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Ports Corporation of Queensland

Report for Abbot Point Coal Terminal X110 Expansion Initial Advice Statement for Infrastructure Development Project

September 2008



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- A PCQ Environmental Policy



Executive Summary

The Ports Corporation of Queensland Limited (PCQ) is the owner of the Abbot Point Coal Terminal (APCT) and is the port authority for the Port of Abbot Point. The existing coal terminal has a current capacity of 21 million tonnes per annum (Mtpa), but following development of an EIS in 2006, PCQ received environmental and planning approvals to expand the terminal to 50 Mtpa. Works to increase the terminal capacity to 50 Mtpa are currently being carried out and are expected to be complete by the end of 2010.

When completed, the Northern Missing Rail Link proposed by QR will open up APCT to more coal fields in the northern Bowen Basin coalfields and allow new mines in the area to be developed. Coal customers have confirmed that a terminal capacity of 50 Mtpa will not be adequate to meet their projected export needs and a terminal capacity of 110 Mtpa, completed by mid 2014, is now required to meet this demand. The expansion of APCT from 50 Mtpa to 110 Mtpa is termed the X110 Expansion.

The Port of Abbot Point X110 Expansion comprises two separate projects, that is, the X110 Apron and Berth Capital Dredging Project and the X110 Infrastructure Development Project. The Apron and Berth Capital Dredging Project involves the dredging of two new berth pockets and an associated apron area. Dredged material is proposed to be relocated offshore to the existing spoil ground. The X110 Infrastructure Development Project involves the construction of offshore and onshore infrastructure associated with the coal terminal expansion.

In order to meet coal customer's requirements and achieve critical construction and operational milestones, the X110 Apron and Berth Capital Dredging Project is proposed to be undertaken in 2009. Dredging must be completed in this timeframe to allow the construction of the offshore wharf (X110 Infrastructure Development Project) to commence in early 2010. This schedule will allow construction resources currently working on the Abbot Point X50 Expansion to continue on to the X110 Infrastructure Development Project, resulting in significant logistical and economic benefits as well as to meet the timeframe for the infrastructure completion. Given the requirement to undertake the two components of the X110 Expansion works at different times, approvals for the two projects will be sought separately.

The X110 Expansion of APCT will result in the terminal being around four times its current size (21 Mtpa). At the completion of the X110 Expansion, APCT will have four rail loops, four offshore berths with shiploaders and a significant increase in stockpile area and the number of yard machines, conveyors and transfer equipment.

The expansion is expected to cost in the order of \$3.6 billion plus financing costs and take around four years to complete, with the works being undertaken in two stages. The works will continue on from the X50 Expansion works.

An environmental assessment will be prepared to assess local environmental values, determine possible social and economic impacts from the project and recommend



appropriate controls to minimise any adverse impacts and to maximise positive benefits that will result from the X110 Infrastructure Development Project.

The project is expected to bring major economic benefits to both Bowen and Queensland. Over 200,000 man weeks of employment will be generated in the construction stages, with the peak workforce expected to exceed 600 in the Bowen area alone, with significant additional employment in the adjacent regional manufacturing centres of Mackay and Townsville. In its operating phase, an additional 100 positions will be created in the coal terminal workforce from this expansion alone, in addition to employment benefits occurring from the X50 current expansion underway.

The expanded terminal is predicted to generate from port operations alone around \$660 million of revenue, \$123 million extra household income and up to 2,300 full-time equivalent jobs (direct and indirect). The port expansion will also generate revenue and employment from the additional coal mine and rail operations that will be facilitated by the expanded port. The export of an additional 60 Mtpa of coal from the expansion will generate between \$6 billion to \$18 billion of export revenue at 2008 coal prices.

1. Introduction

1.1 Scope of Report

The Port of Abbot Point X110 Expansion Project comprises two separate components, that is, the Apron and Berth Capital Dredging Project and the Infrastructure Development Project. The X110 Apron and Berth Capital Dredging Project involves the dredging of two new berth pockets and an associated apron area. Dredged material is proposed to be relocated offshore to the existing spoil ground. The X110 Infrastructure Development Project involves the construction of offshore and onshore infrastructure associated with the coal terminal expansion.

This Initial Advice Statement (IAS) is for the X110 Infrastructure Development Project and has been prepared for the Ports Corporation of Queensland Ltd (PCQ) for the purposes of identifying environmental, cultural and social issues and regulatory approvals associated with these works. This IAS is intended to scope the potential impacts that will be investigated in detail prior to the project being granted appropriate approvals. An environmental assessment and Environmental Management Plan (EMP) will be prepared as part of the approvals process. Terms of Reference (ToR) for the environmental assessment will be developed based on the outcomes of this report, the requirements of relevant government agencies and submissions from stakeholders and the community.

1.2 Proponent

PCQ is the proponent for the X110 Infrastructure Development Project (the Project) and the greater X110 Expansion Project. PCQ is the responsible party for the gaining of all relevant approvals to facilitate the development of the Project.

PCQ has an Environment Policy which covers all of its activities. A copy is provided in Appendix 1. PCQ also has an Environment Management System that is externally certified as being compliant with the international standard AS/NZS ISO 14001: 2004.

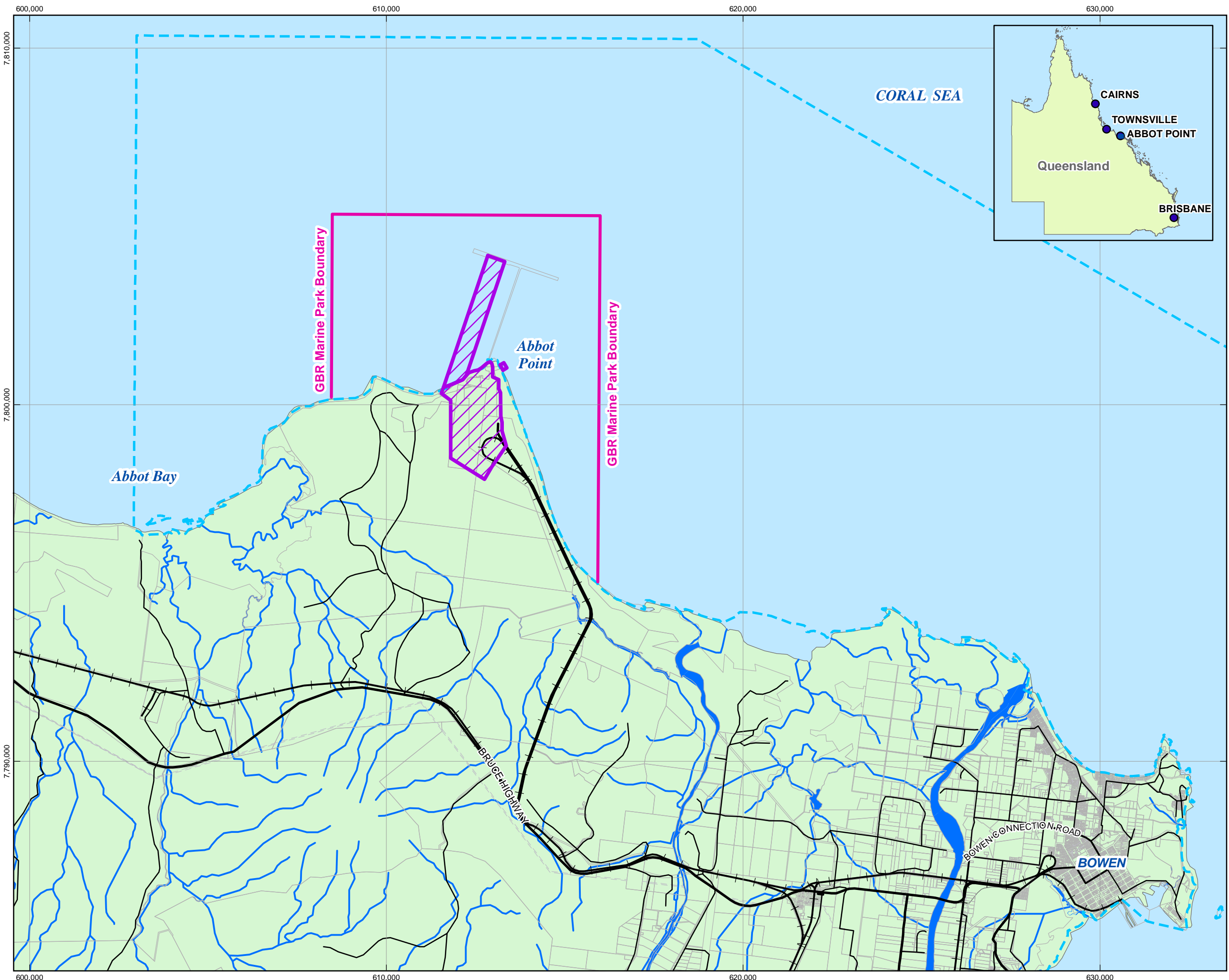
1.3 Location

As shown in Figure 1, Abbot Point is located approximately 25 kilometres (km) north of Bowen on the Central Queensland Coast. It is a strategic asset to Queensland, due to the large tracts of land available for industrial development, its remote location and access to a deep water port. The current Port is purpose designed for the export of coal with the Abbot Point Coal Terminal (APCT) and the tug berths in Bowen being the only facilities at the Port.

The Port limits, as defined in the *Transport Infrastructure Act 1994*, extend from Abbot Bay (to the west) to Gloucester Head (to the southeast). The Port is wholly contained within the Great Barrier Reef World Heritage Area.













The existing berth facilities are located approximately 2.8 km off-shore. Port limits overlap with the Great Barrier Reef Marine Park (GBRMP), but the area surrounding the offshore jetty and berth is excluded from the Marine Park.

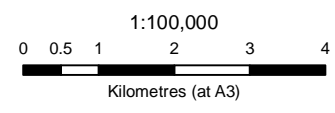
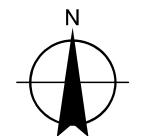


ABBOT POINT COAL TERMINAL X110 EXPANSION INFRASTRUCTURE



LEGEND

-  STUDY AREA
-  ABBOT POINT PORT LIMITS
-  GBRMP BOUNDARY
-  EASEMENT
-  CADASTRE
-  RAILWAY
-  MAJOR ROAD
-  SECONDARY ROAD
-  MINOR ROAD
-  WATERCOURSE



Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

Job Number | 41-20175
Revision | A
Date | 13 June 2008

LOCALITY MAP
FIGURE 1

1.4 Project Scope

The APCT was initially built in 1984 with a coal export capacity of 15 Mtpa. The expansion of the terminal to 21 Mtpa (X21 Project) was completed at the end of 2007. PCQ has gained both State and Commonwealth environmental and planning approvals to expand the terminal to a capacity of 50 Mtpa in a number of stages (X25, X30, X35 and X50).

