commercial salt production facilities at Port Alma;
- ▶ Substantially reduced interaction with existing port activities at Port Alma;
- ▶ Balaclava Island is designated Strategic Port Land;
- ▶ The coal stockpile area would be located on more geotechnically suitable material and would not be located within a wetland; and
- ▶ Reduced channel transit time for coal ships.

The preferred project concept (Figure 4.3) represents the optimal configuration based on the MCA undertaken (Appendix B).

The Project proposes to occupy only a small portion of the foreshore area and there is therefore room for future berths on Balaclava Island. The Project has identified an area for its stockpiles, conveyor and rail alignment within the Investigation Corridor based on the MCA framework. There remain large areas of land potentially suitable for future port infrastructure.

4.4 Identification of Preferred Rail, Stockyard and Conveyor Alignment

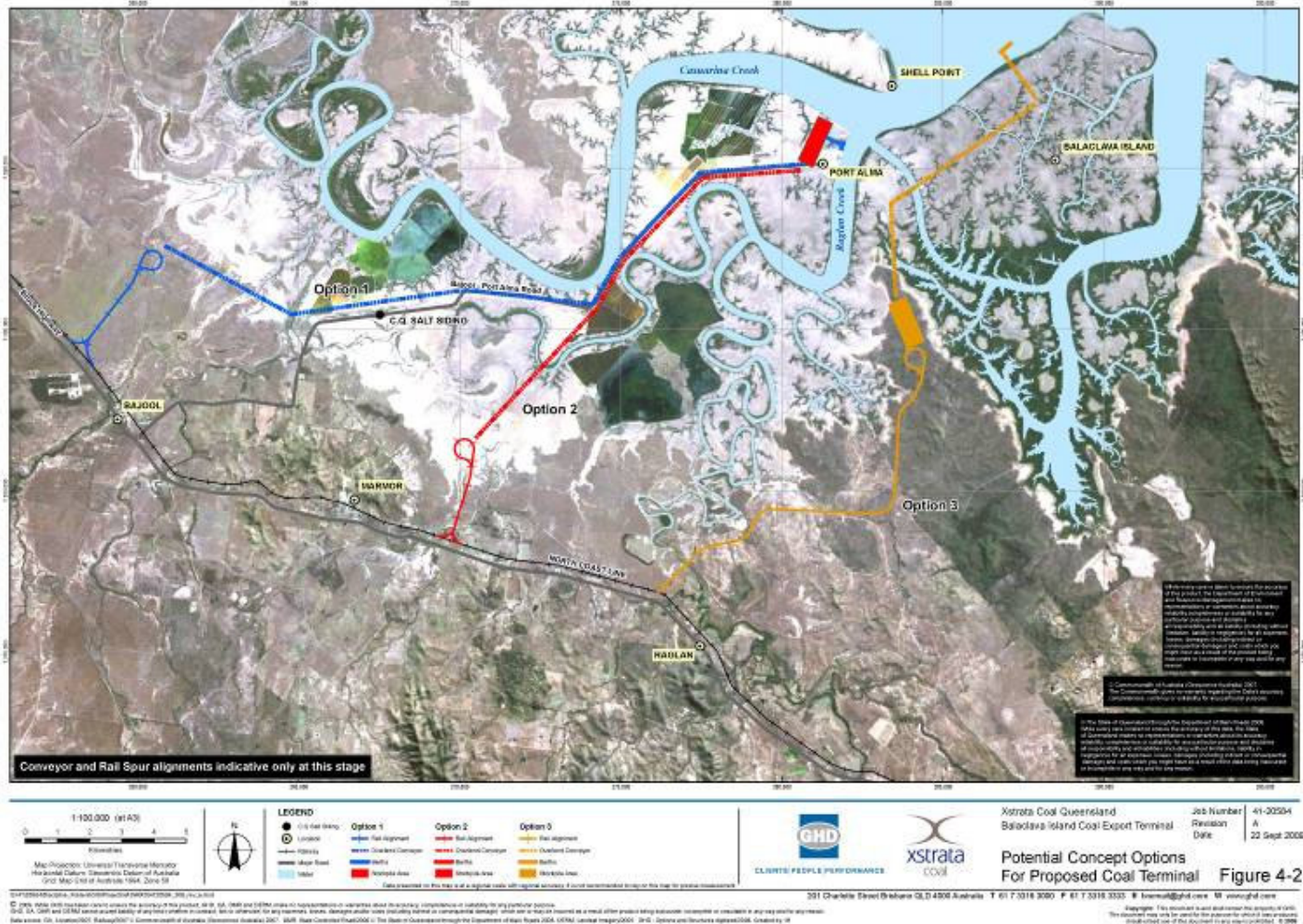
Desktop studies have identified an investigation corridor which is considered broadly suitable for a rail, stockpile area and, conveyor alignment and berth locations (Investigation Corridor as shown in Figure 4.3) based on environmental, social and engineering criteria.

Identification of the preferred alignment for the rail spur is ongoing. The rail alignment will have a nominal 60m width, except at the location of potential provisioning roads where it could be wider to accommodate additional tracks and provisioning facilities. The more precise widths of the rail alignment and conveyor will be defined during the pre-feasibility stage of the Project.

Further desktop studies and limited field investigations will be used to identify a preferred alignment within the Investigation Corridor. The preferred alignment will then be the focus of more detailed studies during preparation of the EIS.

The Investigation Corridor is indicated in Figure 4-3.

Figure 4-2 Potential Concept Options





4.5 Project Timing

Project timing is dependent on a number of internal and external considerations and factors including securing the necessary legislative approvals. Table 4-1 indicates the indicative timings to secure necessary approvals and will be subject to the impact of a range of factors.

Table 4-1 Indicative Timing for Approvals

Request for Significant Project declaration and submission of IAS (commencement of the EIS process)	Q 4 - 2009
Referral to Australian Government (EBPC Act)	Q 4 - 2009
Development of Terms of Reference	Q 4 - 2009
EIS preparation and public display	Mid 2010 (in parallel with completion of pre-feasibility studies)
Supplementary EIS (if required)	Q3 - 2010
Coordinator General's Report	Early 2011
Legislative Approvals	Early 2011
Commence onsite Construction	2012
Commissioning	2014



5. Existing Environment

5.1 Introduction

Development and operation of the proposed coal terminal could result in environmental, social or cultural impacts. The following overview of the existing environment and an initial assessment of potential impacts are based on information drawn from available published data and previous studies undertaken within the project area and surrounds.

5.2 Physical Environment

5.2.1 Geology and Soils

The geological maps¹ for the Rockhampton to Gladstone area (the Study Area) show that the superficial (i.e. more recent) deposits over much of the study area consist of Quaternary Age mangrove swamps, mudflats and salt pans. Further inshore, close to the Bruce Highway, the superficial deposits comprise Quaternary Age Alluvium, which is recorded as a mix of gravel, sand, silt and clay.

The geology of the Study Area is characterised by sedimentary deposits which have been affected by regional faulting, which trend in a northwest-southeast direction. This has resulted in a mix of rock types, which are exposed at the southern end of the study area and which extend below the superficial deposits.

The eastern part of the study area is underlain by the Berserker Beds, which were laid down during the lower Permian period and which comprise acid lapilli tuff, vitric and crystal tuff, andesitic and acid flows, agglomerate, tuffaceous, conglomerate, mudstone and lithic arenite. Geoscience Australia² characterise the Berserker Beds as thinly bedded, mudstone, siltstone, volcanoclastic arenite and minor crystal tuff.

The central part of the Study Area is underlain by the Crana Beds, which were laid down during the Carboniferous period and which comprise arenite, conglomerate, mudstone, siltstone, andesite flows and tuff.

The western part of the Study Area is underlain by the Mount Holly Beds, which were laid down during the Lower to Middle Devonian period and which comprise ash tuff, volcanic arenite, siltstone, mudstone, conglomerate, and crinoidal / coralline limestone.

Soils in the Study Area are predominantly heavy clays (>45%) with a clay content of 40 – 60%. The topsoil comprises 20 – 40% sand, up to 40% silt and up to 60% clay. The pH of the topsoil varies dramatically over a small surface area, with a pH range of 4.3 – 7.0. The organic carbon layer comprises 1 - 2% carbon; total nitrogen content is up to 0.1%, along with a phosphorus content of greater than 0.05%.

The National Acid Sulfate Soils inventory indicates that the probability of acid sulfate soils (ASS) being present in the Study Area is high. The Study Area comprises clay loams and light clays, with a hydraulic conductivity of 0.3 – 3.0 mm per hour. Topsoil in the area is predominantly less than 0.25 m deep. The bulk density of the topsoils is 1.2 – 1.4 g/cm³.

¹ Australian 1: 250000 Series Geological Map Sheet SF 56-13 (Rockhampton), Geoscience Australia, 1974

² Geoscience Australia is a prescribed agency of the Australian Government with the role of providing national geological, geophysical and geohazard mapping



The coastal plain soils are predominantly grey cracking clays, although some other clay types are also present. Saline clays with some alluvial materials are found on level marine plains. Low rounded hills on metasediments and granites with gradients less than six degrees are present in the marine zone; some of these areas, however, are subject to hard acidic red soils. Hard acidic yellow mottled soils are also common in the area. Some remnant soils can be found in pockets throughout the area, although ground investigations will need to be undertaken to clarify their extent.

5.2.2 Climate

No precise climatic data is available for Balaclava Island, however there are three Bureau of Meteorology sites nearby which can be used to characterise the climate of the area. These stations are Rockhampton Post Office, Gladstone Post Office and Cape Capricorn Lighthouse (located on Curtis Island).

Climatic data for each of these sites are presented in Appendix F (Bureau of Meteorology, 2008). No wind speed data are available for the Rockhampton Post Office or Gladstone Post Office stations. Wind Rose data from mean 9 am and mean 3 pm wind speeds at Cape Capricorn Lighthouse are available and are illustrated in Appendix E.

From the climate data acquired from these three sites, it can be deduced that Balaclava Island and the mainland area within the Project Area (as shown in Figure 4.3) will experience an average daily maximum temperature of 26° C and an average daily minimum temperature of 18° C. Average annual rainfall for the area is approximately 920 mm.

5.2.3 Hydrology

The Fitzroy River catchment covers more than 10% of Queensland's land area³ (Figure 5-1); it has a catchment of 150,000 km² and a median annual discharge of 2.7 million ML, the majority of which comes from runoff during heavy rainfall periods. The environment at Balaclava Island is hyper-saline, which is indicative of the coastal inundation that occurs in the area.

The hydrology of the Fitzroy River has been altered in the past by the construction in 1875 of a river training wall downstream of Rockhampton⁴, which resulted in the accumulation of sediment and the formation of mangrove communities. Increased land clearing up river has altered the sediment regime in the river mouth, as has dredging of the berth pocket at Port Alma. These upstream impacts mean that the marine habitat in the vicinity of Balaclava Island may no longer be considered a pristine environment.

³ United Nations Educational, Scientific and Cultural Organisation (UNESCO) (2005).

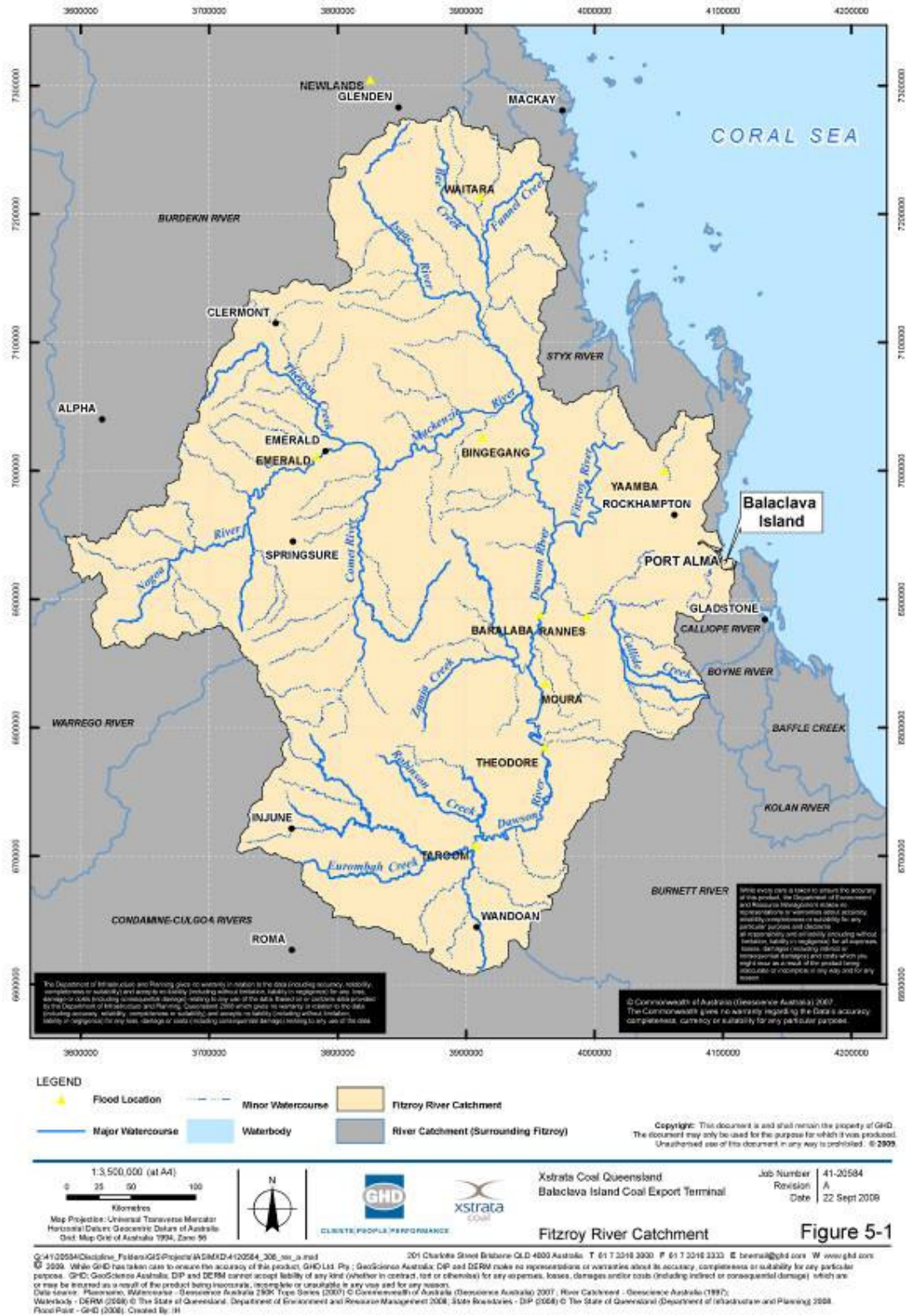
http://portal.unesco.org/science/en/ev.php-URL_ID=3772&URL_DO=DO_TOPIC&URL_SECTION=201.html

⁴ GBRMPA (2008). State of the Marine Environment report.

www.gbrmpa.gov.au/corp_site/info_services/publications/sotr/latest_updates/mangroves_and_saltmarshes/3

GHD believe that GBRMPA are referring to the Rockhampton Barrage when they refer to the "river training wall".

Figure 5-1 Fitzroy River Catchment





5.2.4 Wetlands

There are extensive wetlands in the area surrounding Balaclava Island, including the Fitzroy River Delta which is listed on the national Directory of Important Wetlands (DOI) (Figure 5-2). The Keppel Bay area is frequented by marine megafauna for feeding, along with migratory bird species for nesting and feeding. Balaclava Island itself is comprised of black mangrove (Closed *Avicennia*) and yellow mangrove (Closed *Ceriops*), salt pan and mud flats.

Other conservation estate designations (including Ramsar wetlands) are discussed in Section 5.3.1.

5.2.5 Flooding and Tides

Flooding is discussed in detail in Appendix C. The Fitzroy River has along history of flooding, with the highest recorded flood in Rockhampton in 1918 reaching 10.11m. Floods on the river have the potential to affect the Great Barrier Reef through the discharge of sediment, nutrients and contaminants, which could impact water quality in the vicinity of the Project. The Project design will be developed to permit the terminal to be able to withstand frequent, significant flood events.

Tides are discussed in detail in Appendix D. Tides along the entrance channel to Port Alma are influenced by shallow water effects induced by the estuary; consequently the tidal range at Port Alma (and potentially Balaclava Island) is greater than the offshore tidal range. The tidal range at Balaclava Island has been taken into consideration during development of the preferred project concept, in that the proposed stockpile has been sited above Highest Astronomical Tide (HAT) in order to minimise the risk of loss of containment of coal in proximity to the Great Barrier Reef.

5.2.6 Dredging

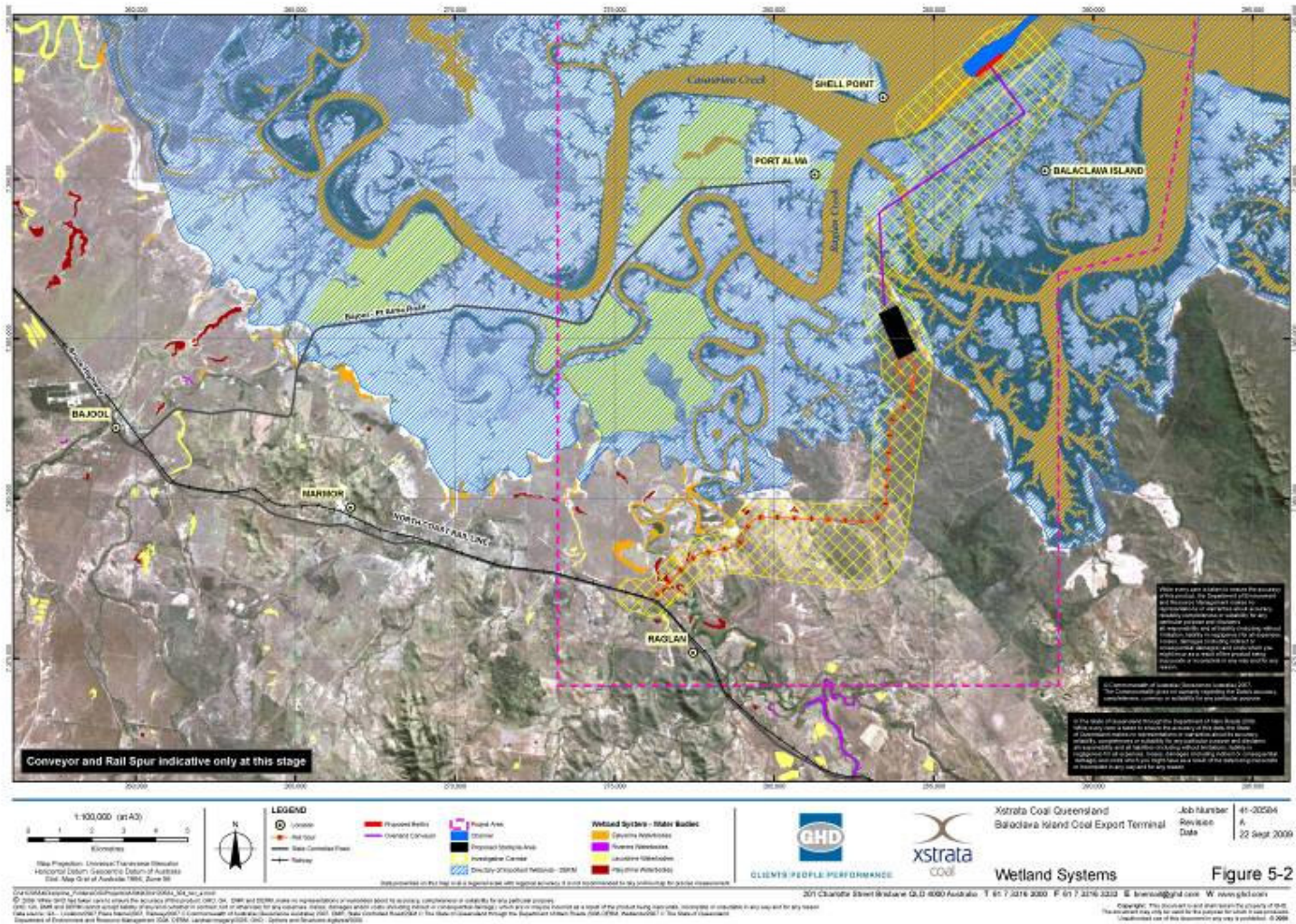
Although some minor dredging currently occurs at Port Alma, the approach channel that has formed naturally to the north of Curtis Island within Keppel Bay and within the river mouth will need to be deepened for the Project, to allow for post-Panamax vessels of up to 110,000 tonnes to traverse the channel.

The proposed area of dredging is indicated in Figure 5-3.

5.2.7 Noise and Air Quality

At present, noise and air quality are affected by current road, rail and port activities. A full noise and air quality assessment will be undertaken as part of the EIS to determine if the Project Area (as detailed in Figure 4.3) is affected by industry in the Gladstone area and if the Project will impact on air or noise quality.

Figure 5-2 Wetlands Systems





5.3 Biological Environment

Under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), approval from the Minister for Environment, Water, Heritage and the Arts must be sought if the project would have, or is likely to have, a significant impact on a Matter of National Environmental Significance (MNES).

A search facility of DEWHA's website has indicated the presence or potential presence of a number of MNES within the vicinity of the proposed Project Area, as described below.

5.3.1 Conservation Estate

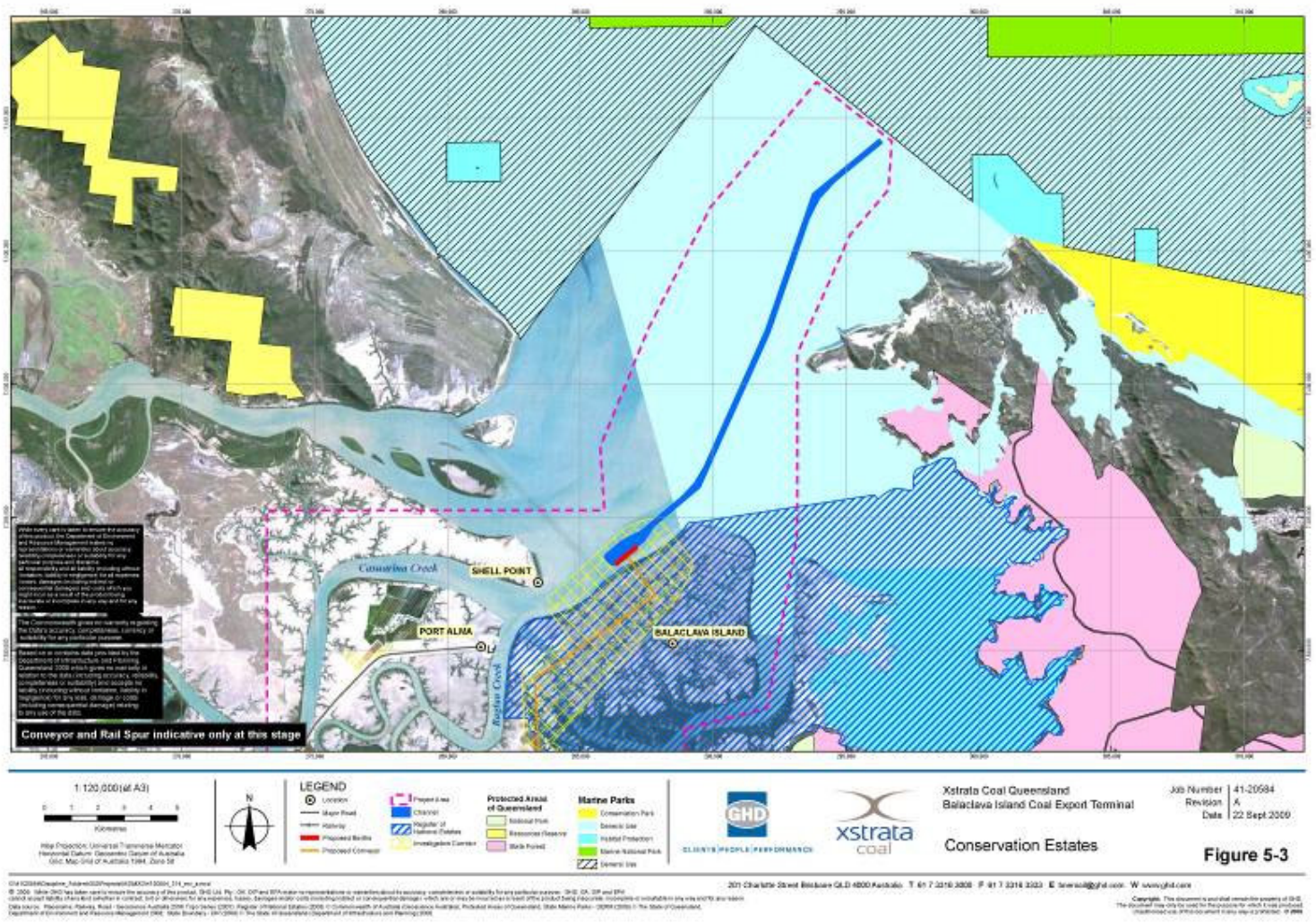
The Project is located within the Fitzroy River catchment which is the same catchment as the Shoalwater and Corio Bays Area Wetland of International Significance (Ramsar site); however, the Project is not envisaged to impact on this site as it is approximately 100 km away on the other side of Rockhampton.

The proposed BICET berths would be located within approximately 1 km of the State-listed Great Barrier Reef Coast Marine Park. The berths would also be located within approximately 9 km of the Commonwealth listed Great Barrier Reef Marine Park, which is designated both a National Heritage Area and a World Heritage Area.

In addition, Balaclava Island is listed on the Register of National Estate (RNE). The RNE was originally established under the *Australian Heritage Commission Act 1975*. The RNE was frozen on 19 February 2007, which means that no new places can be added or existing places removed. The RNE will continue to act as a statutory register until February 2012. During this period DEWHA is required to consider the RNE when making decisions under the EPBC Act.

The boundaries of the Marine Parks and the RNE are indicated on Figure 5-3.

Figure 5-3 Conservation Estate





5.3.2 Flora and Fauna

There are two endangered ecological communities listed as MNES likely to occur in the Project Area:

- ▶ weeping myall woodlands; and
- ▶ semi-evergreen vine thickets of the Brigalow Belt and Nandewar Bioregions.

Based on the findings of initial site visits, neither of these vegetation communities is considered likely to be present in proximity to the proposed Investigation Corridor; however, this will be confirmed through detailed ecological field surveys conducted as part of the EIS.

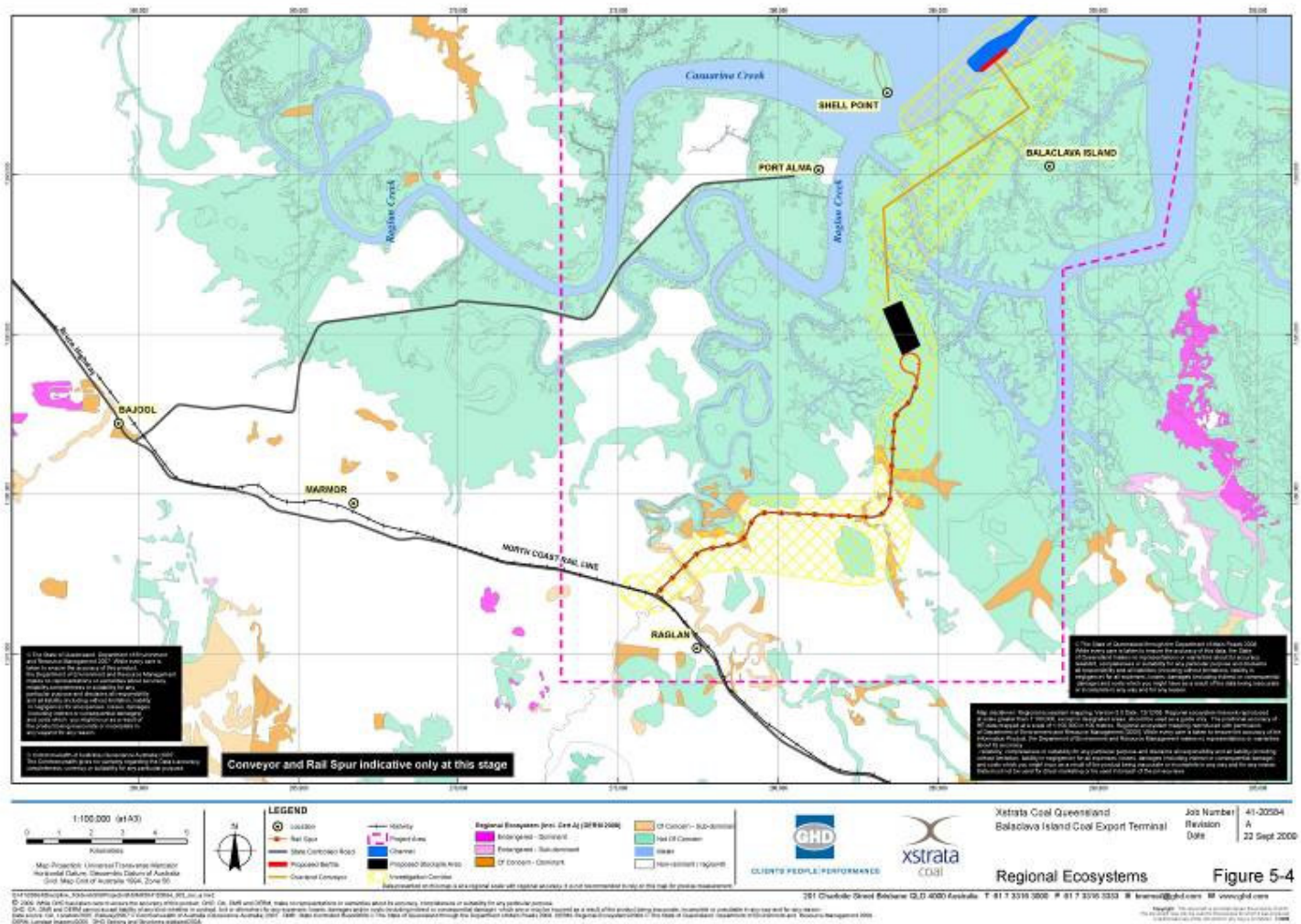
The deltaic wetlands at Balaclava Island are located at the mouth of the largest river system in Queensland, the Fitzroy River. Although some hydrological changes have occurred due to river regulation and local ponding, much of the wetland complex of the Fitzroy River has escaped the major impacts of agricultural and industrial development and accordingly provides a good example of a major estuarine system in the Brigalow Belt South bioregion.

Tidally inundated mangrove forests, salt-marshes, supra-tidal flats and marine swamps of the site provide nursery habitat for fishes and crustaceans, some of which are harvested. Use of low-salinity and fresh water wetlands in the site by waterbirds has not been fully documented but substantial numbers occur after the wet season and some breeding (including small colonies) occurs. Migratory shorebirds use these wetlands as well as intertidal mudflats in seaward sectors of the estuary. The critically endangered eastern yellow chat (Appendix G) may persist in sedge swamps of the Project Area and a small population of estuarine crocodile is associated with the Fitzroy River channel.

The following Regional Ecosystems have been identified in the Investigation Corridor and are indicated in Figure 5-4:

- ▶ Not of Concern 11.1.4 (Mangrove forest on marine clay plains);
- ▶ Of Concern 11.3.2 (*Eucalyptus populnea* woodland on alluvial plains);
- ▶ Of Concern 11.3.4 (*Eucalyptus tereticornis* tall woodland on alluvial plains); and
- ▶ Not of Concern 11.11.15 (*Eucalyptus crebra* woodland on deformed and metamorphosed sediments and interbedded volcanics).

Figure 5-4 Regional Ecosystems





5.4 Socio-Economic Environment

5.4.1 Land Tenure and Native Title

The proposed Project berths and majority of the overland conveyor have been sited on land owned by GPC and designated Strategic Port Land in the Port Alma Land Use Plan.

The proposed stockpile area, part of the overland conveyor and rail corridor impact on two private properties, both of which are currently used for cattle grazing. Initial discussions with the affected landholders have commenced and will continue throughout the assessment of the Project. Both landowners have granted access to the Project team in order to carry out detailed environmental investigations.

The majority of the potential rail alignment within the Investigation Corridor is Freehold land in private ownership, while the tenure of the stockpile location is Lands Lease.

Affected properties are indicated on Figure 5-5.

Native Title claims from the following Traditional Owners have been made over the entire extent of the Project Area:

- ▶ Darumbal (QC97/021) (west of Raglan Creek); and
- ▶ Port Curtis Coral Coast (QC01/029) (east of Raglan Creek).

Initial investigations indicate that Native Title has been extinguished over the majority of the Investigation Corridor, with the exception of the crossing of Raglan Creek by the rail spur and the proposed stockpile location.

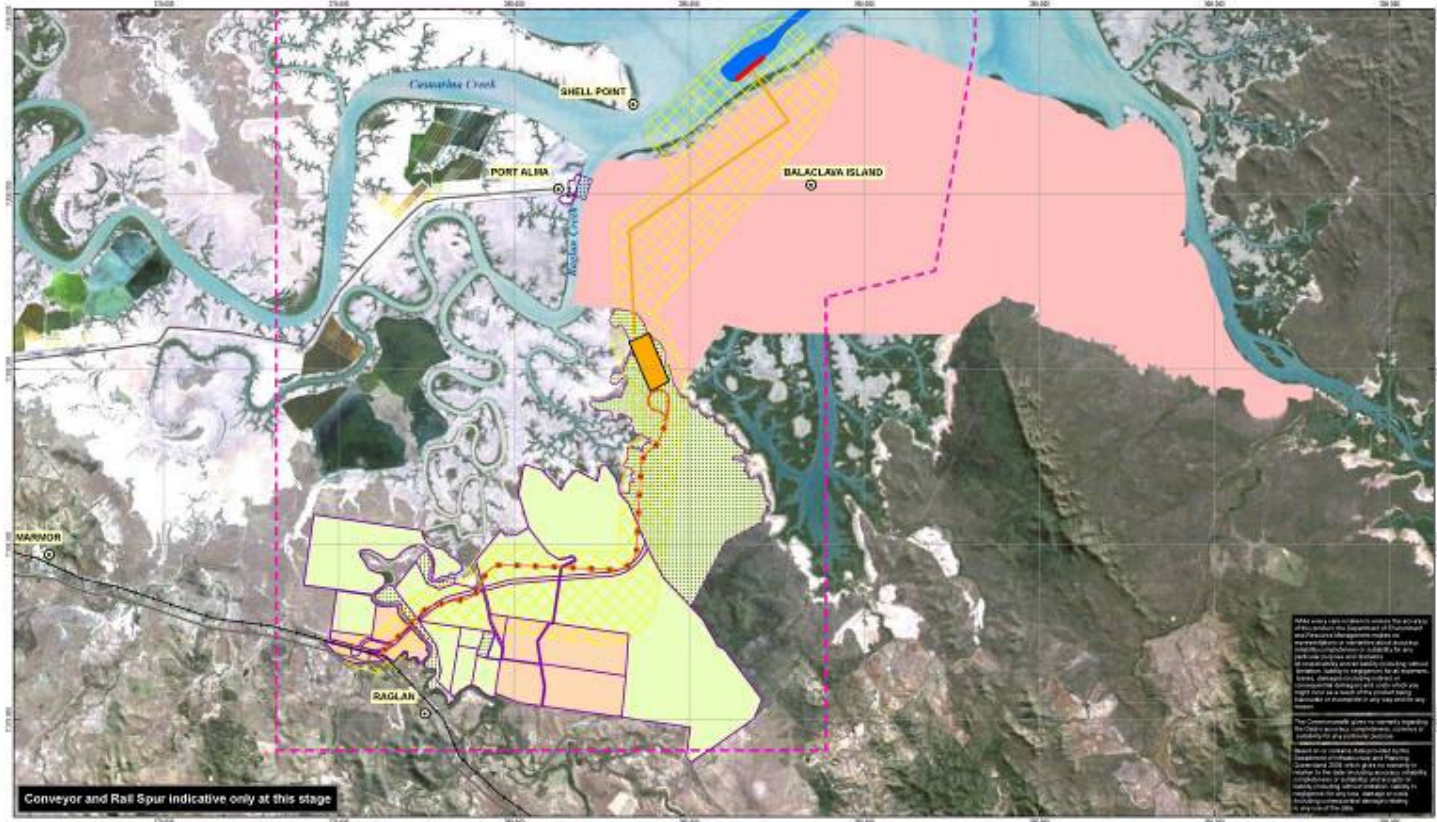
5.4.2 Planning Schemes

The Project components that are located on privately owned land are subject to local planning scheme provisions. A small section of the proposed rail spur is located within Rockhampton Regional Council and hence is subject to the provisions of the Fitzroy Shire Planning Scheme. This scheme designates the land to the west of Raglan Creek as Rural, with no applicable overlays.