The proposed X110 Infrastructure Development Project includes both on-shore and off-shore development. The key on-shore components include (refer Figure 2):

- » The development of associated rail dump stations and in-loading conveyors from each to the stockyard;
- » Installation of new stockyard capacity involving up to 14 new bunds (14 stockpile rows);
- » Installation of up to 15 new stockyard machines, which will be stackers, reclaimers or combined stacker/reclaimers, chosen to optimise efficiency of the stockyard operations;
- » Installation of transfer towers, surge bins and sampling plant for the new stockyard;
- » Construction and operation of a new treatment facility at Abbot Point for ships' quarantine waste;
- » Potential installation of additional fuel facilities for refuelling terminal vehicles and machinery;
- » Provision of cleared and level area for the lay down, storage and preparation of equipment for the construction phases;
- » Provision of additional water settlement pondage for the increased stockpile area;
- » Possible provision of a helipad for marine pilot transfers; and
- » Operation of a number of Environmentally Relevant Activities during the construction stages, which will include as a minimum, additional sewage treatment for the construction workforce; screening of rock; and concrete batching.

Two additional rail loops will also be developed within the port. This work will be subject to a separate assessment and approvals process by the proponent of the rail infrastructure, Queensland Rail.

The key off-shore components include (refer Figure 2):

- » Installation of a second offshore jetty structure to the west of the existing offshore structures, with two out-loading conveyors to take product to the offshore berths.
- » Installation of two new offshore wharf/berth structures with two new ship-loaders on the new berths. The marine structures are expected to be piled structures similar to the existing structures, however the type of structure will be reviewed to ensure the most economic design.
- » Extension of the service jetty structure (to the east of the terminal).

Prior to the construction of the new offshore wharf structures, the berth pockets and associated apron area need to be dredged with material relocated to the existing offshore disposal site. This work is defined as the X110 Apron and Berth Capital Dredging Project and does not form part of the aforementioned X110 Infrastructure Development Project scope of works.

Due to timing conflicts, the X110 Apron and Berth Capital Dredging Project will be subject to a separate approvals process to allow dredging to be undertaken in 2009 and consequently works on the offshore structures to commence in early 2010.

The total cost for expanding APCT from 50 Mtpa to 110 Mtpa is expected to be around \$3.6 billion plus financing costs.

1.5 Associated Infrastructure Works

Electricity supply to the terminal will require upgrading for this project and the additional demand and supply of infrastructure will be assessed. Impacts from this infrastructure need will be studied separately by the responsible agencies. Any further infrastructure needs will be further explored.

1.6 Water Supply

The site is currently not connected to a potable town water supply. Potable water supplies for the site are derived from an on-site bore which is located within a freshwater aquifer adjacent to the coastal dunal system. This is supplemented with potable water brought in by truck as required. Additional water for the construction workforce is expected to be trucked in to meet the peak workforce requirements. The proposed increase in permanent staffing numbers will increase existing water usage.

PCQ has contributed to the Water for Bowen Project which is expected to be operational in 2012. PCQ will investigate other options to meet the water requirements for construction and operation of the X110 Infrastructure Development Project, including desalination. The design of the project will seek to maximise the containment of water on site and reuse of this water as appropriate.

1.7 Road Access

The access road from the Bruce Highway to the terminal is privately owned by CPQ and is generally used only by terminal staff and contractors, plus other authorised users. The impact of the increase in road traffic both during construction and operation phases will be investigated in consultation with the relevant authorities. Crossings between the road and the railway line will also be investigated.

1.8 Project Timing

As outlined above, the Port of Abbot Point X110 Expansion comprises two separate projects, that is, the X110 Apron and Berth Capital Dredging Project and the X110 Infrastructure Development Project. In order to achieve critical construction and



operational milestones it is necessary to separate the two projects in terms of approvals and capital work timeframes.

Dredging of the berth pockets and associated apron area, and relocation of dredged material to the existing offshore spoil ground is proposed to be undertaken during April – October 2009. This window avoids the turtle nesting season and also the wet season.









Dredging during the 2009 window is necessary to allow offshore construction works for the X110 Infrastructure Development Project to commence in early 2010. This schedule will allow construction resources currently working on the Abbot Point X50 Expansion to continue on to the X110 Infrastructure Development Project, resulting in significant logistical and economic benefits as well as to meet the timeframe for the infrastructure completion. Given the requirement to undertake the two components of the X110 Expansion works at different times, environmental studies, mitigation planning and assessment will be undertaken separately for the two projects.

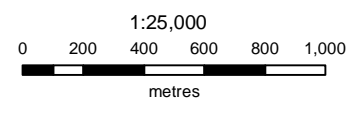
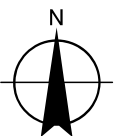
It is expected that by mid-2012, the coal terminal will have a capacity of 80 Mtpa (i.e. expansion to X80) and that by mid-2014, expansion works to accommodate 110 Mtpa will be complete.



ABBOT POINT COAL TERMINAL X110 EXPANSION INFRASTRUCTURE

LEGEND

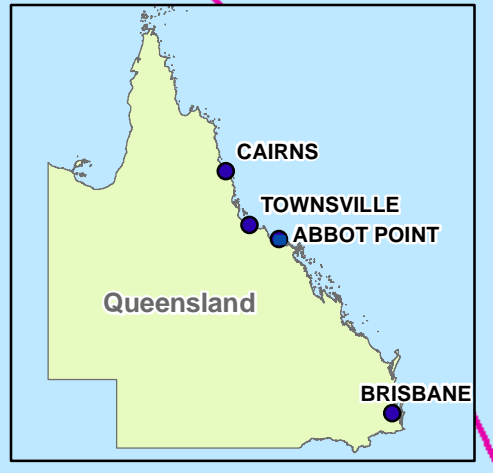
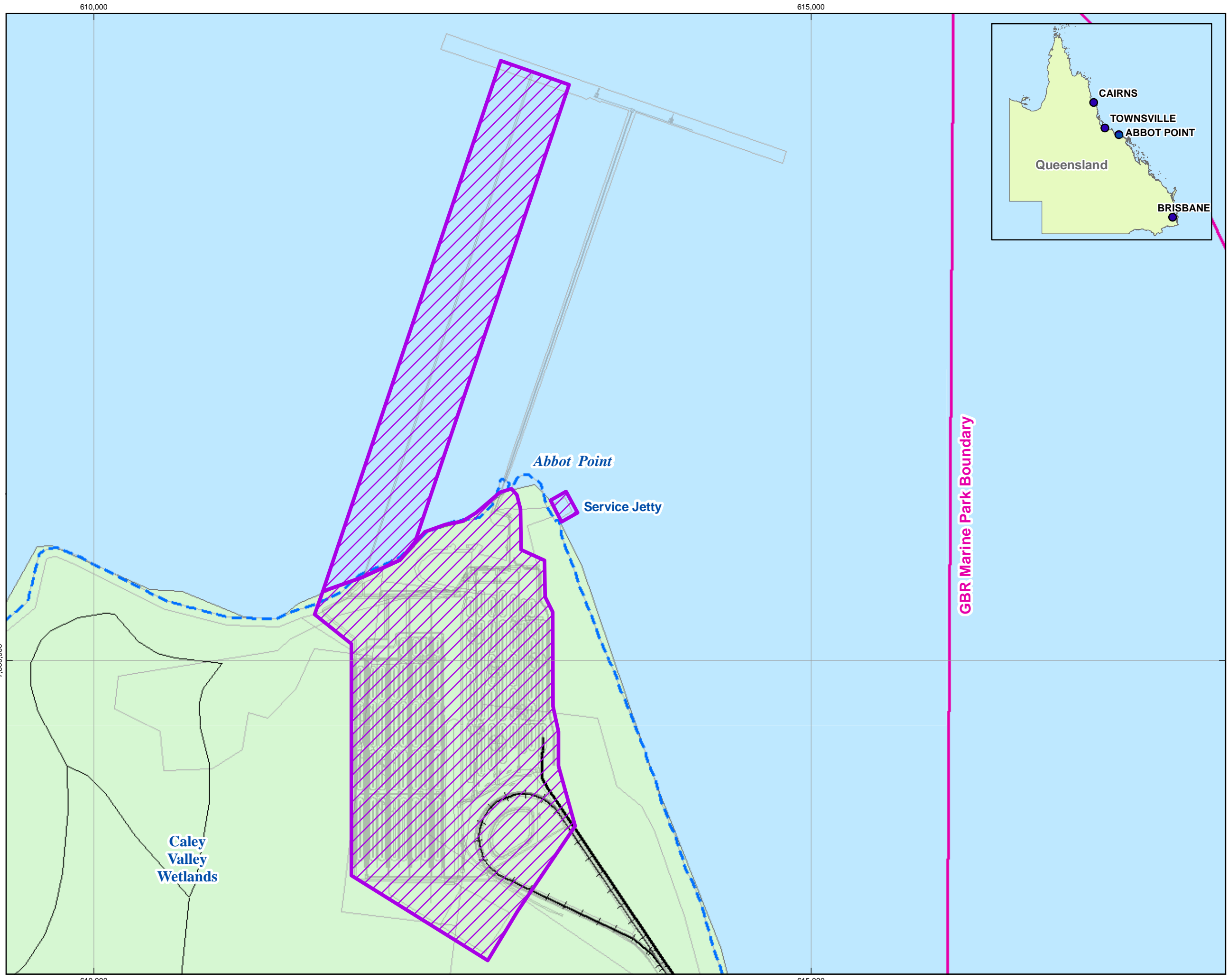
-  STUDY AREA
-  GBRMP BOUNDARY
-  CADASTRE
-  RAILWAY
-  MAJOR ROAD
-  SECONDARY ROAD
-  MINOR ROAD
-  Proposed Infrastructure Footprint



Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

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STUDY AREA FIGURE 2



1.9 Project Need

There has been a very strong growth in demand for coal exports from Australia due to the industrial growth of China and India. Coal mines in Queensland's Bowen Basin are increasing their production levels to meet this customer need and require port infrastructure to export their product. Coal terminal expansions are under way in the ports of Hay Point, Gladstone and Abbot Point. All of these expansions are required to meet the export needs of the coal mines.

The demand for coal comes primarily from the need for coking coal used in the manufacture of steel and also thermal coal requirements for increasing electricity demands of these countries. Exports of iron ore from Western Australia are expected to increase significantly in coming years to meet steel production increases in these countries, which will continue to support a strong coking coal market for many more years.

The Port of Abbot Point has been identified as a key export port for coal from the northern Bowen Basin. The main type of coal exported from Abbot Point is the higher value coking coal, which is used in conjunction with iron ore as an ingredient in the manufacture of steel. The Port of Abbot Point is close to the mines, yet is well distanced from residential communities, enabling storage and export of coal to occur without the community impacts.

Queensland Rail's (QR) proposed Northern Missing Rail Link will open up the Port of Abbot Point to mines in the northern Bowen Basin coal fields. This proposed new rail link will also allow development of new mines that previously were not viable without rail and port connections. The APCT is currently undergoing an expansion from 21 Mtpa to 50 Mtpa. Customer demand however has indicated that there is a demand for over 100 Mtpa required to export through the Port of Abbot Point. PCQ has signed contracts from coal customers to use this extra capacity if provided and PCQ is now seeking the environmental approvals for an expansion to 110 Mtpa.

1.10 Project Benefits

The benefits of the X110 Infrastructure Development Project relate to the benefits of the greater X110 Expansion Project. The most important benefit from this will be the significant economic boost that the project will bring to the State and to the Bowen region.

The expansion of APCT is essential to meet the export needs of coal mines in the northern Bowen Basin coalfields. An economic impact study (PCQ 2008) showed that on average, each ship visit to the Port of Abbot Point provided the following benefits:

- » \$1,033,000 of output for Queensland;
- » \$475,000 of value added;
- » \$187,000 of household income; and
- » 3.5 full-time equivalent jobs for one year.

The expansion from 50 Mtpa to 110 Mtpa would involve around an extra 660 ship visits per year, creating the following predicted benefits from the port operations alone:

- » \$660 million of revenue;
- » \$313 million of value added;
- » \$123 million of value added; and
- » Up to 2300 full time equivalent jobs (direct and indirect) when the terminal is operating at 110 Mtpa.

This excludes the additional benefits from coal mine operations, rail operation and revenue from the sale of the coal. Revenue from the sale of 60 Mtpa of coal is \$6 billion to \$18 billion based on 2008 prices.

Unemployment in Bowen has been running at high levels due to lack of large businesses and industry in the area. The coal terminal is one of the larger employers of Bowen residents and the boost in terminal employment will provide a major long term benefit to Bowen.

With a construction cost of \$3.6 billion plus financing costs, the greater X110 Expansion Project construction is expected to generate over 200,000 man weeks of employment. The predicted peak construction workforce at Abbot Point is expected to be over 600 locally, with additional significant numbers employed in the regional manufacturing areas of Mackay and Townsville. Construction will be carried out in two stages, with the total construction period being around four years.

Based on predictions from the EIS for an expansion to 50Mtpa (WBM 2006), the operating and maintenance workforce at the terminal could also increase by over 100 people for the expansion from 50 Mtpa to 110 Mtpa. The current terminal workforce is 58 and the X50 expansion underway will increase the operating workforce to around 100.

1.11 Legislation, Approvals and Other Requirements

1.11.1 Overview

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

1.11.2 Commonwealth Legislation

Environment Protection and Biodiversity Conservation Act, 1999

In accordance with the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act), an approval from the Commonwealth Minister for the Environment must be sought prior to undertaking an

action, which has, would have, or is likely to have, a significant impact (defined in the Act) on a matter of National Environmental Significance (NES). An action includes a project, development, or undertaking an activity or series of activities.

While significant impacts on matters of NES are considered unlikely, PCQ considers that the X110 Infrastructure Development Project should still be referred to the Department of the Environment, Water, Heritage and the Arts (DEWHA) for a formal decision under the EPBC Act. If the DEWHA determines that the Project is likely to have a significant impact on a matter of National Environmental Significance (NES), then the Project (or an element of the Project) will be determined to be a “controlled action” requiring assessment and approval at the Commonwealth level.

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

- » Sections 12 and 15A (World Heritage properties);
- » Section 15B and 15C (National Heritage);
- » Sections 18 and 18A (Listed threatened species and communities);
- » Sections 20 and 20A (Listed migratory species); and
- » Sections 23 and 24A (Marine environment).

1.11.3 State Legislation

State Development and Public Works Organisation Act 1971 (Qld)

The *State Development and Public Works Organisation Act 1971* (SDPWOA) empowers the Coordinator General to facilitate and coordinate a project with “significant project status”. For a significant project the Coordinator General is responsible for administering the EIS process including an evaluation of the EIS and the preparation of a report. The Coordinator General is empowered to make certain recommendations and, in addition, is empowered to state conditions that must be imposed under certain approval processes.

Once the Coordinator General has completed the EIS process under the SDPWOA, then the various material Project approvals may be granted in accordance with the relevant legislation.

The Project has not been declared as a Significant Project, however, after further discussions with the State Government PCQ may seek significant project declaration for the project in accordance with section (26)(1)a of the SDPWOA,.

Environmental Protection Act 1994 (Qld)

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

The EP Act outlines the scope and content for preparing environmental protection policies to protect Queensland’s environment. These policies may be made about the

environment or anything that affects or may affect the environment. It should also be noted that all subordinate legislation to the Act, such as the Environmental Protection Policies, binds all persons. Compliance with all policies will be required.

Environmentally relevant activities (ERAs) (defined within the Act and associated Regulation) proposed to be undertaken as part of the X110 Project Infrastructure Expansion Project will require licensing in accordance with the Act.

Environmental Protection (Noise) Policy, 1997 (EPP Noise) (Qld)

General construction works must be undertaken having regard to the requirements outlined under the EPP Noise and the *AS 2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites*.

Section 11 of the EPP Noise sets acoustic quality objectives, while Part 3 deals with the evaluation procedure and the approval of a Draft EMP. Part 4 of the policy deals with abatement of unreasonable noise and is intended to provide measures for nuisance noise control. Part 6 sets out details of the procedures and equipment suggested for making noise assessment. Schedules 1 and 3 of the Policy outlined planning levels and prescribed information for particular noise generating works.

Environmental Protection (Air) Policy, 1997 (EPP Air) (Qld)

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. The proponent will have obligations under the EPP Air which must be fulfilled.

Environmental Protection (Water) Policy, 1997 (EPP water) (Qld)

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.

Under Sections 31 and 32 of the EPP Water Policy, it is prohibited to deposit or release materials into a watercourse, or a place where it could be washed into these places, unless an approval is obtained.

Environmental Protection (Waste Management) Policy (2000) (Qld)

The Waste EPP 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). The waste hierarchy ranges from the most preferred to the least preferred method: waste avoidance – waste reuse – waste recycling – energy recovery from waste – waste disposal.

The principles for achieving good waste management include:

- » the polluter pays principle – all costs associated with waste management should be borne by the waste generator;
- » the user pays principle – all costs associated with the use of a resource should be included in the price of goods and services developed from the resource; and

- » the product stewardship principle – the producer or importer of a product should take all reasonable steps to minimise environmental harm from the production, use and disposal of the product.

Aboriginal Cultural Heritage Act 2003 (Qld)

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

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

Coastal Protection and Management Act 1995 (Qld)

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

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

Integrated Planning Act 1997 (Qld)

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

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

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

Development which is a material change of use and which is inconsistent with a land use plan approved under the Transport Infrastructure Act 1994 triggers assessment under the *Integrated Planning Act 1997* (IPA).

Development which involves an Environmentally Relevant Activity (ERA) also triggers assessment under the Act. As a minimum, the proposed development involves a Material Change of Use of a number of ERAs on the site which will require assessment and approvals.

Offshore coastal works will require a tidal works approval for construction of structures.

Fisheries Act 1994 (Qld)

Any Project works that disturb marine plants will require approvals under the *Fisheries Act 1994* and *Integrated Planning Act 1997*.

The Department of Primary Industries and Fisheries (DPIF) is the administering body for these approvals and maintain an interest in the proposed works in relation to:

- » Any temporary or permanent disturbance to protected marine plants and tidal fish habitats;
- » Any temporary or permanent waterway barrier works (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.

Other legislation relevant to the project may include:

- » *Vegetation Management Act 1999* (Qld);
- » *Nature Conservation Act 1994* (Qld).

Abbot Point State Development Area

The Abbot Point State Development Area (APSDA) was declared by the Governor in Council on 19 June 2008 under section 77 of the *State Development and Public Works Organisation Act 1971*.

A development scheme has been prepared to manage land use in the APSDA. This scheme, prepared by the Coordinator-General, was approved by the Governor-in-Council on 19 June 2008.

The development scheme plans for the establishment of industrial development, infrastructure corridors and essential services in a coordinated manner, recognising the environment, cultural heritage and the community.

The Coordinator-General is the assessment manager for the assessment and determination of all applications for land use development (material change of use) within the state development area.

Part of the proposed onshore development area is within the APSDA for which development approval will be required.

2. Existing Environmental Values and Potential Impacts

2.1 Introduction

The potential environmental impacts associated with the X110 Infrastructure Development Project are those that may result from development and operation of the coal storage, handling and transport and the port facilities.

The following provides an overview of the existing environmental values and an initial assessment of potential impacts are based on information drawn from previous studies undertaken within the Project area and surrounds.

2.2 Land and Infrastructure

2.2.1 Land Ownership

Most of the land required on-shore for the terminal expansion is owned by PCQ. However, part of the neighbouring land holdings in the west will be required for the expanded stockpile area. This land is owned by Colinta Holdings, a subsidiary of Xstrata Coal. PCQ has commenced discussions with Colinta to purchase this land.

Part of the onshore works is situated in a State Development Area.

Construction of the new berths will occur within Lot 49 SP185904. The new offshore jetty structure to the new offshore wharf will be built above unallocated State Land. PCQ will need to seek a perpetual lease of this land from the Queensland Government.

2.2.2 Climate

The climate at the Port of Abbot Point is dry tropical with dry winters and wet humid summers and strongly influenced by maritime forces. The majority (80%) of the annual rainfall of 1050 mm (as recorded at the Bowen Meteorological Station) falls between December and March and peak rainfall periods are often associated with cyclonic events. The warmest months in the Bowen area are from November to March, with mean daily maxima exceeding 30°C and averaging 24°C in winter. Winds predominate from the south east to east throughout the year.

2.2.3 Topography

The area of proposed on-shore development comprises gently undulating sand drifts and a sandy plain with minor crest/swale formation with an elevation variation of generally less than 0.5 m (WBM 2006). The elevation of the proposed stockyard expansion area is generally between 3 to 4 m AHD (WBM 2006).

Potential climate change impacts resulting from rising sea level in the future will be an important part of the assessment.

2.2.4 Geology and Soils

Regional ecosystem mapping for the lowland areas of the site has classified the development area as Land System 2 – Quaternary coastal dunes and beaches with soils being predominantly siliceous or calcareous sands. To the west of the coastal sand plains lie the coastal mudflats (Qm) associated with the Abbot Point – Caley Valley Wetland.

Potential acid sulphate soils may be present at the proposed development site as the area is less than 5 m AHD. Investigations into the presence of acid sulphate soils were undertaken as part of the APCT Stage 3 (X30 to X50) Expansion EIS (WBM, 2006) and found that:

- » The landform and geology of the stockyard expansion area comprises low Quaternary coastal sandplains derived primarily from wind and wave action. The site elevation varies between 2.8 m and 5 m AHD;
- » The surface soils (to over 1.0 m deep) are deep homogenous fine to medium grained sands. The prevailing groundwater level is approximately 0.0 m AHD. There is no evidence of conditions that may have caused the formation of pyritic material in these soils; and
- » Screen and SPOCAS testwork indicated an absence of acid sulfate material within the potential area or depth of disturbance (WBM, 2006).

Additional studies in potential acid sulphate soils will be undertaken for the X110 Infrastructure Development Project and management plans developed if required.

2.2.5 Road and Rail Access

Access to the existing Port facilities is via a private road from the junction with the Bruce Highway (an approximate distance of 12 km). This road was developed specifically for access to the APCT and is owned by PCQ. The intersection of the private road with the Bruce Highway was upgraded by PCQ in 2006 as part of the X21 Expansion project. Works included extension of turn-off lanes and intersection lighting. A Road Impact Study is expected to be required to assess any additional road impacts of the X110 Infrastructure Development Project.