The remainder of the rail spur and proposed coal stockpile area (to the east of Raglan Creek) are located within Gladstone Regional Council and are subject to the provisions of the Calliope Shire Planning Scheme. This scheme also designates the Project location as Rural, with overlays relating to bushfire risk, coastal wetlands and good quality agricultural land considered relevant to the Project.

A detailed assessment of the Project against the relevant planning scheme provisions will be carried out as part of the EIS.

Figure 5-5 Affected Properties





5.4.3 Community

Information on the local community is provided to indicate how the Project Area and surrounding communities may be impacted by the introduction of a major construction project and how the operations of the Project could affect the local community in the long term.

The Project’s closest neighbouring community centres are Bajool, Marmor and Raglan. These community centres have slowly developed from the mid 1800s and are now the focal points of their respective state suburbs. Many of the community members occupy surrounding properties, which have been developed for agricultural purposes and feature rural homes with associated farming infrastructure.

Census data can be used to demonstrate how an influx of approximately 800 construction workers could impact upon local services (health, education, commercial, accommodation). Additionally, it can provide information on the current rates of employment and demonstrate the availability of local people to be employed during the construction and operations phases.

Balacava Island is located in the Raglan census collection district (previously Calliope Shire, now Gladstone Regional Council). The surrounding districts of Port Curtis, Marmor and Bajool are also relevant to the Project Area (**Error! Reference source not found.**). Table 5-1 presents a comparison of census data for the four collection districts.

Table 5-1 Census Data for Raglan, Port Curtis, Marmor and Bajool Collection Districts

	Population					Employment Rate	Weekly income ⁵
	Total	Male (%)	Female (%)	Indigenous (%)	Working age (%)	(%)	(AU\$)
Raglan	260	53.6	46.4	2.3	68.0	86	871
Port Curtis	170	57.1	42.9	6.5	66.0	100	937
Marmor	187	49.2	50.8	5.9	66.8	90	725
Bajool	292	50.0	50.0	3.1	66.8	100	979

Accommodation and Amenities

Accommodation within the Project Area and surrounding communities is dominated by separate houses, which are predominantly privately owned. Only a small proportion of houses in the Project Area and surrounding communities are rental properties. Median rents are typically lower than rental levels seen at a regional or state level. There are also various facilities (particularly hotels, motels, serviced apartments and caravan parks) located throughout the broader regional area that provide temporary accommodation options. Table 5-2 presents a comparison of census data for the four collection districts.

⁵ The average Australian household weekly income is \$1,027



Table 5-2 Housing Data for Raglan, Port Curtis, Marmor and Bajool Collection Districts

	Total dwelling	% separate houses	# rental properties	Medium rent (\$/week)
Raglan	253	96%	13	Not available
Port Curtis	121	97%	12	\$96.00
Marmor	84	93%	17	\$35.00
Bajool	123	95%	18	\$80.00

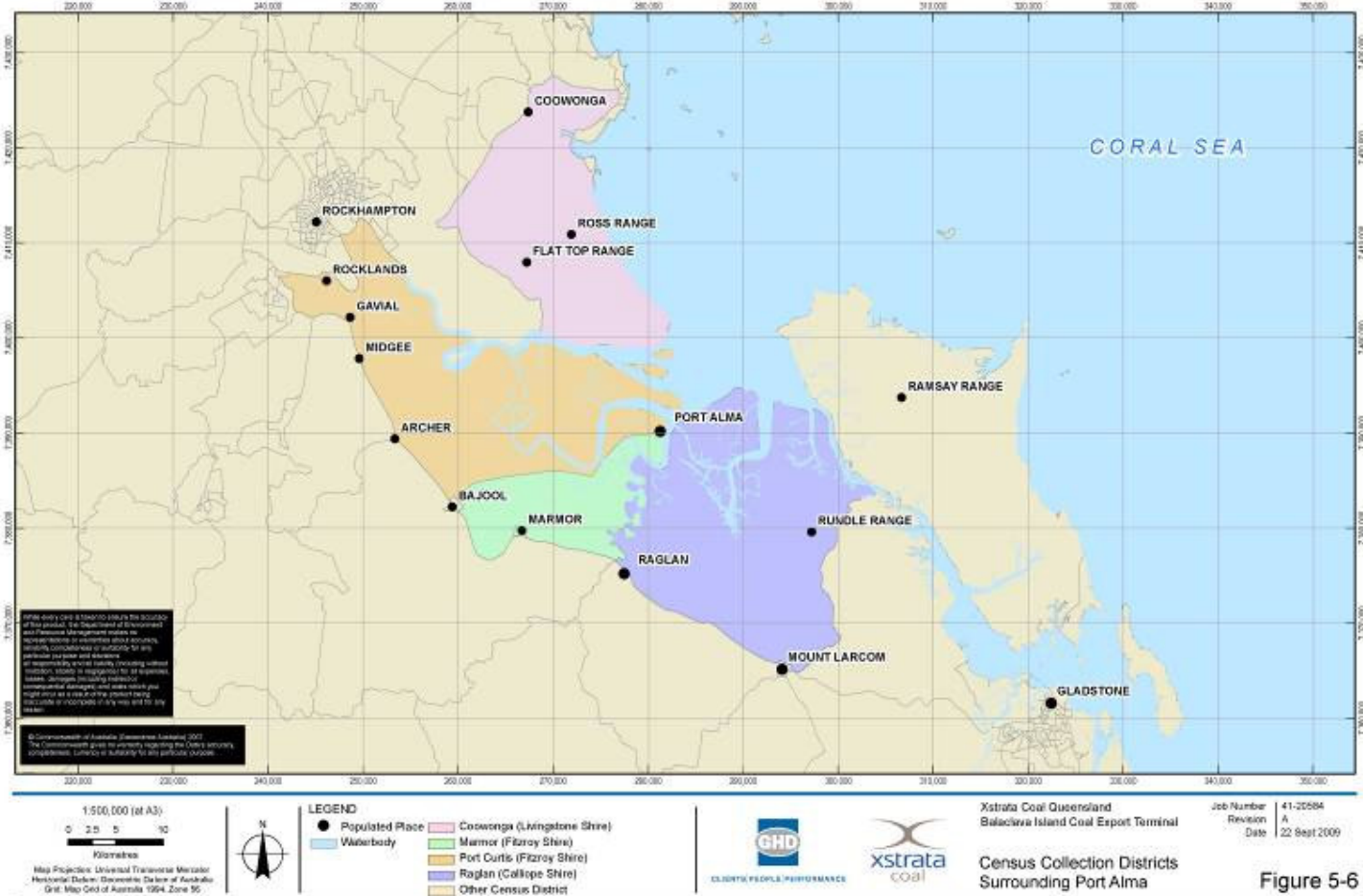
Amenities provided within the local communities are limited. Bajool, Marmor and Raglan are located around their respective railway stations and provide some services to local residents and surrounding rural properties, including basic commercial facilities, primary schools and recreational/sporting facilities. However, community members generally travel to major urban centres, particularly Gladstone and Rockhampton, to access vital services, such as health services, age and child care, and major commercial facilities.

Employment

Within the four collection districts, the main employment sectors are:

- ▶ Sheep, beef cattle and grain farming;
- ▶ Road freight transport;
- ▶ Education (school, adult, community and other);
- ▶ Construction (general, residential building and heavy);
- ▶ Engineering; and
- ▶ Fuel retailing.

Figure 5-6 Census Collection Districts Surrounding BalACLava Island



Q:\4120584\Geospatial_Figures\GIS\Projects\4120584\4120584_307_rev_01.mxd

201 Charlotte Street Brisbane QLD 4000 Australia T 61 7 3316 3000 F 61 7 3316 3333 E bnm@mail@ghd.com W www.ghd.com

© 2009. While GHD has taken care to ensure the accuracy of this product, GHD Ltd, its employees, agents, consultants or subcontractors, or any other person, does not accept any liability for any errors or omissions, or for any consequences or damages, whether direct or consequential, which may arise from the use of this product. The document may only be used for the purposes for which it was produced. Unauthorised use of this document in any way is prohibited. © 2009



5.4.4 Commercial Enterprise

GPC currently operate an existing export facility at Port Alma, which is limited to vessels of up to 35,000 tonnes due to the depth of the existing channel and the berth load rating. Land access to the port is via the Bruce Highway. The highway intersects with various roads that lead onto Port Alma Road, which provides the only road access to the existing port facility. The existing Port Alma facility consists of:

- ▶ An oil storage facility including a number of large tanks;
- ▶ Salt stockpiles and associated structures;
- ▶ Port/wharf and conveyor infrastructure; and
- ▶ One occupied house opposite the port's entry point.

The Port currently both imports and exports ammonium nitrate, in conjunction with activities carried out at the Queensland Government Magazine in Bajool, approximately 26 km from the Port⁶. Smaller tonnages of containers, tallow, general cargo and explosives are also handled at the Port. The most recent statistics for imports and exports at Port Alma are indicated in Table 5-3.

Table 5-3 Import and Export Statistics for Port Alma, 2005 - 2008⁷

	2005	2006	2007	2008
Imports (tonnes)				
Containers (collective)	4,485	7,995	7,829	10,087
Ammonium nitrate	46,293	56,434	38,675	78,342
General cargo (collective)	1,618	385	80	20
Military equipment	-	1,961	4,069	-
Explosives	-	-	15	-
Exports (tonnes)				
Containers (collective)	336	549	122	1,546
Ammonium nitrate	1,173	31,880	91,409	97,206
Explosives	-	-	10	-
Frozen beef	14,013	-	-	-
Tallow	13,284	34,661	29,154	31,290
General cargo	-	-	-	222

Port Alma currently holds the largest single cargo license for ammonium nitrate and Class 1 explosives on the east coast of Australia. The ammonium nitrate port operations could be expected to have a material impact on the future development of other facilities in the immediate vicinity of Port Alma, due to potential

⁶ Port Alma Port Information Handbook, Central Queensland Port Authority, 2006

⁷ www.gpcl.com.au/shipping



impacts on those facilities in the event of a catastrophic event at export facility and consequent exclusion zones. This was a major consideration in the siting of the Project on Balaclava Island rather than adjacent to the existing port facilities.

The area immediately surrounding Port Alma is subject to commercial salt mining operations (Cheetham Salt and Pacific Salt) which could be impacted by development of the Project if located at Port Alma. The potential for impacts upon the area’s main industry was a major consideration in determining the preferred concept for this Project. The MCA framework resulted in route options previously identified in concept studies being designated as less practicable, due to the impacts that a coal transport corridor could have on the commercial salt industry.

Other commercial activities undertaken in the region (incorporating Rockhampton to the north, Gladstone to the south and the surrounding towns of Raglan, Bajool and Marmor) include limeworks, coal mining, flour milling, meat and meat products processing, manufacturing and production of timber and cement.

5.4.5 Recreational Activities

It has been noted during preliminary site visits that the Fitzroy River delta, including the area immediately adjacent to the existing port at Port Alma, is used by recreational fishermen. These fishermen represent a significant stakeholder group for the project and they will be engaged early on in the EIS community consultation process to ensure their views are taken into consideration.

5.4.6 Indigenous and Non-Indigenous Cultural Heritage

A written cultural heritage search request submitted to DERM indicated that no Indigenous cultural heritage is recorded on the Cultural Heritage Database and Register within the Investigation Corridor.

There are two claims of non-indigenous heritage within 5 km of the Investigation Corridor, which are listed in Table 5-4 and illustrated in Figure 5-7 below.

Table 5-4 Sites of Non-Indigenous Heritage in the Investigation Corridor

DERM Identification	Place Name	Location	Significance
600388	Parson’s Inn	Raglan Station Road, Raglan.	Archaeological value showing excellent examples of traditional building techniques.
600389	Raglan Homestead and Slab Hut	Raglan Station Road, Calliope.	Illustrates early pastoral developments in Queensland.



6. Potential Impacts and Management Requirements

6.1 Introduction

Development and operation of the proposed Project could result in environmental, social or cultural impacts. The following overview of the existing environment and initial assessment of potential impacts is based on information drawn from available published data and previous studies undertaken within the Project Area and surrounds.

This assessment covers the entire Project Area. Regional Ecosystems have been considered in relation to the defined Investigation Corridor, whereas impacts on the community are potentially more far reaching and could result in broader impacts outside the Project Area.

The EIS may identify other potential impacts through detailed investigations carried out during its preparation.

6.2 Physical Environment

6.2.1 Geology and Soils

Impacts on geology and soils during construction and operation of the Project could arise as a result of contamination (with coal dust, fuel, oils, lubricants and/or disturbance of previously contaminated soils including Acid Sulfate Soils) or disturbance of potentially erosive soils along the rail corridor.

Impacts will be determined and considered in detail in the EIS with mitigation measures identified. Management plans and appropriate control measures will be developed at the detailed design phase and through construction environmental management plans.

6.2.2 Climate

The Project is not likely to have any impact on local or global climatic conditions. However, a climate change assessment will be included as part of the EIS.

Some greenhouse gas emissions will be generated through operation of the rail spur and minor equipment. Emission control and energy efficiency will be a key consideration in design and equipment selection.

6.2.3 Hydrology

Impacts on the hydrology of the area will be considered in full during the EIS process. Anticipated impacts will result from the development of the berths and watercourse crossings between the North Coast Line and the ship-loading facilities.

6.2.4 Wetlands

The original development of Port Alma, as well as reclamation for salt farms and agriculture, resulted in the loss of 840 ha of mangroves and salt marshes between 1946 and 2002. Approximately 2700 ha of salt evaporation ponds are present in the intertidal areas near Raglan Creek (www.gbrmpa.gov.au).

Significant increases to the sedimentation regime have caused changes to the mangrove distribution across large areas of the Great Barrier Reef coast. The Fitzroy River estuary at Port Alma has been investigated and



found to have experienced a growth in mangrove distribution. However, the spread of mangroves is not necessarily indicative of increased mangrove health, but rather may be an indicator of unnatural increases in sedimentation. Mangrove mortality has been measured at Gladstone and it has been established that increased sedimentation can reduce mangrove health and growth, especially under cyclonic, tidal or flood conditions, all of which are prevalent at Balaclava Island.

The cumulative impacts of removing mangroves from the Project Area will be considered. Presently, Port Alma is a minor port with only small volumes of shipping. Ships currently make use of a naturally-occurring channel and only relatively minor maintenance dredging is required at the existing berth, approximately every five to eight years. Development of the Project will require dredging of the channel as well as the new berth pockets, in order for post-Panamax sized vessels to gain access.

The railway alignment may cross a small wetland area in addition to a number of creeks. The conveyor on Balaclava Island will be located within a designated wetland and will also cross a number of tidal creeks.

6.2.5 Flooding and Tides

Potential flooding and tidal impacts will be considered during the pre-feasibility engineering studies and infrastructure design for the rail spur, stockpile area, conveyors and shiploading facilities.

The Project will not affect the tides in the area.

6.2.6 Dredging

Dredging of the shipping channel and berth pockets will be required as shown on Figure 5.3. To minimise the quantity of dredge spoil the intent of the Project is for loaded vessels to depart during high tides.

The nature of the dredged materials, for example the presence of contaminated particles from upstream agricultural practices, will determine where and how the materials are deposited to sea or land.

A Sediment Analysis Programme (SAP) has been developed to determine the characteristics and volume of the dredge spoil. A number of potential dredge disposal sites are present in the vicinity of Balaclava Island; however, a SAP will be required to determine whether the dredge spoil is suitable for disposal at these sites.

Given that these sites may not be available and would not be sufficient, an assessment will be required to identify suitable locations for the disposal of the excess dredge materials on land or investigate new offshore disposal locations, which would require the approval of the Great Barrier Reef Marine Park Authority.

A Pilot SAP has been undertaken to identify the likely presence of contaminants within the material to be dredged. The Pilot SAP was not intended to replace the full SAP, rather has been being undertaken to provide early identification of potential contaminants and to consequently reduce the number of samples required in the full SAP (as allowed for in the National Assessment Guidelines for Dredging, 2009).

6.2.7 Noise and Air Quality

A full noise and air quality assessment will be undertaken as part of the EIS.

Anticipated impacts include the increase in emissions as a result of increased rail and vehicular traffic in the Project Area and the accidental release of coal dust. However, a consideration in the selection of the preferred concept option was the fact that it would be unlikely to result in coal dust being a nuisance to surrounding properties or enterprises.



Coal dust can impact terrestrial and aquatic flora and fauna if not appropriately managed. These issues will be examined in detail during the preparation of the EIS and will include air quality modelling. They will also be key considerations in the design of the unloading, conveyor and ship loading infrastructure.

Fugitive dust arising during construction, in particular as a result of earthworks will be examined and appropriate mitigation measures and construction environmental management plans implemented.

6.2.8 Infrastructure Requirements

Development of the Project has the potential to impact on existing infrastructure, such as power, water, local roads and temporary accommodation requirements.

During the construction phase there will be an increase in traffic on local roads and a need for temporary accommodation for approximately 800 construction workers. It is possible that a temporary construction camp will be required to house these workers due to a shortage of accommodation available locally. The need for and possible location of any such camp will be investigated further. The impacts of the Project's infrastructure requirements will be assessed during the pre-feasibility studies and in the EIS.

During the operation phase there will be requirements for additional rail capacity on the existing QR North Coast Line. During the EIS preparation and pre-feasibility studies, discussions will be held with QR as to these requirements and what (if any) additional works will be required over and above capacity expansion plans already under consideration by QR.

Also during the operations phase, accommodation for up to 100 full-time staff and new power, water and communications infrastructure to Balaclava Island will be required.

Preliminary discussions with Ergon Energy have indicated that the operational power requirements of the Project could potentially be met through upgrades to an existing substation in the vicinity of Raglan and upgrades to the associated transmission lines.

It is considered likely that a septic system will need to be installed at Balaclava Island to address the Project's need for sewerage facilities.

The source of water for the water requirements for the Project is still being investigated. Several potential options are being considered. Approaches will be made to the Gladstone Area Water Board (GAWB) to ascertain whether or not and, if so, when, it could be in a position to supply water for the operation of the terminal.

It may be that the GAWB will not be in a position to supply water for the terminal in line with the currently anticipated project timelines.

Investigations are under way regarding availability and suitability of any local groundwater resources.

The development and operation of water treatment facilities treating groundwater and/or sea water may also be required. Treatment on site of underground or seawater will produce brine solution. Options for the handling and treatment of the brine solution will be assessed during the EIS and could include; pumping directly to the adjacent salt works" at Port Alma to be utilised by local industry, storage and treatment on site (shallow dams and solar evaporation) or disposal in waterways within the Project Referral Area.