Coal is delivered to the Port via a dedicated rail line to the terminal. This rail line carries coal from mines in the northern Bowen Basin coalfields. Two additional rail loops will also be developed within the port. This work will be subject to a separate assessment and approvals process by the proponent of the rail infrastructure, Queensland Rail.

2.2.6 Port Infrastructure

Existing facilities in the Port include a trestle, jetty and offshore wharf at Abbot Point and tug mooring facilities at the nearby Bowen Wharves. Whilst the terminal is owned by PCQ, it is operated by Abbot Point Bulkcoal Pty Ltd (APB) under an operating and maintenance contract.

The primary infrastructure at the Port is the coal terminal. Offshore infrastructure currently consists of a single offshore berth of approximately 268 m in length, located at the end of a 2.8 km long trestle jetty which is serviced by conveyor and shiploader. The berth pocket is 512 m long x 70 m wide and RL -19.4 m LAT at the berth pocket. The berth pocket is being deepened to RL -20.0 m LAT in August 2008 as part of the X50 Expansion Project. The Port caters for vessels up to 300 m in length or 200,000 deadweight tonnes (dwt) and 50m beam. Water depths approaching the berth are 17 m below datum.

The existing shiploader is a travelling gantry with luffing boom, having a design rate maximum capacity 4,600 tonnes/ph and an average loading capacity 4,000 tonnes/ph. Rail trains have a coal-carrying capacity of up to 4,600 tonnes which is stockpiled through a bottom dump train receival system using rail-mounted stacker reclaimers, capable of handling 4,000 tonnes per hour (tph). Rail capacity to the terminal is being increased as part of Queensland Rail's Northern Missing Rail Link project. Trains of 10,000 tonnes are expected to be used to service the expanded terminal.

The other, less significant infrastructure in the Port is the Bowen wharves, located approximately 20 km away, which are still used for mooring and refuelling of the two tugs that service the coal terminal, and occasionally the mooring of other vessels that visit the Port. At least four tugs will be required to service the increased shipping volume. Additional tug facilities will be required either at the Bowen Wharves or as a new protected offshore facility at Abbot Point as part of the expansion.

2.3 Hydrology and Water Quality

The existing terminal has a drainage and sediment control system to direct most drainage from the coal operational areas first to a primary settlement pond, which then flows to a secondary settlement pond. Water collected in the primary pond is recycled and used for washdown water. The capture of water from the site will be included in the design of the X110 Infrastructure Development Project.

There are coal fines separation/collection devices and a number of sediment sumps in the drainage network to remove solids from the water. These systems will be incorporated into the expanded terminal with similar systems being installed for the new coal stockpile areas.

To the west of the existing terminal is the Abbot Point-Caley Valley Wetland. This wetland is located on privately owned cattle grazing land..

The wetland is not Ramsar listed but is included in the Directory of Important Wetlands of Australia (ANCA 1996 and updated 2001). The directory listing identifies the site as being in a good condition and comprises fresh to brackish seasonally variable water quality with a central water body, Lake Caley, being brackish. No impacts associated with the development and operation of the APCT have been observed over the wetlands due to the runoff protection and detention storage provided by the two existing settlement ponds. This indicates that current environmental management practices are effective in managing potential impacts.

The size of the wetland varies significantly between seasons. In the wet season, it can be up to 18 km long and up to 6 km wide, covering an area of approximately 5,000 ha. In the dry season, it contracts to Lake Caley and can become completely dry during drought conditions. The wetland in its current condition has been created by bunding off tidal exchange. This bund is located on private land some 8 km to the west of APCT. The wetland now has highly variable levels of salinity with extensive hypersaline and ecologically degraded areas in the lower reaches.

The boundary of the wetland is not straight and follows land contours. The proposed coal terminal development is generally adjacent to the boundary of the footprint in the wet season, but it does encroach on a small area of wetland that juts into the proposed development area. In the dry season, the development will be significantly distanced from waters.

Given the small area of wetland to be directly impacted it is unlikely that the overall function of the system will be adversely impacted. The proposed development will be undertaken such that the function of the wetland is safeguarded and alterations to the natural characteristics are prevented where possible.

2.4 Groundwater

A fresh groundwater reservoir is associated with the main dune ridge parallel to the eastern coastline, and limited in width to about 250 metres at its base. This reservoir is south of what is now the terminal complex (WBM 2006).

Peter Hollingsworth and Associates (1979) noted that Lake Caley does not receive any significant recharge from groundwater reservoirs, nor does it act as a source of recharge of groundwater reservoirs.

Current water supplies for the existing Abbot Point operations are sourced from a borefield located near Splitters Creek on the Salisbury Downs Station approximately 25 km to the south west and piped to the terminal reservoir on Bald Hill. It is understood that the Abbot Point requirements are the only significant demands on this aquifer.

The effects of the X110 Infrastructure Project construction and operation on groundwater and water use, will be explored.

2.5 Coastal Environment

2.5.1 Coastal Processes

Sediment transport in coastal environments is driven by the prevailing combination of wind, waves and tides, with storm events capable of causing large-scale change. In particular, the occurrence of tropical cyclones, which can generate extreme wind and wave conditions in the Port.

Studies undertaken by Peter Hollingsworth and Associates (1979) indicated a net south to north littoral drift of 18,000 m³/annum. Ebb and flood tides were noted as being of low velocity (maximum of 0.5 m/sec). The absence of significant infilling of the existing berth pocket since the initial dredging in 1982 combined with an absence of

coastal erosion indicates that the area has a relatively stable beach line and seabed. The relatively deep waters in the area off-shore from the berth mean that seafloor sediments may be only resuspended and transported during moderate to extreme wind and wave events.

Investigations undertaken as part of the Stage 3 (X50) EIS found little evidence of infill in the current off-shore berth, indicating that minimal transport of marine sediments was occurring at the site (WBM, 2006). This study also found no evidence of any adverse impacts on coastal processes associated with the existing off-shore infrastructure (WBM, 2006). The offshore structures are not expected to have a significant impact on the coastal processes of the region.

2.5.2 Marine Water Quality

Marine water quality at Abbot Point is generally good, due to the absence of major influences from agriculture and similar activities. The results of previous monitoring of water quality conducted at the Port show that during calm conditions the water has a constant alkaline pH, high dissolved oxygen concentrations and low turbidity (WBM, 2006). Similar coastal environments exhibit more highly variable water quality conditions, particularly in near-shore areas, during storm events.

PCQ are currently undertaking an extensive water quality monitoring program at Abbot Point and this information will be utilised to assess potential impacts on water quality from the project.

2.6 Terrestrial Ecology

2.6.1 Terrestrial Flora

Detailed flora surveys have been undertaken at the Port on a number of previous occasions (WBM, 2006; Peter Hollingsworth and Associates 1979; EPA 1999; Ecoserve 2005). Findings from these studies as well as the Remnant Regional Ecosystem Mapping are summarised in Table 1. The majority of the Regional Ecosystems (RE) are associated with the Caley Valley Wetlands, which are mostly located outside the area of development.

The majority of the area of proposed development has been previously cleared. Further assessment of potential impact on remaining vegetation will be conducted during the environmental assessment.

Table 1 Regional Ecosystems in vicinity of Abbot Port (Qld)

RE	Status	Description	Comment
11.1.2	Not of concern	Samphire forbland on marine clay plains	Caley Valley Wetlands
11.2.5	Not of concern	Corymbia-Melaleuca woodland complex of beach ridges and swales	Inland dune ridges and swales

RE	Status	Description	Comment
11.3.27	Not of concern	Freshwater wetlands	Caley Valley Wetlands
11.12.4	Not of concern	Semi-evergreen vine thicket + microphyll vine forest on igneous rock	Hill Top and Headland

A search of the EPA's Essential Habitat mapping identified no essential habitat within or adjacent to the proposed disturbance areas.

The EPBC Protected Matters database search identified the potential for the Threatened Ecological Community (TEC) Semi-evergreen vine thickets of the Brigalow Belt (North and South) and Nandewar Bioregions (listed as Endangered under the EPBC Act) to occur within the region. A 3,430 m² area of remnant of concern dominant vegetation (RE 11.2.3) that forms part of this TEC, will need to be cleared as part of the Project disturbance area (refer to Figure 3). This is a small isolated patch of remanent vegetation and its clearing is not expected to have a significant impact.

Approximately 513,740 m² of remnant not of concern vegetation is proposed to be cleared as part of the Project disturbance area (refer to Figure 3). These parcels of not of concern vegetation are highly fragmented and the clearing of this vegetation is not expected to have a significant impact.

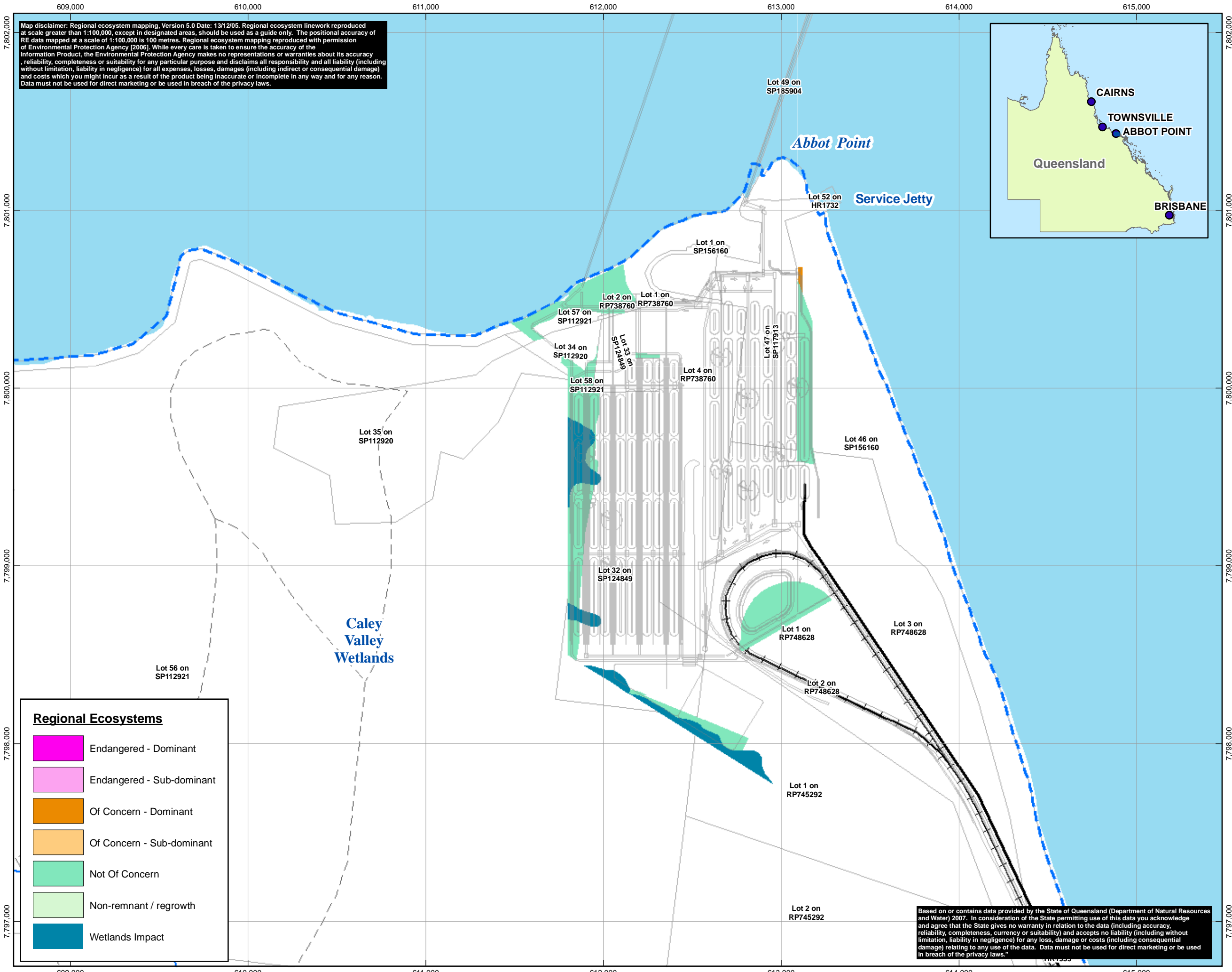
The most north-western area of vegetation to be disturbed has recently been re-mapped from RE 11.2.16 'of concern' to RE 11.12.4 'not of concern'. However, a recent PCQ commissioned study indicated this vegetation is in face RE 11.12.16 'of concern'. This will be clarified during the environmental assessment. Regardless of the classification of this vegetation, it is highly fragmented and disturbance of this vegetation is not expected to have a significant impact. This RE is not listed under the EPBC Act. The area of vegetation to be cleared in this area is 96 150 m².