6.3 Biological Environment

6.3.1 Conservation Estate

The berths of the proposed Project will be located within the Great Barrier Reef World Heritage Area (also designated a National Heritage Place), the boundary of which extends as far inland as the low water mark. It should be noted that the existing wharves at Port Alma are also located within the Great Barrier Reef World Heritage Area.

The Project could also impact on the natural heritage value of the Balaclava Island RNE listing. An assessment of impacts on natural heritage will be carried out as part of the EIS.

As indicated in Figure 5-3 dredging will be required through the State Marine Park. No dredging is proposed for the Federal Great Barrier Marine Park. A SAP has been developed and recently submitted to DEWHA for review and approval.

6.3.2 Flora and Fauna

Identification of the Investigation Corridor has attempted to minimise the amount of vegetation clearing required, however, it is possible that some clearing of the following Regional Ecosystems would be required:

- ▶ Not of Concern 11.1.4 (Mangrove forest on marine clay plains);
- ▶ Of Concern 11.3.2 (*Eucalyptus populnea* woodland on alluvial plains);
- ▶ Of Concern 11.3.4 (*Eucalyptus tereticornis* tall woodland on alluvial plains); and
- ▶ Not of Concern 11.11.15 (*Eucalyptus crebra* woodland on deformed and metamorphosed sediments and interbedded volcanics).

There are no mapped areas of Essential Habitat or Biodiversity Planning Assessment in the Investigation Corridor. There are mapped Fish Habitat Areas in the vicinity of the Investigation Corridor which could potentially be subject to downstream impacts arising from changes in hydrology or accidental release of contaminants such as sediment and coal dust.

Desktop data searches have identified a number of Endangered (E), Vulnerable (V) or Rare (R) (EVR) species in proximity to the Project Area. The full list of each of these affected species is included in Appendix F. A table outlining the likelihood of these species being encountered during construction or operation of the Project is located in Appendix G.

Areas of potential suitable habitat for the Yellow Chat, identified at a desktop level have been subject to one season of site investigations and no suitable habitat was identified. Pre and post-wet season benthic surveys within Keppel Bay have also been undertaken and did not indicate high species diversity or the presence of species of conservation concern.

Additional field surveys for marine and terrestrial flora and fauna will be undertaken as the EIS progresses.



6.4 Socio-Economic Assessment

6.4.1 Private Landowners

The rail alignment area and stockpile area within the Investigation Corridor impact on two private properties. Initial discussions with the affected landholders have commenced and will continue throughout the study of the Project. Both landowners have granted access to the Project team in order to carry out detailed investigations as part of the EIS. The EIS will address potential impacts on existing farming activities and will recommend mitigation measures for adverse impacts.

XCQ intends to make individual arrangements with the affected landowners.

6.4.2 Community

The potential will exist for an increase in employment opportunities for residents in the general locality, which may extend past construction and into the operations phase of work.

A detailed socio-economic assessment will be conducted as part of the EIS to ensure potential impacts on businesses are identified and mitigation measures recommended as required as well as identifying potential benefits. As impacts are identified potential solutions will be discussed with community stakeholders through the already established community consultation process. The socio-economic assessment will consider the project on a local, regional and national scale.

6.4.3 Commercial Enterprise

The Project has the potential to create approximately 800 jobs in the peak stage of construction, which would be expected to benefit the local economy. During the operations phase of the project, it is anticipated that up to 100 people will be directly employed. However, this may be subject to change as the pre-feasibility stage of the Project continues. The extent of local employment will also be determined by factors such as the availability and skill levels of local workers and cumulative demand from other projects occurring in the area.

A number of indirect employment opportunities will also arise from the development of the proposed Project. A full economic assessment will be carried out as part of the EIS.

The impact on commercial salt enterprises will be identified in the EIS and mitigation measures determined and recommended during the EIS.

The current cost of coal is fluctuating around US \$70 to \$100 per tonne. The Queensland Government currently benefits from a two tier royalty regime under which 7% of value up to AU \$ 100 per tonne and 10% of the value thereafter is paid to the State by the coal companies. Port infrastructure that enables Queensland coal producers to compete cost effectively with global coal producers will, therefore, be of direct benefit to the Queensland economy.

6.4.4 Recreational Activities

A detailed socio-economic assessment will be conducted as part of the EIS to ensure impacts on local recreational fishermen will also be identified and mitigation measures recommended as required.



6.4.5 Indigenous and Non-Indigenous Heritage

The Project will not impact directly upon either of the known non-indigenous heritage sites identified within the Investigation Corridor however the railway line may be visible from these properties. A detailed visual impact assessment and landscape character assessment will be undertaken during the EIS to ensure that impacts are minimised and the integrity of these heritage sites is not impacted upon. Should any previously unrecorded heritage artefacts be discovered during the EIS investigations, the potential impacts on these will also be assessed and mitigation measures recommended as appropriate.

There are no published data relating to sites of Indigenous cultural heritage in the Project Area, although this may reflect a lack of previous survey effort rather than a lack of cultural heritage significance. A Cultural Heritage Management Plan (CHMP) will be negotiated with the Traditional Owners and representatives from these groups will be invited to conduct surveys as part of the EIS.

6.4.6 Native Title

Initial investigations indicate that part of the Investigation Corridor, including the rail spur crossing of Raglan Creek and the proposed stockpile area, is subject to the Port Curtis Coral Coast Native Title claim. Consultation with the Traditional Owners will take place before any intrusive site investigations commence.



7. Conclusions

A number of positive impacts are expected to result from the Project, including a rise in employment in the local area during construction and operations phases and the consequent benefits on the local economy, in terms of support for local businesses and the long-term stability of the operational workforce. Wider reaching benefits are possible including supporting Queensland Coal exports in lieu of international demand being served by other coal exporting countries. The Project if developed will supplement Queensland's coal export capacity, therefore reducing current and likely future constraints on the current facilities.

Opportunities could exist for further development around the existing Port Alma facilities and/or, subject to individual proponent's feasibility and environmental studies, for further coal export facilities to be developed at Balaclava Island.

Development of the Project will complement the expansion plans at WICT and allow smaller ships exporting coal from the existing XCQ Rolleston and Oaky Creek mines to be redirected to BICET thereby creating an effective increase in available capacity at Gladstone.

Utilising a structured multi variable, multi criteria assessment that takes account of the lifetime of the project the most economically and environmentally viable options for the Project have been determined. From an assessment of potential concept options, Option 3 has been selected as the preferred option for the Project. This consists of a rail spur from the North Coast Line near the township of Raglan to a stockpile area on high ground, with an overland conveyor for transporting coal from the stockpile to new berths on Balaclava Island. The Project will be further defined and configured as the pre-feasibility and feasibility studies progress and as the EIS is finalised.

To date, site selection has been based predominantly on existing desk-top data, with only limited field studies having been undertaken. Due to the remoteness of Balaclava Island and the limited environmental data available, further environmental assessment will be undertaken to determine significant impacts, other than those identified in this assessment. A programme of field surveys and analyses will be developed as part of the EIS Terms of Reference.

Development of the Project will require further capital dredging of the existing channel. Dredging will occur within the State Marine Park and adjacent to the Federal Great Barrier Reef Marine Park . A Sediment Analysis Programme will be carried out to determine the particle composition of the dredged material and whether it is suitable for use as fill for the Project. If the results of the SAP preclude the re-use of the dredged material and if the dredge volumes exceed reuse requirements, further investigations will be carried out to identify suitable land or offshore disposal grounds.

Despite being a sparsely populated area, there are a number of sensitive socio-economic receptors that may be affected by the Project including directly affected landowners, recreational fishermen, graziers, commercial salt mining operations and existing port activities such as the importation of ammonium nitrate. A comprehensive socio-economic study will be undertaken as part of the EIS to identify and mitigate for any significant impacts.

The Project will have environmental and social challenges and impacts that must be addressed and mitigation measures identified in the EIS. Further studies, analysis, careful planning and design along with operating protocols and environmental management plans will assist in managing and mitigating these impacts.



Declaration of the Project as a “Significant Project” under Section 27 of the *State Development and Public Works Act 1971* is sought due to the fact the Project is of local, regional and State significance on all of the relevant decision criteria. This declaration will facilitate a detailed environmental assessment and preliminary design phase to commence and will permit identification and development of mitigation measures and development of an EIS for public comment.



Appendix A Legislation



A1.1 Overview

XCQ is responsible for ensuring that all Commonwealth, State and local legislation, guidelines and policies are complied with during the construction and operation of the proposed coal terminal. This section identifies all legislation relevant to the environmental management of the site. It is not the intention of this section to provide legal advice, but rather to identify environmental legislation relevant to this project.

Table A1 Legislation and Approvals Relevant to the Project

Legislation	Relevance to project
Commonwealth Legislation	
Environmental Protection and Biodiversity Conservation Act 1999	<p>An approval from the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA) 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 (MNES).</p> <p>The project requires referral to DEWHA to determine whether or not it constitutes a “controlled action” under the EPBC Act. If it is a controlled action, an EIS is likely to be required which could be managed by the State of Queensland under a bilateral agreement.</p> <p>At this stage it is considered likely that the project will be considered a controlled action due to potential impacts on the following MNES:</p> <ul style="list-style-type: none"> ▶ Listed threatened species and ecological communities; ▶ Migratory species protected under international agreements; ▶ World Heritage properties; and ▶ National Heritage places.
The Great Barrier Reef Marine Park Act 1975	A Marine Parks Permit will be required under the Great Barrier Reef Marine Park Act 1975 (GBRMP Act) where an activity has potential direct or indirect effects on the GBRMP.
Environment Protection (Sea Dumping Act) 1981	<p>The <i>Sea Dumping Act</i> regulates the deliberate loading and dumping of wastes and other matter at sea. It applies to all vessels, aircraft or platforms in Australian waters and to all Australian vessels or aircraft in any part of the sea.</p> <p>The <i>Sea Dumping Act</i> is administered by the DEWHA. The <i>Sea Dumping Act</i> applies in respect of all Australian waters (other than waters within the limits of a State or the Northern Territory), from the low water mark out to the limits of the Exclusive Economic Zone. This Act is relevant to dredging activities for the Project.</p>
Native Title Act 1993	The <i>Native Title Act 1993</i> (NTA) recognises the rights and interests over land and water possessed by Indigenous people in Australia under their traditional laws and customs. The objects of the Act are to:



Legislation

Relevance to project

- ▶ Provide for the recognition and protection of native title;
- ▶ Establish ways in which future dealings affecting native title may proceed and to set standards for these dealings;
- ▶ Establish a mechanism for determining claims to native title; and
- ▶ Provide for, or permit, the validation of past acts and intermediate acts, invalidated because of the existence of native title.

State Legislation

State Development and Public Works Organisation Act 1971

The *State Development and Public Works Organisation Act 1971* (SDPWOA) empowers the Coordinator General to declare a project as a Significant Project for which an EIS is required. This EIS process is then coordinated and carried out under the Act.

Integrated Planning Act 1997

The *Integrated Planning Act 1997* (IPA) is Queensland's integral planning legislation for managing "development". Under Section 1.3.2 of IPA, "development" is defined as making a material change of use of premises, reconfiguring a lot and the carrying out building, operational, plumbing or drainage work.

Some aspects of the Project likely to need approval under IPA include, material change of use, and operational works in tidal areas, works in a watercourse and removal of marine plants and native vegetation.

If a the project is declared a Significant Project, its assessment under the IPA is affected by the provisions in the *State Development and Public Works Organisation Act 1971* (SDPWOA) that specifically address the effect of the Coordinator-General's report in relation to the Integrated Development Assessment System (IDAS).

This Project extends over strategic port land and non-strategic port land. Therefore, development undertaken as part of this project will require assessment in accordance with both local government planning schemes and strategic land use plans.

Note: a review and overhaul of the IPA is now drawing to a close with the approval by Parliament in June 2009 of the Sustainable Planning Bill 2009. When passed, the Sustainable Planning Act will repeal and replace IPA and regulate development approvals. IDAS will be retained.

Vegetation Management Act 1999

Under the *Vegetation Management Act 1999* all remnant vegetation (including Endangered, Of Concern and Not of Concern Regional Ecosystems) and all native vegetation on State land (regardless of conservation status) is protected. Clearing of such vegetation requires a development permit under the Integrated Planning Act and, if clearing Endangered



Legislation

Relevance to project

	<p>or Of Concern RE, the provision of vegetation offsets (may also be required in line with Department and State policies).</p>
<p>Vegetation Management (Regrowth Clearing Moratorium) Act 2009</p>	<p>Under the Act, clearing certain regrowth vegetation affected by the moratorium (which includes endangered regrowth in rural areas on freehold and agricultural and grazing State leasehold land) requires approval from DERM. Some exemptions apply.</p>
<p>Coastal Protection and Management Act 1995</p>	<p>An assessment under the <i>Coastal Protection and Management Act 1995</i> (CP&M Act) may be triggered in relation to assessable development within tidal waters. This includes disposal of dredge material within tidal areas and construction within tidal areas.</p>
<p>▶ Queensland State Coastal Management Plan</p>	<p>The State Coastal Plan made under the CP&M Act commenced in February 2002 and describes how the coastal zone is to be managed as required by the Coastal Protection and Management Act 1995. Policies for managing the major coastal issues are detailed under the following topic headings:</p> <ul style="list-style-type: none"> ▶ Coastal use and development ▶ Physical coastal processes (the effects of waves, tides, currents and coastal storms) ▶ Public access to the coast ▶ Water quality ▶ Indigenous traditional owner cultural resources ▶ Cultural heritage ▶ Coastal landscapes ▶ Conserving nature ▶ Coordinated management ▶ Research and information. <p>The State Coastal Plan provides coastal management policy direction and defines how these directions should be implemented by government, industry and the community.</p>
<p>Environmental Protection Act 1994</p>	<p>The Environmental Protection (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. Compliance with all policies will be required.</p> <p>The EP Act is administered by the Queensland Department of Environment and Resource Management (DERM). Under the EP Act, approval (a registration certificate) is required for Environmentally Relevant Activities (ERAs) in addition to the development approval required for an ERA under IPA. The Project will include some ERA's.</p>



Legislation	Relevance to project
Environmental Protection Regulation 2008	One of the main functions of the EP Regulations is to list all the ERAs, their aggregate score and the applicable fee. The EP Regulations also support the EIS process outline in the EP Act and outlines matters relating to environmental management and environmental offences.
Environmental Protection (Air) Policy 2008 (EPP Air)	The aim of this policy is to identify environmental values to be protected or enhanced, specify air quality indicators and provide a framework for decision-making.
Environmental Protection (Noise) Policy 2008 (EPP Noise)	<p>The environmental values to be enhanced or protected under the EPP (Noise) Policy 2008 are the qualities of the environment that are conducive to:</p> <ul style="list-style-type: none"> ▶ Protecting the health and biodiversity of ecosystems; ▶ Human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to sleep, study or learn and be involved in recreation, including relaxation and conversation; and ▶ Protecting the amenity of the community.
Environmental Protection (Waste Management) Policy 2000 (EPP Waste)	The EPP Waste provides a strategic framework for managing waste in Queensland. This is achieved by establishing a preferred waste management hierarchy and principles for achieving good waste management which should be applied by both government and industry (sections 8-13, Schedule 1).
Environmental Protection (Water) Policy 1997 (EPP Water)	The policy provides a framework for making decisions on Queensland waters that promote efficient use of resources and best practice environmental management and involving the community.
Nature Conservation Act 1992	<p>The purpose of the <i>Nature Conservation Act 1992</i> (NCA) is to provide a comprehensive strategy for the conservation and management of Queensland's native animals and plants. The NCA seeks to achieve ecological sustainability by declaration and management of protected areas and the protection of wildlife and wildlife habitats.</p> <p>The Act prohibits the taking or destruction, without authorisation, of certain listed flora and fauna species, or protected areas. A license or permit to remove or interfere with a protected animal or plant may, therefore, be required.</p> <p>DERM, would assess the effect of the Project on Endangered, Vulnerable, or Rare wildlife (EVR), or the habitat on which that wildlife depends.</p> <p>Regulations under the <i>Nature Conservation Act 1992</i> require that a clearing permit is sought from DERM for clearing of any native vegetation, including that of least ecological concern.</p>
Fisheries Act 1994	Any Project works that disturb marine plants will require approvals under the <i>Fisheries Act 1994</i> and <i>Integrated</i>



Legislation

Relevance to project

	<p><i>Planning Act 1997</i>. The Department of Employment, Economic Development and Innovation (DEEDI) is the administering body for these approvals and maintain an interest in the proposed works in relation to:</p> <ul style="list-style-type: none"> ▶ Any temporary or permanent disturbance to protected marine plants and tidal fish habitats; ▶ Any temporary or permanent waterway barrier works (i.e. 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.
<p>Transport Infrastructure Act 1994</p>	<p>Under the <i>Transport Infrastructure Act 1994</i>, Port Alma is required to have a Land Use Plan that outlines proposed operational works or tidal works, reclamation, change of use for buildings and excavation permits within Port land. GPC has developed a Land Use Plan for Port Alma in accordance with the <i>Transport Infrastructure Act 1994</i>.</p>
<p>Aboriginal Cultural Heritage Act 1999</p>	<p>The <i>Aboriginal Cultural Heritage Act 2003</i> (ACHA) established 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. It is expected that a Cultural Heritage Management Plan will be required for the project.</p>
<p>Water Act 2000</p>	<p>The <i>Water Act 2000</i> plans for the allocation and sustainable management of water resources in Queensland. This is done by the preparation of a Water Resources Plan, which:</p> <ul style="list-style-type: none"> ▶ Defines the availability of water for any purpose; ▶ Provides a framework for sustainably managing water and the taking of water; ▶ Identifies priorities and mechanisms for dealing with future water requirements; ▶ Provides a framework for establishing water allocations; and ▶ Provides a framework for reversing degradation that has occurred in the natural ecosystem.
<p><i>Water Supply (Safety & Reliability) Act 2008</i></p>	<p>This Act relevantly regulates the provision of water services by water authorities, local governments and the owners of water infrastructure. It may potentially be applicable depending on the final arrangements for water supply for the Project.</p>



Legislation

Relevance to project

Riverine Protection Permit

Under the *Water Act 2000* a riverine protection permit may be required which authorises the holder to carry out one or more of the following activities within a watercourse, lake or spring:

- ▶ Clear vegetation;
- ▶ Excavate; and
- ▶ Place fill.

Local Legislation

Gladstone City: The Gladstone Plan 2006

In accordance with the IPA the Local Government has prepared this planning scheme as a framework for managing development in a way that advances the purposes of the IPA by:

- ▶ Identifying assessable and self-assessable development; and
- ▶ Identifying outcomes sought to be achieved in the local government area as the context for assessing development.

Calliope Shire Planning Scheme 2007

Although the Project is within the recently amalgamated Gladstone Regional Council, the amalgamated councils' planning schemes remain in force for their respective areas until such time that a single planning scheme is prepared for the entire Gladstone Regional Council area.

The majority of the proposed Project components (to the east of Raglan Creek) will be located in the former Calliope Shire Council area.

In accordance with the IPA, the local government for the Calliope Shire has prepared a planning scheme as a framework for managing development in a way that advances the purposes of the IPA by:

- ▶ Identifying assessable and self-assessable development; and
- ▶ Identifying outcomes sought to be achieved in the local government area as the context for assessing development.

Fitzroy Shire Planning Scheme 2007

A small part of the Project (to the west of Raglan Creek) is located within the Rockhampton Regional Council and is hence subject to the provisions of the Fitzroy Shire Planning Scheme.

Central Queensland Regional Growth Management Framework 2002

The Central Queensland Regional Growth Management Framework has been structured in three stages. The first stage was an extensive consultation process and the preparation of the framework. Implementation follows as Stage 2, and Stage 3 will focus on monitoring and reviewing.

Central Queensland Regional Plan (Department of Infrastructure and Planning)

The process involved community, industry and government input with most of the framework's initial research and development work conducted by 4 working action groups. These comprised local people working for councils, government agencies, business and industry and a number of



Legislation

Relevance to project

community groups. They focused on:

- ▶ Leisure and lifestyle;
 - ▶ People and work;
 - ▶ Sustainability, conservation and environment; and
 - ▶ Regional community identity and development.
-



Appendix B

Identification of Concept and Location



B1 Identification of Preferred Concept and Location

B1.1 Introduction

This Section documents the process used to identify the initial preferred concept option for the Project.

Work to date has focused on identification of the preferred concept option, taking into account the location of the port facilities, stockpile area, rail alignment and conveyor. A high-level MCA process was used to assess the extent to which each option would achieve the project objectives by measuring the performance of options against a number of environmental, social and engineering evaluation criteria. The advantages and disadvantages of each concept option have been quantified using a “weighting and scoring” process. The scoring involves assigning each criterion with a rating, which is collated to show an overall score for each route and stockpile area option in relation to the chosen criteria.

The identification of the preferred alignment for the rail spur and overland conveyor, and the preferred stockpile configuration will continue as part of the pre-feasibility study and be influenced by the outcomes of the EIS studies.

B1.2 Definition of Assessment Criteria

Under the broad assessment criteria of environment, social, operational and cost; the criteria identified as differentiators for the assessment are summarised below:

Environmental

- ▶ Regional Ecosystems;
- ▶ Conservation Estate (World Heritage Area, Great Barrier Reef Marine Park, State Marine Park, Protected Areas of Queensland including Directory of Important (DOI) wetlands);
- ▶ Queensland Heritage Register and Register of the National Estate;
- ▶ Aquatic habitat / hydrology; and
- ▶ Disposal of dredge spoil.

Social

- ▶ Proximity to sensitive social receptors;
- ▶ Good Quality Agricultural Land;
- ▶ Land Tenure and ownership;
- ▶ Impact on lifestyle and natural amenity; and
- ▶ Regional economic benefit.

Operational

- ▶ Rail operations;
- ▶ Material handling operations;



- ▶ Shipping operations;
- ▶ Compatibility with existing operations; and
- ▶ Safety.

Cost

- ▶ Capex;
- ▶ Capex risk;
- ▶ Opex and maintenance cost; and
- ▶ Project programme.

Further information regarding the selection of these criteria is provided in the following sections.

GIS data have been used as the basis of desktop assessments in this options study. Whilst this is appropriate for the comparative assessment, relevant information associated with the selected option will be ground truthed as part of the EIS field studies.

B 1.2.1 Environmental & Social Criteria

The following section provides a summary of the main environmental and social criteria used in the assessment process.

Regional Ecosystems

REs are designated by DERM in accordance with the *Vegetation Management Act 1999* (VMA). The status of an RE is given as either:

- ▶ Endangered;
- ▶ Of Concern; or
- ▶ Not of Concern.

Any disturbance to an RE (including trimming or complete removal) requires a vegetation clearing permit issued by DERM. Recent amendments to the *Nature Conservation Act 1992* have resulted in the requirement to also obtain a vegetation clearing certificate from DERM prior to the removal of any native vegetation, whether mapped as an RE or not.

In the event that any Endangered or Of Concern ecosystems require clearing, XCQ will be required to purchase vegetation offsets. This process involves acquiring land (either by purchasing land outright or by acquiring a covenant over it) within the same bioregion and managing it in such a way that similar vegetation to that cleared is established and maintained over time.

Conservation Estate

This constraints category includes all areas designated as Conservation Estate, including World Heritage Area, the Federal Great Barrier Reef Marine Park (GBRMP), the State Great Barrier Reef Coastal Marine Park and the Fitzroy River Delta DOI wetland.

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) is administered by the Commonwealth government in order to protect the environment, in particular Matters of National Environmental Significance (MNES). MNES within the vicinity of Balaclava Island include the Great Barrier Reef region given its designation as both a World Heritage Area (WHA) and a Marine Park. The WHA



boundary aligns with the low water mark and, hence, incorporates the existing facilities at Port Alma. The GBRMP boundary lands at Curtis Island; however, the Park could still be indirectly impacted by the project. The State Marine Park boundary lands on Balaclava Island and, hence, could also be impacted by the Project.

The Fitzroy River Delta DOI wetland encompasses Port Alma and the immediate surroundings and would be impacted by all potential concept options.

Heritage Values

This category includes sites listed on the Queensland Heritage Register and on the Register of National Estate (RNE).

In the event that any RNE site could be impacted, an approval must be granted by DEWHA prior to development.

Queensland Heritage Register places are designated under the *Queensland Heritage Act 1992* as a means of protecting cultural heritage sites for future generations. Any changes to the places will require a lengthy approvals process coordinated by the Queensland Heritage Council.

Aquatic Habitat and Hydrology

This constraints category includes stream crossings and mapped Fish Habitat Areas.

Fish Habitat Areas are areas designated under the *Fisheries Act 1994* which play a key role in sustaining local and regional fisheries. These areas are typically protected from physical disturbance due to coastal development. A resource allocation authority would be required under the *Fisheries Act 1994* in addition to a fisheries development approval under the *Integrated Planning Act 1997*, prior to any development being able to proceed. In addition, any watercourse crossings (whether by conveyor or railway) will require waterway barrier works and prescribed tidal works approvals in addition to potentially requiring vegetation clearing permits as many streams in the area are fringed by significant riparian vegetation, including marine plants.

Disposal of Dredge Spoil

Although some minor dredging currently takes place at Port Alma, initial new and maintenance dredging will occur during the development of the proposed Project, in order to allow for up to 110,000 tonne vessels to traverse the channel. Initial dredging for the Project will produce significant volumes of dredge spoil. A number of potential dredge disposal sites have previously been identified in the vicinity of Balaclava Island; however, it is not currently known whether the dredge spoil will meet the criteria for disposal at these sites or whether the volume of dredge spoil will exceed reuse requirements. If contamination from upstream agricultural practices and/or existing port activities precludes the use of sea disposal sites, a landfill site (suitably licensed to accept Acid Sulfate Soils) will need to be used for disposal of dredge spoil.

Proximity to Sensitive Social Receptors

The location of a coal stockpile area, railway / conveyor and ship loading facilities in proximity to sensitive social receptors such as residential properties could have potential impacts on health (noise, dust) as well as impacts on existing commercial enterprise (in particular, the commercial salt pans that surround the existing port).



Good Quality Agricultural Land

Good Quality Agricultural Land (GQAL) is designated in the State Planning Policy 1/92. The Policy outlines that development without regard to the need for land conservation and the continuing importance of agriculture would be unacceptable. The best and most versatile farming land has a special importance and should not be built on unless there is an overriding need for the development in terms of public benefit and no other site is suitable for the particular purpose.

Land Tenure and Ownership

There are a range of land tenures within the study area, including Freehold, Land Lease, State Land and Reserve. XCQ would like to minimise the number of private landowners affected by the Project in order to minimise impacts on individuals.

Impact on Lifestyle and Amenity

This constraint includes impacts both in the operational and the construction phases of the Project.

Construction and operation of the Project will result in a number of impacts on local communities. These will predominantly be associated with lifestyle and natural amenity in terms of visual impact, perceived decreases in property value, increased traffic and overall disruption of a rural lifestyle. The remoteness of the Project Area could exacerbate the perceived effects on residents as they are not accustomed to industrial development in the local region.

Regional Economic Benefit

The Project will create employment opportunities in the region and will result in increased support of local businesses. Development of additional port facilities will relieve the pressure on existing and future port facilities at Gladstone, Dalrymple Bay and Abbot Point.

Water and Power Supply

A number of water and power supply options will be assessed within the EIS and detailed design stage of the Project.

B 1.2.2 Summary of Engineering & Costs Criteria

The following section provides a summary of those engineering criteria that were used to identify the best practicable route option based on engineering design, compatibility with current operations, shipping, rail and materials handling operations and cost implications.

Significant consideration has been given to impacts on existing operations. The concept study determined that the ammonium nitrate trade through the existing port is inconsistent with coal terminal operations. In addition, the proximity of the existing port to the salt production operation could lead to contamination of the salt operations. These concerns contributed to the recommended berth and stockpile locations being away from existing operations.

Existing Operations

Any coal terminal proposed for Port Alma must operate in conjunction with the existing operations at the port. These operations are, therefore, an integral consideration in the assessment of development options for the terminal. The dominant commodity through the existing port is ammonium nitrate, comprising 72.6% of the total throughput in 2007. This trade, along with the adjacent salt production operations, are key drivers in the reduction in interaction between the existing and future operations. These drivers have



been considered in the assessment of the options and have contributed to the isolated nature of the recommended option.

Engineering Limitations

Understanding terminal capacity and component limitations is crucial for effective terminal operation. Simulation modelling provides verification of terminal performance in the initial stages of the terminal design to ensure the required outcomes are met. To verify the terminal throughput capacity with the proposed layouts, GHD has developed an ARENA based simulation model of the proposed Project. The model encompasses the entire port operation, from train arrivals at the rail receipt to ship departure. The model is able to compare the terminal performance with varying layouts.

Simulation modelling is in progress as part of the pre-feasibility study and preliminary results indicate that an up to 35 Mtpa export terminal will be achievable using two berths at conveyor capacities in the range of 6,000 to 10,000 tph depending on the final design configuration.

Engineering Risks

Project risks have a major influence on the potential for the Project to proceed. Several major project risks have been identified, which all have the potential to limit the Project's viability. These risks have been captured in the MCA process to derive the option that is the most appropriate for the Project.

This process has resulted in the berth location on Balaclava Island and the stockpile area on higher (and more solid) ground, south of the wetland area.

B1.3 Criteria Not Included in the MCA

Biodiversity Planning Assessment

Biodiversity Planning Assessment (BPA) areas are mapped by DERM and represent patches of vegetation with biodiversity significance at a State, Regional or Local level and/or supporting endangered, vulnerable or rare species. Biodiversity significance is the ranked significance of an area according to specified biodiversity values to account for ecological concepts such as rarity, diversity, fragmentation, habitat condition, resilience, threats and ecosystem processes.

Although Biodiversity Planning Assessment areas are typically an important consideration in site selection for projects, in this instance there are no mapped BPAs within the Project Area and, hence, the criteria has not been considered further.

Essential Habitat

Essential habitat is identified by DERM under the VMA and is used to illustrate vegetation patches where an endangered, vulnerable or rare species (as designated under the *Nature Conservation Act 1992*) is known to occur.

Although Essential Habitat is typically an important consideration in site selection for projects, in this instance there is no mapped Essential Habitat within the Project Area and hence this criterion has not been considered further.



Native Title Claims

The Native Title system was created under the *Native Title Act 1993* in order to gain recognition and protection of native title and to resolve native title matters.

All potential concept options are located within two claim areas (Darumbal [QC97/021] and Port Curtis Coral Coast [QC01/029]) hence Native Title could not be used to differentiate between options.

B1.4 MCA Results

A comparison of the three concept options (refer Figure 4-1) is provided below.

Option 1

Option 1 consists of a rail spur from the main North Coast railway in proximity to Bajool, following the easement of a dismantled rail line to a coal stockpile area and port facilities adjacent to the existing Port Alma.

Advantages:

- ▶ Largely follows existing easements so minimises the number of directly affected landowners; and
- ▶ Port and coal stockpile area would be developed on an existing brownfield site.

Disadvantages:

- ▶ Interaction with the explosives trade at existing port;
- ▶ 90-95 % the rail alignment and stockpile area would be located within a DOI wetland;
- ▶ Stockpile area located on marine muds which would present significant cost and construction risk;
- ▶ Close proximity to commercial salt production facilities;
- ▶ Potential noise, dust and visual impacts for residents at Bajool; and
- ▶ Maximum dredging required with associated dredge spoil disposal issues.

Option 2

Option 2 consists of a rail spur from the main North Coast railway in proximity to Marmor heading due north to a stockpile area and port facilities adjacent to the existing Port Alma.

Advantages:

- ▶ Shortest rail alignment; and
- ▶ Port and coal stockpile area would be developed on an existing brownfield site.

Disadvantages:

- ▶ Interaction with the explosives trade at existing port;
- ▶ 90-95 % the rail alignment and stockpile area would be located within a DOI wetland;
- ▶ Coal stockpile area located on marine muds which would present significant cost and construction risk;
- ▶ Close proximity to commercial salt production facilities;
- ▶ Potential noise, dust and visual impacts for residents at Marmor; and



- ▶ Maximum dredging required with associated dredge spoil disposal issues.

Option 3

Option 3 consists of a rail spur from the main North Coast railway in proximity to Raglan, heading north to a stockpile area on high (firm) ground and a conveyor from the stockpile area to new ship-loading facilities on Balaclava Island. A sub-option of locating the coal stockpile area on Balaclava Island was initially also considered but was dismissed as a fatal flaw due to the risk of environmental impacts on the nearby Marine Park.

Advantages:

- ▶ Substantially reduced dredging and associated spoil disposal;
- ▶ Least impact on DOI wetland;
- ▶ Substantially minimised interaction with commercial salt production facilities;
- ▶ Substantially reduced interaction with existing port activities;
- ▶ Balaclava Island is designated Strategic Port Land;
- ▶ The coal stockpile area would be located on more geotechnically suitable material and would not be located within a wetland; and
- ▶ Reduced channel transit time for coal ships.

Disadvantages:

- ▶ Balaclava Island is a greenfield site and is listed on the RNE;
- ▶ Proximity of new ship loading facilities to Marine Park; and
- ▶ Longest rail line with a substantial watercourse crossing.

Based on the above, the preferred concept option for the Project is Option 3, with the ship loading facilities on Balaclava Island, a conveyor from the ship loading facilities to the stockpile area on higher ground and a rail alignment linking to the North Coast rail line in the general vicinity of Raglan (refer Figure 4-3).



Appendix C Flood Data

The Fitzroy River, which discharges at Shell Point, 3 km from Port Alma, has a long history of flooding and can produce severe floods in the area following heavy rainfall up catchment. The highest recorded flood in the area reached 10.11 m at Rockhampton in 1918. More recently, the Fitzroy flooded in 2008 and reached heights of 7.5 m at Rockhampton. This flood system also caused significant flooding up catchment at Emerald, where flood waters reached in excess of 15 m. Figure C1 below shows the flood heights of the Fitzroy during the last 150 years and provides indicative data of the frequency of flooding to be expected at the proposed Project. Rainfall which exceeds 200 mm in 48 hours over the Fitzroy catchment has the potential to cause flooding. Floods on the Fitzroy River that have the potential to affect the Great Barrier Reef have a one in ten year return period.

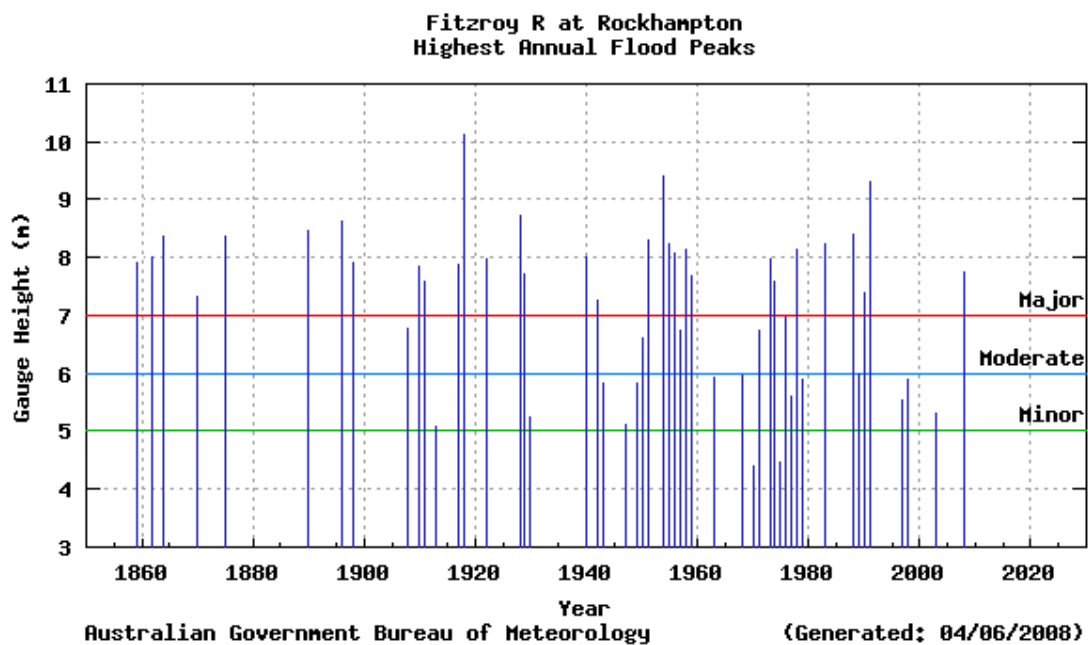


Figure C1 Flood history of the Fitzroy River at Rockhampton (1860 – 2008)

The flood history of the Fitzroy has affected many towns along the river. Table C1 below illustrates the density of the most significant floods in recent history (in metres). Flooding upstream will also affect the discharge of nutrients and potential contaminants at Port Alma. These data show that the Fitzroy River catchment is subject to significant flooding, which has the potential to impact upon the proposed Project.