A search of the EPBC Protected Matters Database (see Table 2) identified two threatened flora species as potentially occurring within the study area. Neither of these species has previously been identified in the area of proposed development.

Table 2 EPBC Threatened Flora extract for Abbot Point (Commonwealth)

Species	Status under EPBC	Habitat and comments
<i>Croton magneticus</i>	V	Previously only found at Magnetic Island and Weetalaba. Species is very unlikely to occur within the development area.
<i>Leucopogon cuspidatus</i>	V	Not listed as present in any of the REs found on the project site

Note: E = Endangered; V = Vulnerable



Map disclaimer: Regional ecosystem mapping, Version 5.0 Date: 13/12/05. Regional ecosystem linework reproduced at scale greater than 1:100,000, except in designated areas, should be used as a guide only. The positional accuracy of RE data mapped at a scale of 1:100,000 is 100 metres. Regional ecosystem mapping reproduced with permission of Environmental Protection Agency (2006). While every care is taken to ensure the accuracy of the Information Product, the Environmental Protection Agency makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason. Data must not be used for direct marketing or be used in breach of the privacy laws.

Regional Ecosystems

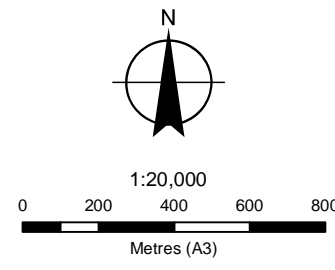
- Endangered - Dominant
- Endangered - Sub-dominant
- Of Concern - Dominant
- Of Concern - Sub-dominant
- Not Of Concern
- Non-remnant / regrowth
- Wetlands Impact



ABBOT POINT COAL TERMINAL X110 EXPANSION INFRASTRUCTURE

LEGEND

- CADASTRE
- COASTAL EDGE
- RAILWAY
- MAJOR ROAD
- SECONDARY ROAD
- MINOR ROAD
- Proposed Infrastructure Footprint



Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia 1994
Grid: Map Grid of Australia, Zone 55

Job Number | 41-20175
Revision | C
Date | 17 September 2008

REMNANT VEGETATION MAPPING FIGURE 3

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Water) 2007. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

2.6.2 Terrestrial Fauna

A Wildlife Online search was conducted which retrieved three rare and threatened species found on the site since 1980 (see Table 3). The Eastern Curlew and Black Necked Stork have both been recorded within intertidal areas adjacent to the Port. The remaining species, the Little Tern, nests on beaches, but feeds in saline wetlands including the Caley Valley wetlands. The proposed area of development will not directly effect habitat of these species.

Table 3 Wildlife Online extract for Abbot Point (EPA)

Species	NCA	Comments
Eastern Curlew <i>Numenius madagascariensis</i>	R	Habitat is beaches of all types, often associated with mangroves. More common in Northern Qld toward NT border. Nests at back of sandy beaches among mangroves, grass or Casuarinas. Several individuals were recorded feeding and roosting on intertidal sandbanks associated with Breakfast Creek and along the eastern ocean beach (Ecoserve/LAMR, 2005).
Black-necked Stork/Jabiru <i>Ephippiorhynchus asiaticus</i>	R	Core habitat is wetlands, estuarine and littoral, sometimes grassland/woodland. Less common in salt waters than in freshwater wetlands. Nests in tall vegetation, dead or alive, roosts on ground beside wetlands. Intolerant of disturbance. Three individuals were observed at a large lagoon formed on Saltwater Creek. An adult was also recorded in shallow intertidal waters along Dingo Beach (Ecoserve/LAMR, 2005).
Little Tern <i>Sterna albifrons</i>	E	Favours sheltered coastal environments, especially lagoons, estuaries, bays etc. Breeds on sand in sheltered coastal locations. Disturbance to nests is major factor in decline, as is coastal development. Other major factors include drainage works and destruction of seagrass, mangroves and saltmarsh, all of which are a major source of food. Two individuals were recorded roosting on Abbot Point eastern ocean beach. Several birds were also observed foraging over open waters near the coal conveyor trestle (Ecoserve/LAMR, 2005).

Note: *E* = Endangered; *R* = Rare; *V* = Vulnerable

A search of the EPBC Protected Matters database (see Table 4) identified seven threatened terrestrial fauna species which may potentially occur within the study area.

Table 4 EPBC Terrestrial Threatened Fauna extract for Abbot Point (Commonwealth)

Species	Status under EPBC	Habitat and comments
Red Goshawk <i>Erythrotriorchis radiatus</i>	V	<p>Bowen is the extreme southern end of its north-east Qld range. These birds have a large range and require diverse vegetation types – open woodland and forest near permanent water, especially riverine habitat/Melaleuca forest.</p> <p>Project area does include prime habitat for this bird, and as they have a low natural density and a large range. Given that no clearing will occur as part of the proposal no significant impact expected.</p>
Squatter Pigeon (southern) <i>Geophaps scripta scripta</i>	V	<p>Core habitat is open dry sclerophyll woodland with an open grassy ground layer – actively adapting to grazed pasture with exotic legumes.</p> <p>Project area does not include core habitat.</p>
Australian Painted Snipe <i>Rostratula australis</i>	E	<p>Almost always occurring in shallow freshwater habitats – unlikely to be affected by development in saline wetlands and associated eco-systems. Major threats are drainage of freshwater swamps and wetlands inland and loss of water flows in major river systems, and overgrazing. Should not be affected by this proposal.</p>
Northern Quoll <i>Dasyurus hallucatus</i>	E	<p>Bowen is not mapped as being within this quolls' probable distribution. Core habitat is broken, rocky country and open Eucalypt forest/woodland, breeding near water in hollow tree trunks.</p> <p>Project area does not include core habitat.</p>
Spectacled Flying-fox <i>Pteropus conspicillatus</i>	V	<p>A rainforest specialist, roosting in paperbark forests, mangroves and wet sclerophyll forest. Rarely more than 6 km from rainforest.</p> <p>No forage resources will be affected by this proposal however roosting grounds may lie within vine forest or RE11.2.5.</p> <p>Unlikely to be affected as proposal will not result in clearing of habitat.</p>

Species	Status under EPBC	Habitat and comments
Water Mouse or False Water Rat <i>Xeromys myoides</i>	V	A relatively unknown species mostly known from mangrove forests but also freshwater swamps and sledged lakes. Unlikely to be affected by the proposal as no mangroves or freshwater swamps/wetlands will be affected.
Yakka Skink <i>Egernia rugosa</i>	V	Secretive species found in dry open forest/woodland and rocky areas in hollow fallen timber, rock crevices and abandoned burrows. Project area does not include core habitat.

Note: *E* = Endangered; *V* = Vulnerable

Public submissions on the Stage 3 (X50) Expansion EIS (WBM, 2006) noted two further species of concern to local environmental groups. These are described in Table 5.

Table 5 EPBC Species of local concern (Commonwealth)

Species of concern	Status under EPBC	Habitat and comments
Coastal Sheathtail bat <i>(Taphozous australis)</i>	N/A <i>Vulnerable under Nature Conservation Act)</i>	Its preferred roosting sites comprise sea clefts and rocky caves but it may roost in disused buildings and other abandoned infrastructure. There are no sea clefts, rocky caves or disused infrastructure in the vicinity. Previous fauna investigations conducted at the site have not identified any evidence of this species. While it is possible that this species may periodically overfly the terminal area, the site is highly unlikely to provide a significant roosting or foraging resource.
Striped- tailed Delma <i>(Delma labialis)</i>	V	The distribution of the lizard <i>Delma labialis</i> is only known as from Magnetic Island, north of Townsville and a few localities on the mainland near Townsville. The Abbot Point area is 200 kilometres south of Townsville. It is not part of the documented distribution of the <i>Delma labialis</i> . Previous detailed fauna surveys of the terminal did not find any evidence of <i>Delma labialis</i> . Unlikely to be impacted by this project.

2.6.3 Migratory Birds

A variety of shorebirds are likely to frequent the intertidal areas within the study area, many of which are protected under the JAMBA and CAMBA agreements.

Sixteen migratory bird species were identified in the EPBC Protected Matters database search (see Table 6) as potentially occurring within the vicinity of the study area. The Black-Faced Monarch *Monarcha melanopsis* and Spectacled Monarch *Monarcha trivirgatus* were identified as potentially breeding in the area, however both species are common along the eastern seaboard and are unlikely to be significantly impacted by the project. No species were identified as having core habitat in the areas affected by this proposal.

Table 6 EPBC Migratory Species (Commonwealth)

Species	Comments
Little Tern <i>Sterna albifrons</i>	The Little Tern prefers coastal habitats and inshore waters, especially the mouths or downstream reaches of rivers. This species takes fish by aerial dives, and breeds on islands and beaches. Four individuals have previously been recorded by the Qld EPA within /adjacent to the Project area.
White-Bellied Sea-Eagle <i>Haliaeetus leucogaster</i>	The eagle is a resident from India through southeast Asia to Australia on coasts and major waterways. It feeds mainly off aquatic animals, such as fish, turtles and sea snakes, but it takes birds and mammals as well. Risks to this species are generally related to bioaccumulation of prey species or reduced foraging habitat, neither of which are likely to result as part of the proposal.
White-Throated Needletail <i>Hirundpus caudacutus</i>	They build their nests in rock crevices in cliffs or hollow trees. They never settle voluntarily on the ground and spend most of their lives in the air, living on the insects they catch in their beaks. These swifts breed in rocky hills in central Asia and southern Siberia and migrate in the winter to Australia.
Barn Swallow <i>Hirundo rustica</i>	The preferred habitat of the Barn Swallow is open country with low vegetation, such as pasture, meadows and farmland, preferably with nearby water. This swallow avoids heavily wooded or precipitous areas and densely built-up locations. Four are strongly migratory, and their wintering grounds cover much of the Southern Hemisphere as far south as central Argentina, the Cape Province of South Africa, and northern Australia.