Table C1 Major flood event heights on the Fitzroy River

River Height Station	January 1918	February 1954	January / February 1978	May 1983	January 1991	January 2008
Waitara	-	10.67	11.90	7.35	13.60	11.10
Cardowan	-	17.37	16.38	9.95	17.10	14.80
Connors Junction	-	-	15.98	13.75	17.30	-
Emerald	-	14.12	12.97	12.00	-	15.36
Yakcam	-	-	23.15	20.12	13.80	20.55
Bingegang	-	-	17.23	16.0	12.35	15.80
Tartrus	-	17.48	16.60	14.90	18.10	16.20
Taroom	6.71	8.15	4.08	7.46	6.24	6.07
Theodore	-	13.64	11.27	13.24	7.98	-
Moura	-	-	10.46	12.09	6.60	8.0
Karamea	-	10.26	8.10	9.98	9.12	-
Baralaba	-	15.52	2.68	4.60	9.45	-
Rannes	-	8.28	10.17	9.60	9.55	-
Newlands	-	18.16	16.28	14.63	15.29	9.05
Riverslea	31.48	28.60	23.15	22.89	27.97	21.93
Yaamba	17.32	16.59	14.75	14.97	16.65	14.25
Rockhampton	10.11	9.40	8.15	8.25	9.30	7.50



Appendix D Tide Data



The tides along the entrance channel to Port Alma are affected by shallow water effects induced by the estuary. Consequently, the tidal ranges at the existing Port Alma Berths are greater than the offshore tidal range. To quantify the variation in tidal range, reference is made to three tidal stations:

- ▶ Port Alma;
- ▶ Sea Hill Creek: located on Curtis Island part way along the channel; and
- ▶ Rosslyn Bay: an open coast tidal station some 20 km north of the entrance channel to Port Alma – adopted as representative of the open water tidal range.

The extrapolated tidal range at Balaclava Island has been considered during the concept development of the railway corridor and location of the stockpiles. In particular, the stockpile area has been sited above Mean High Water Springs and Highest Astronomical Tide, which reduces the risk of loss of containment of coal within proximity to the GBRMP. Balaclava Island is located on low lying tidal mudflats and is inundated twice daily by tides. These tides reach over 5 m LAT and are illustrated in Figure D1 below.

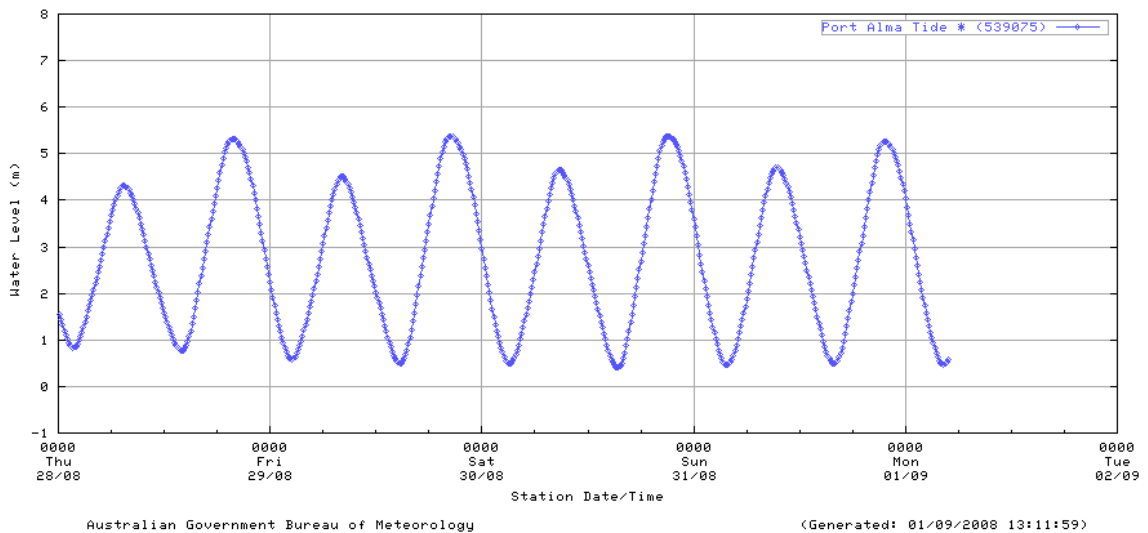


Figure D1 Tidal movement at Port Alma

Tidal Planes supplied by Queensland Transport of the three tidal stations are summarised in Table D1.

Table D1 Tidal Planes

	Port Alma	Sea Hill Creek	Roslyn Bay (Open Water)
Tidal Plane	metres (LAT)	metres (LAT)	metres (LAT)
Highest Astronomical Tide (HAT)	5.98	5.3	4.93
Mean High Water Springs (MHWS)	4.81	4.42	4.10
Mean High Water Neaps (MHWN)	3.76	3.46	3.20
Australian Height Datum (AHD)	2.854	----	2.360
Mean Sea Level (MSL)	2.90	2.63	2.42
Mean Low Water Neaps (MLWN)	1.86	1.72	1.57
Mean Low Water Springs (MLWS)	0.81	0.76	0.66
Lowest Astronomical Tide (LAT)	0.00	0.00	0.00
Chart Datum (CD)	0.00	-----	-----

These values show an approximate linear variation of around 550 mm over the length of the channel. Therefore, the channel has been assessed in two sections, the first with 3.5 m of tidal assistance and the second with 3.0 m of tidal assistance.

The following “design” tide heights shall be adopted for the assessment of the required channel / berth depths:

- ▶ Vessel movement will be assessed on the basis that the loaded vessel movements will be undertaken on the high tide within a period of 24 hours. The long term average of two consecutive high waters during neap tides (MHWN – Port Alma) is 3.76 m CD and, therefore, to allow vessel movements for all high tides a lower value of 3.5m CD for Balaclava Island has been adopted.
- ▶ It has been assumed that vessels may need to remain laden at the berth at the lowest tide of the year or 0.0 m CD (LAT).

The potential for sea level rise is a threat to all coastal environments worldwide. This risk has been considered in the design of the stockpiles to ensure that loss of containment to the marine environment is minimised. Storm surges may impact the coal terminal in the future, but it is considered a minor risk and, as such, has not been considered in full detail.



Appendix E

Climate Data

Climate tables for:

Rockhampton Post Office

Gladstone Post Office

Cape Capricorn Lighthouse

9 am wind rose data (Cape Capricorn Lighthouse)

3 pm wind rose data (Cape Capricorn Lighthouse)



Table E1 Climate data for Rockhampton Post Office

	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Mean Max. Temp (°C)	32.1	31.4	30.6	28.9	26.2	23.4	23.1	25.0	27.5	30.0	31.5	32.5	28.5
Mean Min. Temp (°C)	22.5	22.3	21.2	18.3	14.8	12.0	10.5	11.6	14.7	17.7	20.0	21.6	17.3
Mean Rainfall (mm)	179.1	189.4	109.7	58.0	41.2	57.8	41.1	21.6	29.4	45.4	61.5	112.2	946.7

Table E2 Climate Data for Gladstone Post Office

	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Mean Max. Temp (°C)	29.9	29.7	29.1	27.8	25.1	22.8	22.2	23.1	24.8	26.7	28.3	29.6	26.6
Mean Min. Temp (°C)	22.2	22.1	21.0	18.2	15.0	12.6	11.4	12.2	15.0	17.9	20.1	21.6	17.4
Mean Rainfall (mm)	181.6	191.1	129.6	61.0	46.1	63.1	47.3	23.7	30.9	51.9	75.1	118.7	1020.8

Table E3 Climate Data at Cape Capricorn Lighthouse

	J	F	M	A	M	J	J	A	S	O	N	D	Annual
Mean Max. Temp (°C)	27.7	27.4	26.7	24.9	22.6	20.4	19.6	20.6	22.3	24.3	25.9	27.2	24.1
Mean Min. Temp (°C)	23.4	23.2	22.4	20.4	17.7	15.1	14.2	15.2	17.4	19.8	21.6	22.9	19.4
Mean Rainfall (mm)	120.9	130.6	98.1	65.4	61.1	53.5	44.1	24.9	25.0	36.5	54.4	83.5	797.5



Appendix F

Desktop Database Searches

EPBC Matters of National Environmental Significance
Wildlife Online



Protected Matters Search Tool

9 September 2009 14:35

You are here: Environment Home > EPBC Act > Search

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

You may wish to print this report for reference before moving to other pages or websites.

The Australian Natural Resources Atlas at <http://www.environment.gov.au/atlas> may provide further environmental information relevant to your selected area. Information about the EPBC Act including significance guidelines, forms and application process details can be found at <http://www.environment.gov.au/epbc/assessmentsapprovals/index.html>

Search Type: **Area**

Buffer: **1 km**

Coordinates: **-23.61352,150.931, -
23.72994,150.9292, -
23.7278,150.7753, -
23.53706,150.7785, -
23.53878,150.9028, -
23.44061,150.9482, -
23.40191,150.9788, -23.415,151.0106,
-23.43144,151.0091, -
23.44683,150.9947, -
23.4867,150.9747, -
23.54774,150.9738, -
23.60699,150.9617**

Report Contents: **Summary**

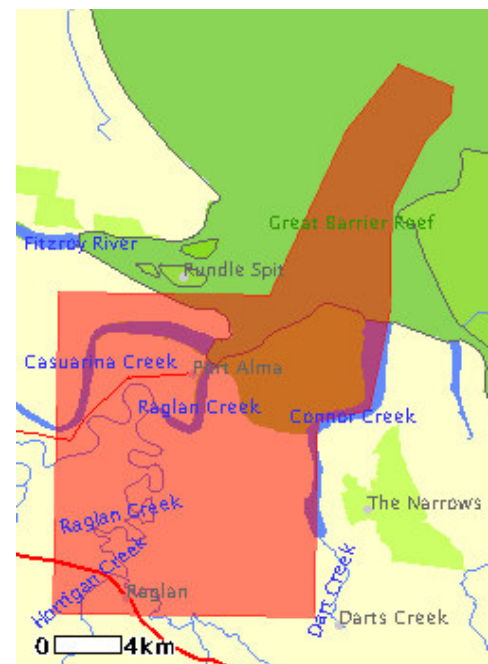
Details

- **Matters of NES**
- **Other matters protected by the EPBC Act**

● **Extra Information**

Caveat

Acknowledgments



This map may contain data which are
© Commonwealth of Australia
(Geoscience Australia)
© 2007 MapData Sciences Pty Ltd, PSMA

Summary

Matters of National Environmental Significance

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

<http://www.environment.gov.au/epbc/assessmentsapprovals/guidelines/index.html>.

<u>World Heritage Properties:</u>	1
<u>National Heritage Places:</u>	1
<u>Wetlands of International Significance:</u>	1
(Ramsar Sites)	
Commonwealth Marine Areas:	None
Threatened Ecological Communities:	3
Threatened Species:	27
Migratory Species:	57

Other Matters Protected by the EPBC Act

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

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

Please note that the current dataset on Commonwealth land is not complete. Further information on Commonwealth land would need to be obtained from relevant sources including Commonwealth agencies, local agencies, and land tenure maps.

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

permit requirements and application forms can be found at <http://www.environment.gov.au/epbc/permits/index.html>.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
<u>Places on the RNE:</u>	2
<u>Listed Marine Species:</u>	110
<u>Whales and Other Cetaceans:</u>	12
Critical Habitats:	None
Commonwealth Reserves:	None

Extra Information

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

<u>State and Territory Reserves:</u>	1
<u>Other Commonwealth Reserves:</u>	1
Regional Forest Agreements:	None

Details

Matters of National Environmental Significance

World Heritage Properties [[Dataset Information](#)]

[Great Barrier Reef QLD](#)

National Heritage Places [[Dataset Information](#)]

[Great Barrier Reef QLD](#)

Wetlands of International Significance [[Dataset Information](#)]

(Ramsar Sites)

[SHOALWATER AND CORIO BAYS AREA](#)

Within same catchment as Ramsar site

Threatened Ecological Communities [[Dataset Information](#)]

Status

Type of Presence

[Littoral Rainforest and Coastal Vine Thickets of Eastern Australia](#)

Critically Endangered

Community likely to occur within area

[Semi-evergreen vine thickets of the Brigalow Belt \(North and South\) and Nandewar Bioregions](#)

Endangered

Community likely to occur within area

[Weeping Myall Woodlands](#)

Endangered

Community likely to occur within area

Threatened Species [[Dataset Information](#)]

Status

Type of Presence

Birds

<u><i>Epthianura crocea macgregori</i></u> Yellow Chat (Dawson)	Critically Endangered	Species or species habitat known to occur within area
<u><i>Erythrotriorchis radiatus</i></u> Red Goshawk	Vulnerable	Species or species habitat likely to occur within area
<u><i>Geophaps scripta scripta</i></u> Squatter Pigeon (southern)	Vulnerable	Species or species habitat likely to occur within area
<u><i>Macronectes giganteus</i></u> Southern Giant-Petrel	Endangered	Endangered Species or species habitat may occur within area
<u><i>Pterodroma neglecta neglecta</i></u> Kermadec Petrel (western)	Vulnerable	Species or species habitat may occur within area
<u><i>Rostratula australis</i></u> Australian Painted Snipe	Vulnerable	Species or species habitat may occur within area
<u><i>Turnix melanogaster</i></u> Black-breasted Button-quail	Vulnerable	Species or species habitat likely to occur within area

Mammals

<u><i>Balaenoptera musculus</i></u> Blue Whale	Endangered	Species or species habitat may occur within area
<u><i>Chalinobus dwyeri</i></u> Large-eared Pied Bat, Large Pied Bat	Vulnerable	Species or species habitat may occur within area
<u><i>Dasyurus hallucatus</i></u> Northern Quoll	Endangered	Species or species habitat likely to occur within area
<u><i>Megaptera novaeangliae</i></u> Humpback Whale	Vulnerable	Breeding known to occur within area
<u><i>Nyctophilus timoriensis (South-eastern form)</i></u> Eastern Long-eared Bat	Vulnerable	Species or species habitat may occur within area
<u><i>Xeromys myoides</i></u> Water Mouse, False Water Rat	Vulnerable	Species or species habitat likely to occur within area

Reptiles

<u><i>Caretta caretta</i></u> Loggerhead Turtle	Endangered	Species or species habitat may occur within area
<u><i>Chelonia mydas</i></u> Green Turtle	Vulnerable	Species or species habitat may occur within area
<u><i>Denisonia maculata</i></u> Ornamental Snake	Vulnerable	Species or species habitat likely to occur within area
<u><i>Dermochelys coriacea</i></u> Leatherback Turtle, Leathery Turtle, Luth	Endangered	Species or species habitat may occur within area
<u><i>Egernia rugosa</i></u> Yakka Skink	Vulnerable	Species or species habitat likely to occur within area
<u><i>Fretmochelys imbricata</i></u> Hawksbill Turtle	Vulnerable	Species or species habitat may occur within area

<i>Furina dunmalli</i> Dunmall's Snake	Vulnerable	Species or species habitat may occur within area
<i>Lepidochelys olivacea</i> Olive Ridley Turtle, Pacific Ridley Turtle	Endangered	Species or species habitat may occur within area
<i>Natator depressus</i> Flatback Turtle	Vulnerable	Breeding known to occur within area
<i>Rheodytes leukops</i> Fitzroy River Turtle, Fitzroy Tortoise, Fitzroy Turtle	Vulnerable	Species or species habitat may occur within area
Sharks		
<i>Pristis zijsron</i> Green Sawfish, Dindagubba, Narrowsnout Sawfish	Vulnerable	Species or species habitat may occur within area
<i>Rhincodon typus</i> Whale Shark	Vulnerable	Species or species habitat may occur within area
Plants		
<i>Bulbophyllum globuliforme</i> Miniature Moss-orchid	Vulnerable	Species or species habitat likely to occur within area
<i>Cycas megacarpa</i>	Endangered	Species or species habitat likely to occur within area
Migratory Species [Dataset Information]	Status	Type of Presence
Migratory Terrestrial Species		
Birds		
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	Migratory	Species or species habitat likely to occur within area
<i>Hirundapus caudacutus</i> White-throated Needletail	Migratory	Species or species habitat may occur within area
<i>Hirundo rustica</i> Barn Swallow	Migratory	Species or species habitat may occur within area
<i>Merops ornatus</i> Rainbow Bee-eater	Migratory	Species or species habitat may occur within area
<i>Monarcha melanopsis</i> Black-faced Monarch	Migratory	Breeding may occur within area
<i>Monarcha trivirgatus</i> Spectacled Monarch	Migratory	Breeding likely to occur within area
<i>Myiagra cyanoleuca</i> Satin Flycatcher	Migratory	Species or species habitat likely to occur within area
<i>Rhipidura rufifrons</i> Rufous Fantail	Migratory	Breeding may occur within area

Migratory Wetland Species

Birds

<i>Actitis hypoleucos</i> Common Sandpiper	Migratory	Roosting known to occur within area
<i>Ardea alba</i> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
<i>Ardea ibis</i> Cattle Egret	Migratory	Species or species habitat may occur within area
<i>Arenaria interpres</i> Ruddy Turnstone	Migratory	Roosting likely to occur within area
<i>Calidris acuminata</i> Sharp-tailed Sandpiper	Migratory	Roosting likely to occur within area
<i>Calidris alba</i> Sanderling	Migratory	Roosting likely to occur within area
<i>Calidris canutus</i> Red Knot, Knot	Migratory	Roosting likely to occur within area
<i>Calidris ferruginea</i> Curlew Sandpiper	Migratory	Roosting likely to occur within area
<i>Calidris ruficollis</i> Red-necked Stint	Migratory	Roosting known to occur within area
<i>Calidris tenuirostris</i> Great Knot	Migratory	Roosting likely to occur within area
<i>Charadrius bicinctus</i> Double-banded Plover	Migratory	Roosting likely to occur within area
<i>Charadrius leschenaultii</i> Greater Sand Plover, Large Sand Plover	Migratory	Roosting known to occur within area
<i>Charadrius mongolus</i> Lesser Sand Plover, Mongolian Plover	Migratory	Roosting likely to occur within area
<i>Gallinago hardwickii</i> Latham's Snipe, Japanese Snipe	Migratory	Species or species habitat may occur within area
<i>Glareola maldivarum</i> Oriental Pratincole	Migratory	Roosting likely to occur within area
<i>Heteroscelus brevipes</i> Grey-tailed Tattler	Migratory	Roosting known to occur within area
<i>Limicola falcinellus</i> Broad-billed Sandpiper	Migratory	Roosting likely to occur within area
<i>Limosa limosa</i> Black-tailed Godwit	Migratory	Roosting likely to occur within area
<i>Nettapus coromandelianus albipennis</i> Australian Cotton Pygmy-goose	Migratory	Species or species habitat may occur within area

<u>Numenius madagascariensis</u> Eastern Curlew	Migratory	Roosting known to occur within area
<u>Numenius minutus</u> Little Curlew, Little Whimbrel	Migratory	Roosting likely to occur within area
<u>Numenius phaeopus</u> Whimbrel	Migratory	Roosting known to occur within area
<u>Pluvialis fulva</u> Pacific Golden Plover	Migratory	Roosting likely to occur within area
<u>Pluvialis squatarola</u> Grey Plover	Migratory	Roosting likely to occur within area
<u>Rostratula benghalensis s. lat.</u> Painted Snipe	Migratory	Species or species habitat may occur within area
<u>Tringa glareola</u> Wood Sandpiper	Migratory	Roosting likely to occur within area
<u>Tringa nebularia</u> Common Greenshank, Greenshank	Migratory	Roosting known to occur within area
<u>Tringa stagnatilis</u> Marsh Sandpiper, Little Greenshank	Migratory	Roosting likely to occur within area
<u>Xenus cinereus</u> Terek Sandpiper	Migratory	Roosting known to occur within area

Migratory Marine Birds

<u>Apus pacificus</u> Fork-tailed Swift	Migratory	Species or species habitat may occur within area
<u>Ardea alba</u> Great Egret, White Egret	Migratory	Species or species habitat may occur within area
<u>Ardea ibis</u> Cattle Egret	Migratory	Species or species habitat may occur within area
<u>Macronectes giganteus</u> Southern Giant-Petrel	Migratory	Species or species habitat may occur within area
<u>Sterna albifrons</u> Little Tern	Migratory	Species or species habitat may occur within area

Migratory Marine Species

Mammals

<u>Balaenoptera edeni</u> Bryde's Whale	Migratory	Species or species habitat may occur within area
<u>Balaenoptera musculus</u> Blue Whale	Migratory	Species or species habitat may occur within area
<u>Dugong dugon</u> Dugong	Migratory	Species or species habitat likely to occur within area
<u>Megaptera novaeangliae</u> Humpback Whale	Migratory	Breeding known to occur within area

<i>Orcaella brevirostris</i> Irrawaddy Dolphin	Migratory	Species or species habitat may occur within area
<i>Orcinus orca</i> Killer Whale, Orca	Migratory	Species or species habitat may occur within area
<i>Sousa chinensis</i> Indo-Pacific Humpback Dolphin	Migratory	Species or species habitat may occur within area
Reptiles		
<i>Caretta caretta</i> Loggerhead Turtle	Migratory	Species or species habitat may occur within area
<i>Chelonia mydas</i> Green Turtle	Migratory	Species or species habitat may occur within area
<i>Crocodylus porosus</i> Estuarine Crocodile, Salt-water Crocodile	Migratory	Species or species habitat likely to occur within area
<i>Dermochelys coriacea</i> Leatherback Turtle, Leathery Turtle, Luth	Migratory	Species or species habitat may occur within area
<i>Eretmochelys imbricata</i> Hawksbill Turtle	Migratory	Species or species habitat may occur within area
<i>Lepidochelys olivacea</i> Olive Ridley Turtle, Pacific Ridley Turtle	Migratory	Species or species habitat may occur within area
<i>Natator depressus</i> Flatback Turtle	Migratory	Breeding known to occur within area
Sharks		
<i>Rhincodon typus</i> Whale Shark	Migratory	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Dataset Information]	Status	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper	Listed	Roosting known to occur within area
Anseranas semipalmata Magpie Goose	Listed - Over fly marine area	Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift	Listed - Over fly marine area	Species or species habitat may occur within area
Ardea alba Great Egret, White Egret	Listed - Over fly marine area	Species or species habitat may occur within area
Ardea ibis Cattle Egret	Listed –over fly marine area	Species or species habitat may occur within area
Arenaria interpres Ruddy Turnstone	Listed	Roosting likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper	Listed	Roosting likely to occur within area
Calidris alba Sanderling	Listed	Roosting likely to occur within area
Calidris canutus Red Knot, Knot	Listed –overfly marine area	Roosting likely to occur within area
Calidris ferruginea Curlew Sandpiper	Listed –overfly marine area	Roosting likely to occur within area
Calidris melanotos Pectoral Sandpiper	Listed –overfly marine area	Roosting likely to occur within area
Calidris ruficollis Red-necked Stint	Listed –overfly marine area	Roosting likely to occur within area
Calidris subminuta Long-toed Stint	Listed –overfly marine area	Roosting likely to occur within area
Calidris tenuirostris Great Knot	Listed –overfly marine area	Roosting likely to occur within area
Charadrius bicinctus Double-banded Plover	Listed –overfly marine area	Roosting likely to occur within area
Charadrius dubius Little Ringed Plover	Listed –overfly marine area	Roosting likely to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover	Listed	Roosting known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover	Listed	Roosting likely to occur within area

<u>Charadrius ruficapillus</u> Red-capped Plover	Listed –overfly marine area	Roosting known to occur within area
<u>Gallinago hardwickii</u> Latham's Snipe, Japanese Snipe	Listed –overfly marine area	Species or species habitat may occur within area
<u>Gallinago megala</u> Swinhoe's Snipe	Listed –overfly marine area	Roosting likely to occur within area
<u>Gallinago stenura</u> Pin-tailed Snipe	Listed –overfly marine area	Roosting likely to occur within area
<u>Glareola maldivarum</u> Oriental Pratincole	Listed –overfly marine area	Roosting likely to occur within area
<u>Haliaeetus leucogaster</u> White-bellied Sea-Eagle	Listed	Species or species habitat likely to occur within area
<u>Heteroscelus brevipes</u> Grey-tailed Tattler	Listed	Roosting known to occur within area
<u>Heteroscelus incanus</u> Wandering Tattler	Listed	Roosting likely to occur within area
<u>Himantopus himantopus</u> Black-winged Stilt	Listed –overfly marine area	Roosting likely to occur within area
<u>Hirundapus caudacutus</u> White-throated Needletail	Listed –overfly marine area	Species or species habitat may occur within area
<u>Hirundo rustica</u> Barn Swallow	Listed –overfly marine area	Species or species habitat may occur within area
<u>Limicola falcinellus</u> Broad-billed Sandpiper	Listed –overfly marine area	Roosting likely to occur within area
<u>Limnodromus semipalmatus</u> Asian Dowitcher	Listed –overfly marine area	Roosting likely to occur within area
<u>Limosa limosa</u> Black-tailed Godwit	Listed –overfly marine area	Roosting likely to occur within area
<u>Macronectes giganteus</u> Southern Giant-Petrel	Listed	Species or species habitat may occur within area
<u>Merops ornatus</u> Rainbow Bee-eater	Listed –overfly marine area	Species or species habitat may occur within area
<u>Monarcha melanopsis</u> Black-faced Monarch	Listed –overfly marine area	Breeding may occur within area
<u>Monarcha trivirgatus</u> Spectacled Monarch	Listed –overfly marine area	Breeding likely to occur within area
<u>Myiagra cyanoleuca</u> Satin Flycatcher	Listed –overfly marine area	Species or species habitat likely to occur within area
<u>Nettapus coromandelianus albipennis</u> Australian Cotton Pygmy-goose	Listed –overfly marine area	Species or species habitat may occur within area
<u>Numenius madagascariensis</u>	Listed	Roosting known to occur within area

Eastern Curlew		
<i>Numenius minutus</i>	Listed –overfly marine area	Roosting likely to occur within area
Little Curlew, Little Whimbrel		
<i>Numenius phaeopus</i>	Listed	Roosting known to occur within area
Whimbrel		
<i>Phalaropus lobatus</i>	Listed	Roosting likely to occur within area
Red-necked Phalarope		
<i>Philomachus pugnax</i>	Listed –overfly marine area	Roosting likely to occur within area
Ruff (Reeve)		
<i>Pluvialis fulva</i>	Listed	Roosting likely to occur within area
Pacific Golden Plover		
<i>Pluvialis squatarola</i>	Listed – overfly marine area	Roosting likely to occur within area
Grey Plover		
<i>Recurvirostra novaehollandiae</i>	Listed – overfly marine area	Roosting likely to occur within area
Red-necked Avocet		
<i>Rhipidura rufifrons</i>	Listed – overfly marine area	Breeding may occur within area
Rufous Fantail		
<i>Rostratula benghalensis s. lat.</i>	Listed – overfly marine area	Species or species habitat may occur within area
Painted Snipe		
<i>Sterna albifrons</i>	Listed	Species or species habitat may occur within area
Little Tern		
<i>Stiltia isabella</i>	Listed – overfly marine area	Roosting likely to occur within area
Australian Pratincole		
<i>Thinornis rubricollis</i>	Listed –overfly marine area	Roosting likely to occur within area
Hooded Plover		
<i>Tringa glareola</i>	Listed - Overfly marine area	Roosting likely to occur within area
Wood Sandpiper		
<i>Tringa nebularia</i>	Listed – overfly marine area	Roosting known to occur within area
Common Greenshank, Greenshank		
<i>Tringa stagnatilis</i>	Listed – overfly Marine area	Roosting likely to occur within area
Marsh Sandpiper, Little Greenshank		
<i>Tringa totanus</i>	Listed – overfly marine area	Roosting likely to occur within area
Common Redshank, Redshank		
<i>Xenus cinereus</i>	Listed – overfly marine area	Roosting known to occur within area
Terek Sandpiper		
Mammals		
<i>Dugong dugon</i>	Listed	Species or species habitat likely to occur within area
Dugong		
Ray-finned fishes		
<i>Acentronura tentaculata</i>	Listed	Species or species habitat may occur within area
Hairy Pygmy Pipehorse		

<u>Campichthys tryoni</u> Tryon's Pipefish	Listed	Species or species habitat may occur within area
<u>Choeroichthys brachysoma</u> Pacific Short-bodied Pipefish, Short-bodied Pipefish	Listed	Species or species habitat may occur within area
<u>Corythoichthys amplexus</u> Fijian Banded Pipefish, Brown-banded Pipefish	Listed	Species or species habitat may occur within area
<u>Corythoichthys flavofasciatus</u> Yellow-banded Pipefish, Network Pipefish	Listed	Species or species habitat may occur within area
<u>Corythoichthys haematopterus</u> Reef-top Pipefish	Listed	Species or species habitat may occur within area
<u>Corythoichthys intestinalis</u> Australian Messmate Pipefish, Banded Pipefish	Listed	Species or species habitat may occur within area
<u>Corythoichthys ocellatus</u> Orange-spotted Pipefish, Ocellated Pipefish	Listed	Species or species habitat may occur within area
<u>Corythoichthys paxtoni</u> Paxton's Pipefish	Listed	Species or species habitat may occur within area
<u>Corythoichthys schultzi</u> Schultz's Pipefish	Listed	Species or species habitat may occur within area
<u>Doryrhamphus excisus</u> Indian Blue-stripe Pipefish, Blue-stripe Pipefish	Listed	Species or species habitat may occur within area
<u>Festucalex cinctus</u> Girdled Pipefish	Listed	Species or species habitat may occur within area
<u>Filicampus tigris</u> Tiger Pipefish	Listed	Species or species habitat may occur within area
<u>Halicampus dunckeri</u> Red-hair Pipefish, Duncker's Pipefish	Listed	Species or species habitat may occur within area
<u>Halicampus grayi</u> Mud Pipefish, Gray's Pipefish	Listed	Species or species habitat may occur within area
<u>Halicampus nitidus</u> Glittering Pipefish	Listed	Species or species habitat may occur within area
<u>Halicampus spinirostris</u> Spiny-snout Pipefish	Listed	Species or species habitat may occur within area
<u>Hippichthys cyanospilos</u> Blue-speckled Pipefish, Blue-spotted Pipefish	Listed	Species or species habitat may occur within area
<u>Hippichthys heptagonus</u> Madura Pipefish, Reticulated Freshwater	Listed	Species or species habitat may occur within area
<u>Hippichthys penicillus</u> Beady Pipefish, Steep-nosed Pipefish	Listed	Species or species habitat may occur within area
<u>Hippocampus bargibanti</u> Pygmy Seahorse	Listed	Species or species habitat may occur within area
<u>Hippocampus kuda</u>	Listed	Species or species habitat may occur within area

Spotted Seahorse, Yellow Seahorse		
<u>Hippocampus planifrons</u>	Listed	Species or species habitat may occur within area
Flat-face Seahorse		
<u>Hippocampus zebra</u>	Listed	Species or species habitat may occur within area
Zebra Seahorse		
<u>Lissocampus runa</u>	Listed	Species or species habitat may occur within area
Javelin Pipefish		
<u>Micrognathus andersonii</u>	Listed	Species or species habitat may occur within area
Anderson's Pipefish, Shortnose Pipefish		
<u>Micrognathus brevisrostris</u>	Listed	Species or species habitat may occur within area
Thorn-tailed Pipefish		
<u>Nannocampus pictus</u>	Listed	Species or species habitat may occur within area
Painted Pipefish, Reef Pipefish		
<u>Solegnathus hardwickii</u>	Listed	Species or species habitat may occur within area
Pipehorse		
<u>Solenostomus cyanopterus</u>	Listed	Species or species habitat may occur within area
Blue-finned Ghost Pipefish, Robust Ghost		
<u>Solenostomus paradoxus</u>	Listed	Species or species habitat may occur within area
Harlequin Ghost Pipefish, Ornate Ghost Pipefish		
<u>Syngnathoides biaculeatus</u>	Listed	Species or species habitat may occur within area
Double-ended Pipehorse, Alligator Pipefish		
<u>Trachyrhamphus bicoarctatus</u>	Listed	Species or species habitat may occur within area
Bend Stick Pipefish, Short-tailed Pipefish		
<u>Acalyptophis peronii</u>	Listed	Species or species habitat may occur within area
Horned Seasnake		
Reptiles		
<u>Aipysurus duboisii</u>	Listed	Species or species habitat may occur within area
Dubois' Seasnake		
<u>Aipysurus eydouxii</u>	Listed	Species or species habitat may occur within area
Spine-tailed Seasnake		
<u>Aipysurus laevis</u>	Listed	Species or species habitat may occur within area
Olive Seasnake		
<u>Astrotia stokesii</u>	Listed	Species or species habitat may occur within area
Stokes' Seasnake		
<u>Caretta caretta</u>	Listed	Species or species habitat may occur within area
Loggerhead Turtle		
<u>Chelonia mydas</u>	Listed	Species or species habitat may occur within area
Green Turtle		
<u>Crocodylus porosus</u>	Listed	Species or species habitat likely to occur within area
Estuarine Crocodile, Salt-water Crocodile		
<u>Dermochelys coriacea</u>	Listed	Species or species habitat may occur within area

Leatherback Turtle, Leathery Turtle, Luth

<i>Disteira kingii</i> Spectacled Seasnake	Listed	Species or species habitat may occur within area
<i>Disteira major</i> Olive-headed Seasnake	Listed	Species or species habitat may occur within area
<i>Emydocephalus annulatus</i> Turtle-headed Seasnake	Listed	Species or species habitat may occur within area
<i>Eretmochelys imbricata</i> Hawksbill Turtle	Listed	Species or species habitat may occur within area
<i>Hydrophis elegans</i> Elegant Seasnake	Listed	Species or species habitat may occur within area
<i>Lapemis hardwickii</i> Spine-bellied Seasnake	Listed	Species or species habitat may occur within area
<i>Laticauda colubrina</i> a sea krait	Listed	Species or species habitat may occur within area
<i>Laticauda laticaudata</i> a sea krait	Listed	Species or species habitat may occur within area
<i>Lepidochelys olivacea</i> Olive Ridley Turtle, Pacific Ridley Turtle	Listed	Species or species habitat may occur within area
<i>Natator depressus</i> Flatback Turtle	Listed	Breeding known to occur within area
<i>Pelamis platurus</i> Yellow-bellied Seasnake	Listed	Species or species habitat may occur within area
Whales and Other Cetaceans[Dataset Information]	Status	Type of Presence
<i>Balaenoptera acutorostrata</i> Minke Whale	Cetacean	Species or species habitat may occur within area
<i>Balaenoptera edeni</i> Bryde's Whale	Cetacean	Species or species habitat may occur within area
<i>Balaenoptera musculus</i> Blue Whale	Cetacean	Species or species habitat may occur within area
<i>Delphinus delphis</i> Common Dolphin, Short-beaked Common	Cetacean	Species or species habitat may occur within area
<i>Grampus griseus</i> Risso's Dolphin, Grampus	Cetacean	Species or species habitat may occur within area
<i>Megaptera novaeangliae</i> Humpback Whale	Cetacean	Breeding known to occur within area
<i>Orcaella brevirostris</i> Irrawaddy Dolphin	Cetacean	Species or species habitat may occur within area
<i>Orcinus orca</i> Killer Whale, Orca	Cetacean	Species or species habitat may occur within area

Sousa chinensis Indo-Pacific Humpback Dolphin	Cetacean	Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin	Cetacean	Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin	Cetacean	Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin	Cetacean	Species or species habitat may occur within area

Places on the RNE [[Dataset Information](#)]
Note that not all Indigenous sites may be listed.

Natural

[Balaclava Island and The Narrows QLD](#)
[Great Barrier Reef Region QLD](#)

Extra Information

State and Territory Reserves [[Dataset Information](#)]
Mackay/Capricorn Marine Park, QLD
Other Commonwealth Reserves [[Dataset Information](#)]
Great Barrier Reef Marine Park, COM

Caveat

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

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

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

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where

threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under "type of presence". For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and nongovernment organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the [migratory](#) and [marine](#) provisions of the Act have been mapped.