Species	Comments
Rainbow Bee-Eater <i>Merops ornatus</i>	Rainbow Bee-Eaters are a common species and can be found during the summer in un-forested areas in most of southern Australia and Tasmania, however they are becoming increasingly rare in Suburban parks. They migrate north during the winter into northern Australia, 27 individuals have previously been recorded by the Qld EPA within or adjacent to the Project area.
Black-Faced Monarch <i>Monarcha melanopsis</i>	The Black-Faced Monarch is found along the entire eastern seaboard of Australia. It is unlikely that the proposed development will impact this species.
Spectacled Monarch <i>Monarcha trivirgatus</i>	Is found in Australia, Indonesia, and Papua New Guinea. Its natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist mountains. It is unlikely that the proposed development will impact this species.
Satin Flycatcher <i>Myiagra cyanoleuca</i>	Its habitats are temperate forests and subtropical or tropical moist lowland forests.
Great Egret <i>Ardea alba</i>	The Great Egret is partially migratory, with northern hemisphere birds moving south from areas with cold winters. It breeds in colonies in trees close to large lakes with reed beds or other extensive wetlands. The Great Egret feeds in shallow water or drier habitats, spearing fish, frogs or insects with its long, sharp bill.
Cattle Egret <i>Ardea ibis</i>	The Cattle Egret is often found in dry grassy habitats, unlike most herons which are associated with shallow water. It feeds on insects, especially grasshoppers, and is usually found with cattle and other large animals which disturb small creatures which the egrets then catch.
Australian Cotton Pygmy-Goose <i>Nettapus coromandelianus albipennis</i>	Although once found from north Queensland to the Hunter River in NSW, the Cotton Pygmy-goose is now only a rare visitor to NSW. Uncommon in Queensland. Freshwater lakes, lagoons, swamp and dams, particularly those vegetated with waterlilies and other floating and submerged aquatic vegetation. The Cotton Pygmy-Goose uses standing dead trees with hollows close to water for roosting and breeding.
Latham's Snipe <i>Gallinago hardwickii</i>	Non-breeding habitat in Australia: shallow freshwater wetlands of various kinds with bare mud or shallow water for feeding, with good nearby vegetation cover for shelter. The entire population migrates and spends the non-breeding season principally in eastern Australia.

Species	Comments
Little Curlew <i>Numenius minutus</i>	This wader bird is a strongly migratory species, wintering in Australasia. It is gregarious, forming sizeable flocks. This species feeds by probing soft mud for small invertebrates. 1 individual has previously been recorded by the Qld EPA within or adjacent to the Project area.
Painted Snipe <i>Rostratula benghalensis s. lat.</i>	This species lives in reedy swamps, and their diet consists of annelid worms and other invertebrates. Their presence in the Project area is unknown, though possible.
Fork-Tailed Swift <i>Apus pacificus</i>	This species is migratory, wintering south to Australia. They never settle voluntarily on the ground. Pacific Swifts spend most of their lives in the air, living on the insects they catch in their beaks.
Marsh Sandpiper <i>Tringa stagnatilis</i>	This species prefer to winter on inland wetlands, both fresh and brackish, sometimes in large numbers of several hundred. Few numbers are recorded to winter in Southeast Asia and Australia

The field studies by Ecoserve (2005) as presented in the Stage 3 (X50) EIS (WBM 2006) of the Abbot Point area indicated the presence of the following EPBC listed species associated with marine and coastal/intertidal areas:

- » Eastern Curlew (*Numenius madagascariensis*) (listed JAMBA/CAMBA).
- » Little Tern (*Sterna albifrons*) (Endangered under EPBC Act; listed JAMBA/CAMBA).
- » Whimbrel (*Numenius phaeopus*) (JAMBA/CAMBA).
- » Marsh Sandpiper (*Tringa stagnatilis*) (JAMBA/CAMBA).
- » Caspian Tern (*Sterna Caspia*) (JAMBA/CAMBA).
- » Common Tern (*Sterna hirundo*) (JAMBA/CAMBA).

The intertidal areas in or adjacent to the port are not likely to support an ecologically significant proportion of population for any of these species. Additionally, impacts on the intertidal area will be minimal with construction work occurring outside these habitats. Accordingly, none of the above species are likely to be significantly impacted by the proposed X110 Infrastructure Development Project.

2.6.4 Pest Management

A total of 25 weed species and one feral animal species have been recorded from within the vicinity of the development area. A number of these species may be listed under the *Land Protection (Pest and Stock Route Management) Act 2002*, which may require specific management strategies to be implemented during construction to ensure that the requirements of this Act are met. A site assessment will be required to determine the presence and extent of weed invasions within the proposed disturbance footprint.

2.7 Marine Flora and Fauna

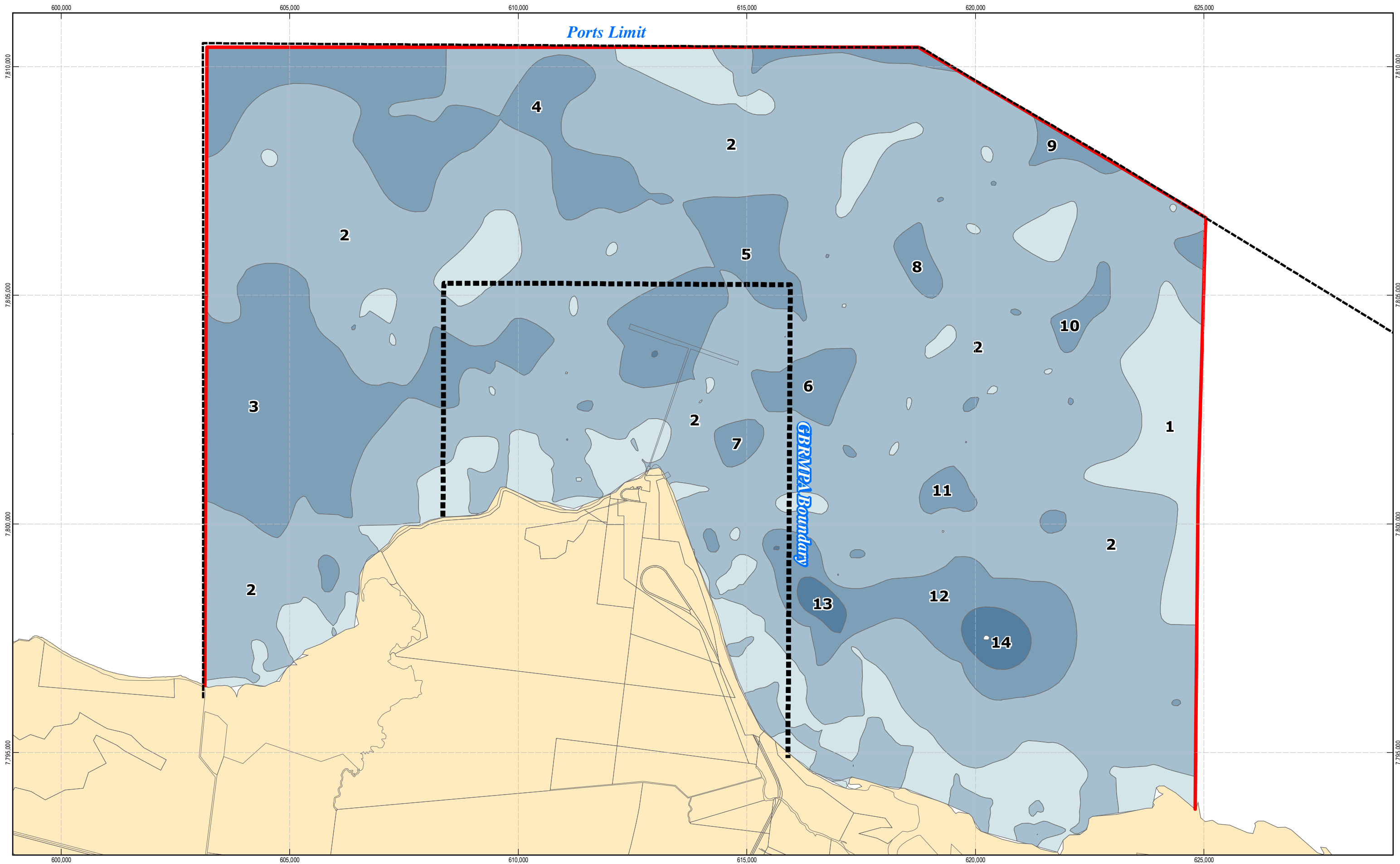
2.7.1 Coral Reefs

Clark Shoal comprises a sandy shoal area and lies 1.7 km due west of the berth and there appears to be little, if any, reefal developments in this area. Recent baseline environmental surveys have shown that there are no significant coral communities in the offshore works area (GHD 2008).

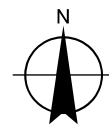
The closest fringing rock reefs occur near the rocky headlands of Cape Edgecumbe and Dalrymple Point and also encircle nearby islands, particularly Stone Island. These support up to 50 % cover of hard and soft corals, with the closest of these located approximately 15.5 km southeast of the berth. Further south in Edgecumbe Bay, a narrow chain of isolated near-shore patch reefs occur in water depths of 2-4 m and support a high coverage of macroalgae and soft corals.

A recent survey of benthic macroinvertebrate communities at the Port of Abbot Point identified 14 benthic macroinvertebrate regions however no coral areas of high environmental value were observed within the Project Area (GHD 2008). Of the 300 sites investigated, coral was determined to be present at 41 sites but in very low densities (<10% cover) with only two sites classified as medium/low density.

Impacts on corals and benthic communities from the offshore works are not likely to be significant as construction methods entail pile driving and basic structural works.



1:75,000
 0 1 2
 Kilometres @ A3
 Map Projection: Transverse Mercator
 Horizontal Datum: Geocentric Datum of Australia 1994
 Grid: Map Grid of Australia, Zone 55



Legend

- PORTS LIMIT (PCQ, 2008)
- GBRMPA BOUNDARY (PCQ, 2008)
- SURVEY LIMIT
- 3** REGION NUMBER

- CADASTRE
- EASEMENT

- MACROINVERTEBRATE DENSITY**
- OPEN SUBSTRATE (<1% COVER)
 - LOW DENSITY (1-10% COVER)
 - LOW/MEDIUM DENSITY (10-20% COVER)
 - MEDIUM DENSITY (20-80% COVER)



Ports Corporation of Queensland Limited
 Abbot Point X110 Infrastructure Development Project
**DISTRIBUTION OF BENTHIC
 MACROINVERTEBRATE REGIONS**

Job Number | 41-20175
 Revision | A
 Date | 20 June 2008

Figure 4

2.7.2 Marine Plants

Seagrass is found throughout the Port limits at varying densities, previous surveys undertaken by Department of Primary Industries and Fisheries (DPI&F) (Rasheed *et al.* 2005) have noted that seagrass distribution and abundance at Abbot Point is highly seasonal.