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

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

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

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

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

Acknowledgments

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

- [New South Wales National Parks and Wildlife Service](#)
- [Department of Sustainability and Environment, Victoria](#)
- [Department of Primary Industries, Water and Environment, Tasmania](#)
- [Department of Environment and Heritage, South Australia Planning SA](#)
- [Parks and Wildlife Commission of the Northern Territory](#)
- [Environmental Protection Agency, Queensland](#)
- [Birds Australia](#)
- [Australian Bird and Bat Banding Scheme](#)
- [Australian National Wildlife Collection](#)
- Natural history museums of Australia
- [Queensland Herbarium](#)
- [National Herbarium of NSW](#)

- [Royal Botanic Gardens and National Herbarium of Victoria](#)
- [Tasmanian Herbarium](#)
- [State Herbarium of South Australia](#)
- [Northern Territory Herbarium](#)
- [Western Australian Herbarium](#)
- [Australian National Herbarium, Atherton and Canberra](#)
- [University of New England](#)
- Other groups and individuals

[ANUcliM Version 1.8, Centre for Resource and Environmental Studies, Australian National University](#) was used extensively for the production of draft maps of species distribution. Environment Australia is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Last updated: Thursday, 20-Nov-2008 14:17:56 EST

[Department of the Environment, Water,
Heritage and the Arts](#)

GPO Box 787 Canberra ACT 2601 Australia

Telephone: +61 (0)2 6274 1111

© Commonwealth of Australia 2004

Wildlife Online Extract

Search Criteria: Species List for a Defined Area
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: 23.64 to 23.7
Longitude: 150.805 to 150.8867
[Email: Vicki.Low@ghd.com.au](mailto:Vicki.Low@ghd.com.au)
Date submitted: Thursday 29 Jan 2009 12:33:08
Date extracted: Thursday 29 Jan 2009 12:38:07
The number of records retrieved = 44

Disclaimer

As the EPA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all responsibility for this information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

Kingdom Class		Family	Scientific Name	Common Name	Q	A	Records
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle	C		1
animals	birds	Anatidae	<i>Anas gracilis</i>	grey teal	C		3
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan	C		3
animals	birds	Anatidae	<i>Aythya australis</i>	hardhead	C		2
animals	birds	Anatidae	<i>Tadorna radjah</i>	radjah shelduck	R		1
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck	C		1
animals	birds	Anatidae	<i>Nettapus coromandelianus</i>	cotton pygmy-goose	R		1
animals	birds	Anatidae	<i>Dendrocygna arcuata</i>	wandering whistling-duck	C		1
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck	C		2
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter	C		2
animals	birds	Ardeidae	<i>Ardea modesta</i>	eastern great egret	C		1
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret	C		2
animals	birds	Ardeidae	<i>Egretta garzetta</i>	Littl egret	C		2
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron	C		2
animals	birds	Charadriidae	<i>Euseiornis melanops</i>	black-fronted dotterel	C		1
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)	C		1
animals	birds	Charadriidae	<i>Charadrius ruficapillus</i>	red-capped plover	C		1
animals	birds	Charadriidae	<i>Erythronyx cinctus</i>	red-kneed dotterel	C		2
animals	birds	Gruidae	<i>Grus rubicunda</i>	brilga	C		1
animals	birds	Jacaniidae	<i>Irediparra gallinacea</i>	comb-crested jacana	C		1
animals	birds	Laridae	<i>Chlidonias hybrida</i>	whiskered tern	C		2
animals	birds	Laridae	<i>Hydroprogne caspia</i>	Caspian tern	C		1
animals	birds	Laridae	<i>Chroicocephalus novaehollandiae</i>	silver gull	C		1
animals	birds	Meliphagidae	<i>Epthianura crocea</i>	yellow chat	V		1
animals	birds	Meliphagidae	<i>Epthianura crocea macgregori</i>	yellow chat (Dawson)	E	CE	1
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican	C		2
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant	C		2
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant	C		2
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe	C		3
animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen	C		2
animals	birds	Rallidae	<i>Porphyrio porphyrio</i>	purple swamphen	C		1
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged sti	C		3
animals	birds	Recurvirostridae	<i>Recurvirostra novaehollandiae</i>	red-necked avocet	C		2
animals	birds	Scolopacidae	<i>Limosa limosa</i>	black-tailed godwit	C		1
animals	birds	Scolopacidae	<i>Numenius madagascariensis</i>	eastern curlew	R		1
animals	birds	Scolopacidae	<i>Calidris ferruginea</i>	curlew sandpiper	C		2
animals	birds	Scolopacidae	<i>Tringa stagnatilis</i>	marsh sandpiper	C		3
animals	birds	Scolopacidae	<i>Tringa nebularia</i>	common greenshank	C		2
animals	birds	Scolopacidae	<i>Calidris acuminata</i>	sharp-tailed sandpiper	C		2
animals	birds	Threskiornithidae	<i>Platalea regia</i>	royal spoonbill	C		2
animals	birds	Threskiornithidae	<i>Platalea flavipes</i>	yellow-billed spoonbill	C		2
animals	birds	Threskiornithidae	<i>Plegadis falcinellus</i>	glossy ibis	C		1
animals	birds	Threskiornithidae	<i>Threskiornis molucca</i>	Australian white ibis	C		2

animals mammals Phascolarctidae *Phascolarctos cinereus* | koala | C | 1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Presumed Extinct (PE), Endangered (E), Vulnerable (V), Rare (R), Common (C) or Not Protected ().

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*. The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon. This number is output as 999 if it equals or exceeds this value.

Appendix G

Endangered, Vulnerable and Rare Species List

Potential likelihood within proximity of the Project

Table G1 EVR species identified for the BalACLava Island area

Species	Status		Previously Recorded	Ecological Notes	Likelihood of Presence in Study Area
	EPBC	NCA			
Plants					
Miniature Moss Orchid <i>Bulbophyllum globuliforme</i>	V	R	No	An epiphyte that grows on the bark of trees. It is particularly associated with the Hoop Pine (<i>Araucaria cunninghamii</i>) and is restricted to cool, wet, upland subtropical rainforest.	<i>Unlikely</i> – this is a rainforest species that is generally associated with Hoop Pine in upland environments exposed to cool and wet climatic conditions.
Birds					
Red Goshawk <i>Erythrotrichia radiatus</i>	V	E	No	Inhabits wooded and forested lands with a mosaic of vegetation types. The primary prey of this species is large birds although it will also take mammals, reptiles and insects. Prefers habitats within close proximity of permanent water. The red goshawk is generally considered sedentary.	<i>Unlikely</i> – although the species may occasionally use the area for foraging, there is no key habitat for this species at BalACLava Island.
Squatter Pigeon (southern) <i>Geophaps scripta scripta</i>	V	V	No	The squatter pigeon is usually found in wooded and forested lands with a mosaic of vegetation types. It prefers habitats within close proximity of permanent water. Feeding takes place on the ground, with grass seeds making up the bulk of the squatter pigeons diet. This species does not undertake long range movements.	<i>Unlikely</i> – the squatter pigeon is not associated with marine mudflats, salt pans and mangrove forest.
Australian Painted Snipe <i>Rostratula australis</i>	V	V	No	This species inhabits thickly vegetated margins and shallows of wetlands, dams and marshes. It occasionally inhabits tea-tree scrub	<i>Unlikely</i> – this species inhabits freshwater and brackish inland wetlands and is not known to inhabit coastal wetlands and estuarine habitats

Species	Status		Previously Recorded	Ecological Notes	Likelihood of Presence in Study Area
	EPBC	NCA			
				and open woodlands. Foraging for seeds and invertebrate prey is usually concentrated in shallow water or the edge of mudflats and wetlands. The Australian painted Snipe is believed to move seasonally in response to rainfall, moving to northern Australia during the summer months.	such as those that are in occurrence at the study site.
Black-breasted Button-quail <i>Turnix melanogaster</i>	V	V	No	Found in dry low-closed forests, vine thickets and vine forests, acacia thickets and on rare occasions individuals are observed in open eucalypt forest. During prolonged dry periods this species may move into moist rainforests. Small invertebrates and seeds constitute the majority of these species dietary requirements.	<i>Unlikely</i> - this species is not known to occur in marine environments and is generally found in habitats that are not present at the project site.
Yellow Chat <i>Ephthianura crocea macgregori</i>	CE	E	No	This species is usually associated with wetlands and adjacent grasslands and periodically inundated marine floodplains, where a mosaic of dense sedgeland and taller samphire grasslands is present. It is known from three locations in central Queensland: Curtis Island, Torilla Plain and the Fitzroy Delta. Grass seeds are an important food source for the Yellow Chat.	<i>Possible</i> – the species is only known from three locations in Australia all of which are in close proximity to the study site (Curtis Island, the Fitzroy River Delta and Torilla Plains). Suitable habitat for this species in the form of samphire forland occurs adjacent to Balaclava Island and seasonally inundated marine plains are also present. The estimated adult population of Yellow Chats is 300 individuals.
Radjah Shelduck		R		This species is known from terrestrial wetlands	<i>Possible</i> – this species may utilise the wetland,

Species	Status		Previously Recorded	Ecological Notes	Likelihood of Presence in Study Area
	EPBC	NCA			
<i>Tadorna radjah</i>				and estuarine and littoral habitats including mudbanks, mangroved areas, floodplains and beaches. Feeds mainly on molluscs and other invertebrates (Marchant & Higgins, 2004).	mangrove and mudflat environments associated with the study area for foraging
Cotton pygmy- goose <i>Nettapus coromandelianus</i>	-	R		A wetland species preferring permanent fresh waters with abundant vegetation. Also swamps and floodplains. (Marchant & Higgins, 2004).	<i>Unlikely</i> – this species is most commonly known to freshwater habitats
Eastern curlew <i>Numenius madagascariensis</i>	M	R		This migratory species is found in estuaries, intertidal mudflats and sandflats as well as mangroves and saltmarsh. Feeds mainly on molluscs, crabs and insects (Higgins & Davies, 1996).	<i>Possible</i> – this species may utilise the estuarine, mangrove and mudflat environments associated with the study area for foraging
Marine Mammals					
Blue Whale <i>Balaenoptera musculus</i>	E	-	No	The blue whale inhabits coastal and oceanic waters. It is a highly mobile species. Feeding on krill tends to occur in Antarctic Waters although blue whales have been recorded feeding off Rottnest Island in Western Australia and Kangaroo Island in South Australia.	<i>Unlikely</i> – the blue whale is not known to inhabit estuarine environments, and has not been recorded in the vicinity of Balaclava Island. Transient individuals may occasionally pass the site in adjacent offshore waters.
Humpback Whale <i>Megaptera novaeangliae</i>	V	V	No	The humpback whale is found in oceanic and coastal waters along the east and west coasts of Australia during the annual winter migration. Calving takes place in eastern Australia between June and	<i>Unlikely</i> - the humpback whale is not known to inhabit estuarine environments and has not been recorded in the vicinity of Balaclava Island. It is possible that during the winter migration of this species,

Species	Status		Previously Recorded	Ecological Notes	Likelihood of Presence in Study Area
	EPBC	NCA			
				October.	individuals will travel in coastal waters offshore from the site.
Terrestrial Mammals					
Large-eared Pied Bat <i>Chalinolobus dwyeri</i>	V	R	No	This species favours areas that boast an abundance of cliffs and caves (where the species roost). Well-timbered areas with varying topography are inhabited by the Large-eared pied bat. Feeding for flying insects generally takes place below the canopy.	<i>Unlikely</i> – no suitable habitat for this species exists at the study site.
Eastern Long-eared Bat <i>Nyctophilus timoriensis</i> (South-eastern form)	V	V	No	The eastern long-eared bat utilises a range of habitats including mallee, bulloke, <i>Allocasuarina luehmannii</i> and box eucalypt communities. In southern Queensland it is generally associated with box/ bulloke/ ironbark woodlands. It feeds on non-flying insects and occasionally feeds on the ground. It roosts in tree hollows, under ledges and under the bark of trees.	<i>Unlikely</i> - no suitable habitat for this species exists at the study site.
Northern Quoll <i>Dasyurus hallucatus</i>	E	-	No	A predominantly nocturnal predator that is found in open woodlands and open forests, especially near rocky areas. Breeding success is greatly enhanced when the species is within close proximity to permanent water.	<i>Unlikely</i> - no suitable habitat for this species exists at the study site.
Water Mouse	V	V	No	This species is confined to coastal regions. It	<i>Unlikely</i> – suitable habitat for the water mouse is

Species	Status		Previously Recorded	Ecological Notes	Likelihood of Presence in Study Area
	EPBC	NCA			
<i>Xeromys myoides</i>				inhabits mangroves, salt marshes and freshwater wetlands. Foraging usually occurs around mangroves and well vegetated marine floodplains for marine invertebrates including crabs, snails and shellfish.	prevalent in and adjacent to the project site; however, this species has been rarely encountered in central Queensland.
Marine Reptiles					
Loggerhead Turtle <i>Caretta caretta</i>	E	E	No	Loggerhead turtles are found along the coast of Queensland and inhabit bays, estuaries, coral reefs and warm coastal waters. Beaches around Bundaberg are the favoured nesting site of the species in Queensland.	<i>Possible</i> – this species may utilise the estuarine waters adjacent to the proposed port site as foraging grounds.
Green turtle <i>Chelonia mydas</i>	V	V	No	The green turtle is found along the coast in warm and temperate Australian waters. Adults feed on seaweeds and seagrasses, whilst immature turtles are carnivorous. Islands of the Great Barrier Reef and the Capricorn Bunker group are important nesting sites for this species.	<i>Possible</i> – this species may utilise the estuarine water adjacent to the proposed port site as foraging grounds.
Leatherback (Leathery) Turtle <i>Dermochelys coriacea</i>	V	E	No	The leatherback turtle is a wide ranging marine species. It is found in tropical and temperate coastal waters and offshore waters. In Australian waters the leatherback turtle is more prevalent in cooler waters. It feeds on jellyfish, squid and other gelatinous marine	<i>Unlikely</i> – the leatherback turtle has not been recorded in the study area and the shallow estuarine waters are unlikely to be utilised by this species.

Species	Status		Previously Recorded	Ecological Notes	Likelihood of Presence in Study Area
	EPBC	NCA			
				invertebrates.	
Hawksbill Turtle <i>Eretmochelys imbricate</i>	V	V	No	This species is found in tropical waters from Western Australia to southern Queensland. Breeding and feeding efforts are concentrated along the east coast of Australia. Sponges make up a significant proportion of this species diet, although it will also forage on seagrass, soft corals and shellfish.	<i>Unlikely</i> – the hawksbill turtle is most frequently encountered in coral reef environments and is not expected to occur in the shallow estuarine waters adjacent to the proposed Port. Transient individuals may occasionally enter this environment to forage on seagrass.
Pacific Ridley/Olive Ridley Turtle <i>Lepidochelys olivacea</i>	E	E	No	The Pacific Ridley turtle is distributed in tropical coastal waters along the northern half of Australia. This species has only been recorded nesting at five locations in northern Australia. The diet of this species is not well known but is believed to comprise mostly of marine molluscs and gastropods.	<i>Possible</i> – this species may occur in the area, especially in coastal waters with a muddy or soft substrate. It has not been previously recorded at the site.
Flatback turtle <i>Natator depressus</i>	V	V	No	The flatback turtle inhabits tropical coastal waters as far south as central Queensland. It often enters shallow coastal environments such as bays on soft substrates. The diet of this species is made up of sea cucumbers, jellyfish and soft corals. Australia is the only known breeding location for this species.	<i>Possible</i> – the flatback turtle is known to inhabit shallow coastal environments, and its Australian range extends south to central Queensland.
Terrestrial Reptiles					
Ornamental Snake	V	V	No	This elapid snake inhabits low-lying areas	<i>Unlikely</i> – no suitable habitat exists for the

Species	Status		Previously Recorded	Ecological Notes	Likelihood of Presence in Study Area
	EPBC	NCA			
<i>Denisonia maculata</i>				with deep-cracking clay soils. It also occurs in vegetation in open woodland such as Brigalow (<i>Acacia harpophylla</i>) woodland. It is only found in central coastal Queensland within the drainage systems of the Fitzroy and Dawson River systems. It almost exclusively feeds on frogs.	ornamental snake at the site. It has not been recorded in the vicinity of Balaclava Island historically and is unlikely to inhabit the estuarine marine habitats associated with the study site.
Dunmall's Snake <i>Furina dunmalli</i>	V	V	No	This species occurs in open forest and woodland of the southern Brigalow Belt bioregion, especially where cracking clay soils are prevalent. Small reptiles constitute this snake's diet.	<i>Unlikely</i> – the Dunmall's snake is not expected to be encountered as no suitable woodland and open forest habitat is present at the study site.
Yakka Skink <i>Egernia rugosa</i>	V	V	No	The yakka skink inhabits rocky outcrops, sand plains and dense leaf litter, usually in association with dry sclerophyll or Brigalow woodlands and forests. The species has a patch distribution throughout Queensland. A terrestrial, diurnal species, the yakka skink occasionally occurs in small colonies. It is omnivorous.	<i>Unlikely</i> – the absence of rocky outcrops and leaf litter associated with sclerophyll or Brigalow woodlands indicates that this species is unlikely to be found at the study site.
Fitzroy Tortoise <i>Rheodytes leukops</i>	V	V	No	This freshwater tortoise is only found in the Fitzroy River in central Queensland. It occurs in freshwater reaches of the river and its tributaries and adjacent permanent waterbodies. It feeds on aquatic	<i>Unlikely</i> – the Fitzroy tortoise inhabits freshwater environments and is unlikely to be encountered in the marine waters adjacent to the proposed port.

Species	Status		Previously Recorded	Ecological Notes	Likelihood of Presence in Study Area
	EPBC	NCA			
				weeds and insect larvae.	
Sharks					
Green Sawfish <i>Pristis zijsron</i>	V	-		The green sawfish is a benthic ray that inhabits coastal bays, estuaries, rivers, often in very shallow water. It is long lived and has low fecundity. Mature animals can reach 5m in length. The species actively pursues prey such as small fish and prawns. Although historically recorded in New South Wales, this species is currently not believed to occur south of Cairns.	<i>Unlikely</i> – although suitable habitat exists for this species at the site, current evidence suggests this species is no longer found south of Cairns in eastern Australia.
Whale Shark <i>Rhincondon typus</i>	V	-	No	The whale shark is found in coastal and open ocean water, generally where water temperatures are between 21-25°C. They are pelagic filter feeders that consume plankton and small fishes.	<i>Unlikely</i> – the whale shark is not known to inhabit estuarine environments, and has not been recorded in the vicinity of Balaclava Island. Transient individuals may occasionally pass the site in adjacent coastal waters.

GHD Pty Ltd ABN 39 008 488 373

201 Charlotte Street Brisbane QLD 4000

GPO Box 668 Brisbane QLD 4001

T: (07) 3316 3000 F: (07) 3316 3333 E: bnemail@ghd.com.au

© GHD Pty Ltd 2009

This document is and shall remain the property of GHD Pty Ltd. The document may only be used for the purposes for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