In the 2005 survey, a total of eight species of seagrass were identified, *Halodule uninervis*, *Halophila ovalis* and *Halophila spinulosa* were the most widespread and dominant species within seagrass meadows. All of the species identified are considered to be colonising species, typical of environs subject to wide variations in water quality. *Halodule* and *Halophila spp.* are a preferred food resource for foraging dugong. However, these beds have low biomass and are not recognised as important dugong feeding areas, but may form temporary dugong foraging areas as they move between important dugong habitats to the north and south of the study area.

Very low density (< 1 %) algae exists in the area of proposed berth construction (Rasheed *et al.* 2005). These algae are unlikely to be present in the areas where berth structures are to be development as dredging of these berths is proposed to be undertaken in 2009. Low to moderate density (5-20%) algae is present in approximately half of the area where the jetty structure will be built (Rasheed *et al.* 2005). Small areas of this algae will be impacted during construction.

Impacts on marine plants from the offshore works are not likely to be significant as construction methods entail pile driving and basic structural works.

2.7.3 Mangroves

A number of mangrove species are present both east and west of the off-shore jetty, at the mouth of Euri Creek and Don River Estuary and the Mt Stuart Creek. Both these areas are several kilometres from the proposed development area.

2.7.4 Marine Turtles

Limited information is available about marine turtle nesting and habitat utilisation within the Port limits. Species that have been recorded as foraging and nesting in this area are populations that are well-represented in other regional areas. In 2003 Bell conducted a baseline turtle foraging and nesting study that identified the Port area as being a nesting habitat for Flatback (*Natator depressus*) and Green (*Chelonia mydas*) turtles and foraging habitat for Green and Loggerhead (*Caretta caretta*) turtles. The survey identified this area as supporting a notable number of foraging juvenile and sub-adult turtles.

Two genetic stocks of Green turtles exist along the Queensland coast. The northern genetic stock has a significant breeding habitat at Raine Island, in the far northern Great Barrier Reef and the southern green turtle population has the majority of their nesting habitat within the Capricorn Bunker Group (Limpus *et al.* 1992). The green turtles identified within the Port limits are generally believed to be associated with the

southern genetic stock (Bell, 2003) and as such it is unlikely that the Port represents a significant nesting area.

The flatback turtle has major breeding sites in the Cape York region and also nesting populations in southern beaches near Gladstone, also suggesting that the Port limits are not a significant breeding site for this species.

The flatback turtle has major breeding sites in the Cape York region and also nesting populations in southern beaches near Gladstone, also suggesting that the Port limits are not a significant breeding site for this species.

In Australia, marine turtles are listed in the *EPBC Act* and in the Queensland *Nature Conservation Act 1992*. Table 7 provides a summary of the EPBC status of marine turtles.

Table 7 Marine Turtles Potentially Occurring in Study Area

Species	EPBC Status	Comments
Green turtle <i>Chelonia mydas</i>	V/M	Recorded nesting sites within the Port limits. Observed foraging and mating within Port limits.
Loggerhead turtle <i>Caretta caretta</i>	E/M	Observed foraging and mating within Port limits.
Leatherback turtle <i>Dermochelys coriacea</i>	V/M	This species is unlikely to inhabit the Project area. It generally feeds in pelagic waters and rarely nests along the Australian coastline. Not previously observed within the Port.
Flatback turtle <i>Natator depressus</i>	V/M	Recorded nesting sites within the Port limits.
Hawksbill turtle <i>Eretmochelys imbricata</i>	V/M	Not mapped as nesting below Lockhart River in northern Cape York. Main feeding grounds tidal and sub-tidal reef. Observed foraging within Port limits.
Olive Ridley turtle <i>Lepidochelys olivacea</i>	E/M	Not recorded as nesting outside of north west Cape York Peninsula and NT. Observed foraging within Port limits.

Of the six species of marine turtles occurring in Australian waters, five have been observed nesting or foraging within the Port limits. The Hawksbill (*Eretmochelys imbricata*), and Olive Ridley turtle (*Lepidochelys olivacea*) are listed as vulnerable and endangered respectively under State and Federal legislature, have anecdotally been observed foraging in the area (Bell pers comm.).

The principle impacts of offshore construction on marine turtles include disturbance from vessels and underwater noise from construction and indirect impacts associated with the loss of habitat and onshore lighting. Marine turtles are mobile and can

generally avoid impacted areas for the duration of offshore construction activities. Impacts on habitat from offshore construction activities are considered to be negligible and lighting during construction and operation can be managed to minimise any potential impacts.

2.7.5 Dugong

The works proposed are in an area that has been used for shipping for over 20 years with no impacts to dugong.

In the region, the Dugong Protection Areas (as declared under the Queensland *Nature Conservation Act 1992* and the Queensland *Fisheries Act 1994*) are at Upstart Bay (Upstart Bay Dugong Sanctuary – Zone A – located approximately 20 km to the north west of Abbot Point) and Edgumbe Bay (Edgumbe Bay Dugong Sanctuary – Type B, approximately 25 km to the south). Both areas are well distanced from the development area.

Dugongs occur within the Port limits and they are known to migrate along the Queensland coast up to hundreds of kilometres between feeding sites. Aerial surveys of dugong populations along the Queensland coast have been undertaken since the mid 1980's. Population estimates are determined over large spatial area rather than local areas as their movements are highly variable and influenced by numerous natural and anthropogenic factors. Table 8 presents a summary of dugong population estimates for the areas of Upstart Bay, Abbot Point and south to Edgumbe Bay. These data suggest that hundreds of dugong utilise the seagrass habitats within these areas.

Table 8 Dugong survey population estimates (1986 – 2005)

Survey Region	1987	1992	1999	2005
Edgumbe Bay	173 (77)	40 (24)	445 (236)	234 (79)
Abbot Point	312 (122)	NS	203 (90)	NS
Upstart Bay	171 (87)	91 (46)	NS	495 (175)

NS – Not Surveyed; Brackets () indicate Standard Error (SE). Source: Marsh and Lawler (2006)

Australia supports the global stronghold for the dugong (Marsh and Lawler, 2000); thereby providing a significant obligation to manage their conservation appropriately. Dugong feed almost exclusively on seagrass species *Halophila ovalis*, *Halophila spinulosa* and *Halodule uninervis* (Lanyon and Marsh, 1995, Sheppard *et al.* 2006). Rasheed *et al* (2005) identified that seagrass beds in the port have low biomass and are not recognised as important dugong feeding areas. They may, however, form temporary dugong foraging areas as they move between important dugong habitats to the north and south of the study area.

Potential impacts to dugong include localised and temporary displacement due to presence of construction vessels and impact from underwater construction noise (pile driving). Potential effects of the elevated man-made background noise levels include:

- » limiting the detection of natural sounds;
- » disturbing their normal behaviour resulting in possible displacement from areas; and
- » causing temporary or permanent reductions in hearing sensitivity.

Very little research has been undertaken to investigate the sensitivity of dugongs to noise, though there are many anecdotal reports of dugongs avoiding areas with high boat traffic. Initial research results into the auditory physiology and hearing sensitivity have highlighted some significant anatomical differences between manatees and dugongs, as well as between sirenians and other marine mammals (URS 2003, *cited in* URS 2004). The sensitive parts of their auditory range appears to be restricted to the middle frequencies (1 – 18 kHz) (URS 2004).

An animal's sensitivity to sounds varies with frequency, and its response to a sound is expected to depend strongly on the presence and levels of sound in the frequency band or range of frequencies to which it is sensitive (Richardson *et al.* 1995). Virtually all marine mammals are potentially impacted by sound sources with a frequency of 500 Hz or higher, but relatively few species are likely to be impacted by lower frequencies.

When considering the possible impacts of underwater noise, in general McCauley & Duncan (2001) suggest that it is necessary to recognise that:

- » different effects may be elicited from an approaching noise source as compared to a stationary or departing noise source; and
- » the scale of the noise disturbance needs to be considered (i.e. is it frequent, infrequent or continual over short and long time scales?).

In the recent revision documents for the DEH Cetacean Guidelines on the Application of the EPBC Act to Interactions between Off-shore Seismic Operations and Larger Cetaceans (URS 2004), a detailed risk assessment was undertaken for the impacts of various sources of noise on marine mammals occurring within Australian waters. The risk assessment was undertaken for those activities identified as having potentially significant impacts on marine mammals from an extensive literature review. No risk assessment was undertaken for pile driving or similar sorts of activities, demonstrating that this activity is considered not to pose a significant threat to marine mammals.

Similarly, the authors of the DEH Guideline review did not consider it necessary to develop particular guidelines for management of impacts from marine construction activities (URS 2004).

2.7.6 Marine Mammals

The humpback (*Megaptera novaeangliae*) and blue (*Balaenoptera musculus*) whale occur in deep offshore waters. Dolphins have also been known to be present in the port area.

Marine mammals are highly mobile and can generally avoid impacted areas for the duration of construction activities. Considering the inshore location of the construction

activities, it is considered unlikely that works will impact on the migratory patterns of whales as they tend to migrate further offshore and will avoid construction areas.

The primary potential impact of the offshore construction on marine mammals is considered to be the generation of underwater noise and vibration. The types of effects underwater noise may produce on marine mammals range from severe to no effect (McCauley 1994). There has been no documented evidence of any lethal effects for most whale species resulting from exposure to noise. Several studies (Malme *et al.* 1983; 1984; 1986; 1988, *cited in* McCauley 1994) have shown that some whales begin to avoid sounds at exposure levels of 110 dB received acoustic intensity, and more than 80% of the whales investigated including humpbacks, showed avoidance to sounds of 130 dB received acoustic intensity. These sound events were continuous source events. Therefore, it is likely that whales will avoid areas where the construction vessels are operating. However, as shipping occurs continuously within the port area, producing an acoustic intensity greater than 110 dB it is unlikely that presence of construction vessels will result in a specific change to whale behaviour within the vicinity of the Port.

In the recent revision documents for the DEH Cetacean Guidelines on the Application of the EPBC Act to Interactions between Off-shore Seismic Operations and Larger Cetaceans (URS 2004), a detailed risk assessment was undertaken for the impacts of various sources of noise on marine mammals occurring within Australian waters. The risk assessment was undertaken for those activities identified as having potentially significant impacts on marine mammals from an extensive literature review. No risk assessment was undertaken for pile driving or similar sorts of activities, demonstrating that this activity is considered not to pose a significant threat to marine mammals.

Similarly, the authors of the DEH Guideline review did not consider it necessary to develop particular guidelines for management of impacts from marine construction activities (URS 2004).

2.8 World Heritage

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

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

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

The Port of Abbott Point and surrounds while forming part of the world heritage area are not considered to be overly unique within the WHA. The area has been an operating port since 1984. The X110 Infrastructure Development Project will be limited to within the port area and will not result in major changes to land use in the area. Significant impacts on the values of the WHA are not expected.

2.9 Air Quality

As part of the recent EIS for the X50 Expansion (WBM, 2006), air quality at the Port was investigated. This study found that off-site air emissions are well within EPA guidelines. The impact of air emissions from the Port are further mitigated due to the distance to the nearest sensitive receivers.

Doubling the size of the terminal will increase coal dust emissions. The potential for air quality impacts from the project will be investigated during the environmental assessment for the project. Dust controls will be recommended to ensure local air quality remains at acceptable levels.

2.10 Greenhouse Gas Emissions

The extra coal handling equipment proposed for the X110 Infrastructure Development Project will result in a significant increase in electricity usage on-site. The greenhouse gas emissions from the additional equipment will be assessed as part of the environmental assessment and measures to reduce emissions recommended.

The impacts of climate change will be assessed and are covered in Section 2.2.2 under topography.

2.11 Noise and Vibration

Existing noise sources at Abbot Point comprise the on-shore coal handling facilities (including coal train movement and unloading) and off-shore activities including the conveyors and shiploading. Current expansion construction activities are also contributing minor noise emissions from plant and equipment.

The area surrounding the terminal is largely used for grazing. The closest residential area is in Bowen, 25 kilometres to the south. The nearest single residence is located approximately 5 km from the site.

Noise can occur as a result of construction and operation activities and emissions from both stationary and transitory sources. The nature of noise emitted varies depending upon the source. Potential noise sources for the Project include the following:

- » Ship engines;
- » Coal handling activities including the loading and unloading of vessels;
- » Pile driving for the construction of jetty and wharf structures; and
- » General vehicular traffic.

The impact these emissions will have on nearby sensitive receptors will depend upon the extent to which these emissions exceed background noise levels, which vary with the time of day. The impact of noise emissions from the Port is mitigated due to the distance to the nearest sensitive receivers.

The potential for noise and vibration impacts from the project will be investigated during the environmental assessment for the project.

2.12 Cultural Heritage

Abbot Point is the traditional land of the Juru people. PCQ completed an indigenous and European cultural heritage assessment of port lands in 1999 (Barker 1999). Two sites of significant cultural heritage value were identified. The first, located along the Abbot Beach dunes, comprises an extensive range of archaeological remains, with the greatest concentration of artefacts being between 1.8 and 3.5 km from the sea wall at Abbot Beach (PCQ, 2005). The second site consists of intermittent concentrations of shell middens material and sparsely located artefacts located within the mangrove ridges of Lot 47 (PCQ, 2005).

PCQ, in consultation with Traditional Owners, manages these sites through implementation of the Port of Abbot Point Environmental Management Plan. Development is not planned near these sites for this project.

No Native Title claims are current over the area of proposed development. The majority of the on-shore area to be developed is held under freehold title and therefore not subject to Native Title. Offshore areas are held under a perpetual lease from the Queensland Government.

PCQ will consult with Traditional Owners of the area regarding the project and develop management strategies to address any issues of concern.

2.13 Housing

An accommodation camp is expected to be constructed at the township of Merinda, north of Bowen, to house workers for the X30 to X50 expansion of APCT. It is expected that this accommodation camp will be retained and expanded if required to house single workers for the X110 Expansion. Benefits from these workers being based close to Bowen will flow into Bowen shops and businesses. Provision of the accommodation camp will ensure that housing for itinerant single workers for fruit and vegetable picking is not significantly affected.

Accommodation houses in Bowen however will benefit from married workers and families seeking accommodation in Bowen itself.

2.14 Social and Economic Environment

Bowen is the closest settlement to the Port of Abbot Point (25 km). Bowen has an industrial focus as well as tourism, environmental and agricultural. As of June 2006, Bowen had an estimated resident population of 13,142 (PIFU, 2008). Projections by the Queensland Government (PIFU 2008) indicate that the expected population in



2011 of the Bowen Shire will be between 12,800 and 13,500 people. The median age of Bowen Shire's population is projected to increase by three years from a median age of 41 years in 2006 to 44 years in 2026.

The Port of Abbot Point is a key asset to the communities that surround it. In 2006/2007, there were 149 ship visits to the Port of Abbot Point and 11.2 million tonnes of coal was exported. An economic impact study commissioned by PCQ in 2008 found that the Port accounted for an estimated 189 full-time equivalent jobs and that a further 336 flow-on jobs were generated by Port-related activities. In total, these 525 jobs earned an estimated \$28 million in household income during the 2006/2007 financial year.

Based on these results, the expansion from 50 Mtpa to 110 Mtpa would be expected to generate in the order of 2,800 full-time equivalent jobs (direct and indirect) and add around \$149 million in household income.



3. Conclusion

The proposed X110 Infrastructure Development Project will increase the capacity of the APCT from 50 Mtpa to 110 Mtpa. It is expected that any impacts of this project on the natural, social or built environment can be minimised through appropriate mitigation measures specified in an EMP for the construction and operating phases of the project.

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

4. References

- Australian Nature Conservation Agency (ANCA). 1996 and 2001. *Directory of Important Wetlands in Australia*. Australian Nature Conservation Agency: Commonwealth Government Canberra.
- Barker, B. 1999. *A Cultural Heritage Assessment of Ports Corporation (Queensland) Holdings at Abbot Point / Bowen Region (Bowen Shire)*. EPA Permit No. N 38/EIS/99.
- Bell, I. 2003. *Turtles Population Dynamics in the Hay Point, Abbot Point and Lucinda Port Areas*. Unpublished Report to Ports Corporation of Queensland.
- Department of the Environment, Water, Heritage and the Arts (DEWHA). 2008 Australian Natural Resource Atlas, <http://www.anra.gov.au/topics/vegetation/assessment/qld/ibra-bbn-imp-wetlands.html> (accessed 16 May 2008).
- Ecoserve. 2005. *Abbot Point and Caley Valley Wetlands Dry Season Flora and Fauna Surveys*. Report prepared for Collinsville Coal Company.
- Environmental Protection Agency (EPA). 1999. *Report on Abbot Point Field Survey September 1999*. (unpublished).
- GHD Pty Ltd. 2008. *Baseline Environment Monitoring for Port of Abbot Point: Benthic Baseline Assessment Report*. GHD:Brisbane.
- Lanyon, JM. and Marsh, H. 1995. 'Temporal changes of some tropical intertidal seagrasses in North Queensland'. *Aquatic Botany* 49: 217 -237.
- Limpus, C.J., Miller, J.D., Parmenter, C.J., Reimer, D., McLachlan, M. and Webb, r. 1992. 'Migration of green (*Chelonia mydas*) and loggerhead (*Caretta caretta*) turtles to and from eastern Australian rookeries'. *Wildlife Research*. 19,347-58.
- McCauley, R.D. 1994. 'Environmental implications of off-shore oil and gas development in Australia – Seismic Surveys'. pp 19 – 122 in J.M. Swan, J.M. Neff and P.C. Young (1994). *Environmental implications of off-shore oil and gas development in Australia*.
- McCauley, R. D. and A. Duncan 2001. *Report on Marine Acoustic effects study, blue whale feeding aggregations, Otway Basin, Bass Strait*. Victoria Ecos Consulting 01-01238 1-46.
- Marsh, H. and Lawler, IR. 2000. *Dugong distribution and abundance in the northern Great Barrier Reef Marine Park - November 2000*. Report for the Great Barrier Reef Marine Park Authority. Townsville. (Public access)
- Marsh, H, and Lawler, I.R. 2006 *Dugong distribution and abundance on the urban coast of Queensland: a basis for management*. Marine and Tropical Science Research Facility – Unpublished Report.



Peter Hollingsworth and Associates. 1979 and 1981. *Impact Assessment Study – Export Coal Proposal*. Prepared for the Collinsville Coal Company. 1979 and Addendum to Impact Assessment Study 1981.

Ports Corporation of Queensland (PCQ). 2005. *Abbot Point Approved Environmental Management Plan (EMP)*. PCQ: Brisbane.

Ports Corporation of Queensland (PCQ). 2008. *Economic Impact Study*. PCQ: Brisbane..

PIFU. 2008. *Bowen Shire Population and Housing Fact Sheet* Queensland Department of Local Government, Planning, Sport and Recreation.

Rasheed, M.A., Thomas, R. and McKenna, S.A. 2005. *Port of Abbot Point seagrass, algae and benthic macro-invertebrate community survey – March 2005*. DPI&F Information Series Q105044 (DPI&F Cairns), 27 pp.

Richardson, W. J., C. R. J. Greene, C. I. Malme and D. H. Thomson. 1995. *Marine mammals and noise*. Academic Press: San Diego.

Sheppard, JK., Lawler, IR., and Marsh, H. 2006. 'Seagrass as pasture for seacows: Landscape-level dugong habitat evaluation'. *Estuarine, Coastal and Shelf Science* 71, Issues 1-2, 117-132.

WBM. 2006. *Abbot Point Coal Terminal, Stage 3 Expansion, Environmental Impact Statement March 2006*. WBM: Brisbane.

URS. 2004. *The review: Draft Review of DEH Guidelines on the Application of the EPBC Act to Interactions between Off-shore Seismic Operations and Larger Cetaceans*.



Appendix A
PCQ Environmental Policy



**Ports
Corporation**
of Queensland

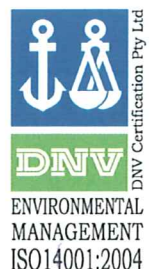
ENVIRONMENT POLICY

Ports Corporation of Queensland is committed to the environmentally responsible management of its ports and the provision (planning and construction) and maintenance of port infrastructure, with minimum adverse impact on the natural and social environment.

Our environmental policy is to:

- Comply with all relevant environmental legislation, government policies, industry standards and codes of practice, whilst aiming for best industry practice in all aspects of our operations.
- Monitor the impact on the natural and social environment surrounding our ports.
- Minimise the environmental impacts of our port operations and developments and seek continual improvement in the environmental performance of all of our ports. PCQ is committed to the prevention of pollution of the environment.
- Use resources efficiently and minimise wastes.
- Measure and reduce greenhouse gas production.
- Strive for usage and development of PCQ ports to be consistent with the concept of ecologically sustainable development.
- Aim to enhance our reputation as a business and port authority through our high environmental standards and performance.
- Develop and maintain effective Environmental Management Plans and Emergency Response Plans to protect the environment under our control.
- Communicate openly and honestly on the environmental performance of our ports to key stakeholders, government and the general community.
- Work cooperatively with other organisations, or provide appropriate support, where it will help achieve the environmental objectives of PCQ. Share any outcomes from PCQ's own research work.
- Hold all employees accountable for environmental performance in their area so that they carry out their duties in accordance with legislation and company requirements.
- Require contractors engaged by PCQ to meet PCQ's environmental standards and requirements and to comply with relevant legislation.
- Encourage port tenants/lessees to meet PCQ's environmental standards and requirements.

Brad Fish
Chief Executive Officer
25 March 2008





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1	J Keane	J Keane		J Keane		04/08/2008
2	J Lee R Robertson	J Lee	JL	J Lee	JL	19/08/2008